



Technical Assistance Consultant's Report

Project Number: 53145-001
March 2021

INDIA: Strengthening Capacity to Design and Implement Water and Rural Infrastructure Facility

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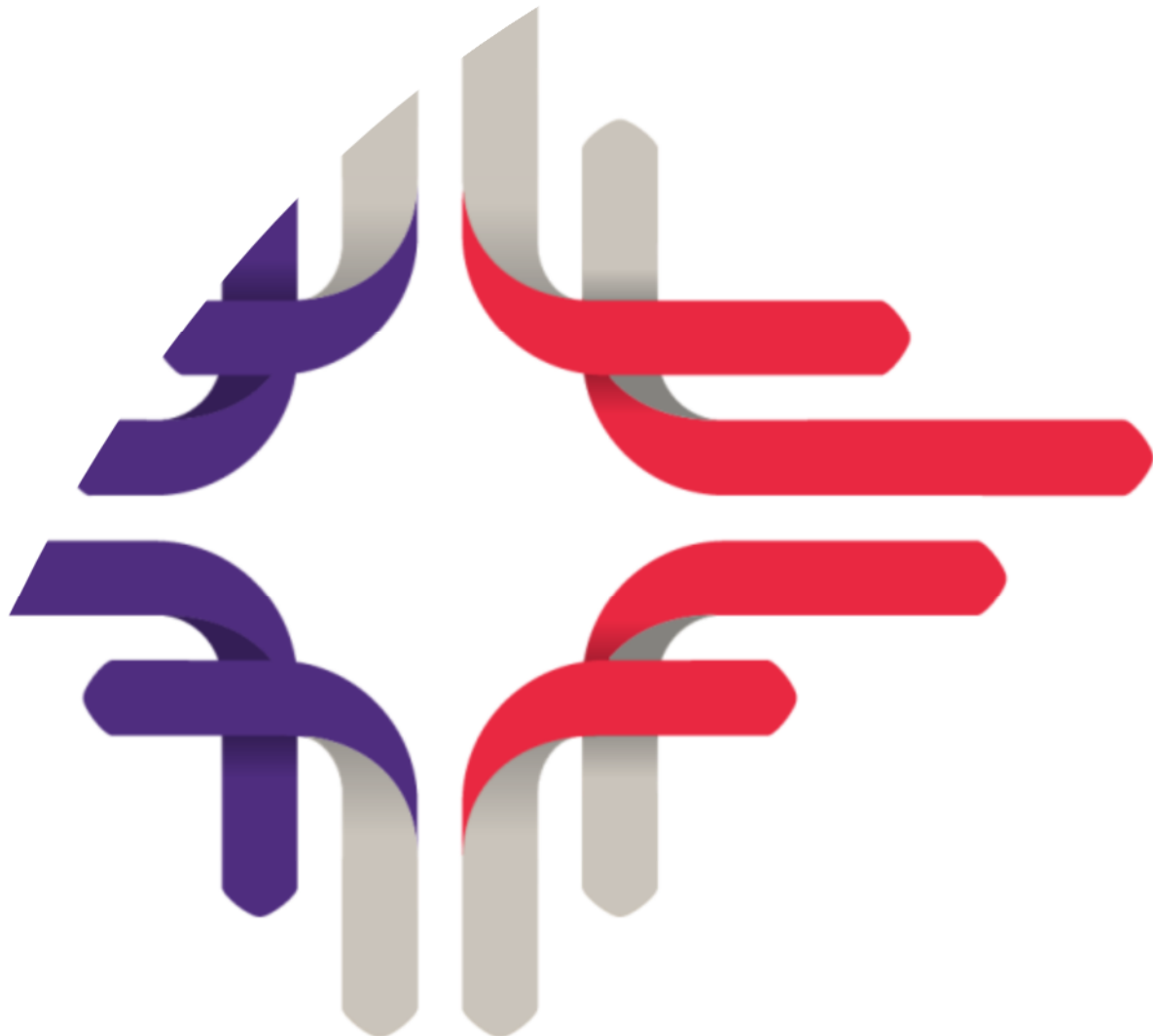
Asian Development Bank

Maharashtra Agribusiness Network Project (MAGNET)

Final Report – Version 1

CONTRACT No.: 154635-S5379

March 2021



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1. Introduction

A. TA Context

TA facility TA-9738 IND is about strengthening capacity to Design and Implement Water and Rural Infrastructure. The proposed transaction technical assistance (TA) facility bridges capability gaps and enables the application of best practices to ADB funded projects. Two of the seven operational priorities of the Asian Development Bank (ADB) Strategy 2030 are (i) promoting rural development and food security; and (ii) tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability¹. ADB's investments in these areas have generated jobs, raised rural incomes, and reduced poverty².

The TA facility has been supporting project preparation, including capacity-building, undertaking due diligence, and increasing project readiness for ensuing investment projects, including those identified in the country operations business plan for India, 2019–2021³

The TA facility approach in the past projects has been to (i) enhance project preparation efficiency and improve readiness for projects that have limited processing resources; (ii) reap important synergies from working with the same team of consultants, including reducing lengthy tendering processes and improving knowledge transfer; and (iii) strengthen coordination.

Output 1: Well-designed agriculture, rural development and water resource project proposals and project readiness achieved. Technical expertise will be provided to support preparation of selected investment projects for potential ADB financing. This will include necessary due diligences involving assessments of

- (i) Technical suitability
- (ii) Economic and financial sustainability
- (iii) Capacity and institutional issues
- (iv) Environmental and social safeguards
- (v) Identification of measures to strengthen project implementation capacity of projects.

Assistance to meet project readiness conditions will also be provided, including recruitment of project implementation consultants and technical inputs for loan processing.

Detailed activities will include support for (i) feasibility studies required for the ensuing investment; (ii) economic analysis; (iii) financial management assessment, financial evaluation and financial analysis; (iv) gender analysis, collection of baseline data, and gender action plans; (v) risk assessment and management plans; (vi) safeguards documents on environment, involuntary resettlement, and indigenous peoples; (vii) climate risk and vulnerability assessments and adaptation measures; (viii) sector assessment; (ix) preparation of loan processing documents; (x) project implementation consultant recruitment; (xi) preparation of bidding documents and assisting with advance procurement activities; and (xii) initiating resettlement plan implementation.

Output 2: Project implementation and management capacity of executing agency improved. Technical expertise and capacity building will be provided to select executing agencies in India to enhance water and rural investment sustainability. Support will be provided through consultants to ongoing or ensuing water and rural investments and programs within the core TA facility priority areas. The focus will be on enhancing procurement, construction and contract management, fiduciary requirements and safeguard processes, gender mainstreaming,

¹ ADB. July 2018. Strategy 2030 – Achieving a Prosperous, Inclusive, Resilient and Sustainable Asia and the Pacific. Manila.

² ADB. 2010. Evaluation Study: Sector Synthesis - Performance of ADB Assistance to Agriculture and Natural Resources: Evidence from Post-Completion Evaluations. Manila.

³ ADB. August 2018. Country Operation Business Plan: India, 2019–2021. Manila.

and monitoring capacity. The TA facility will utilize the same consultants across multiple projects to allow knowledge transfer of best practices. Support will also include workshops and on-the-job training to enhance the capacity of State line departments.

The TA facility will be implemented over 3 years, from June 2019 to May 2022. Disbursements under the TA facility will be in accordance with ADB's Technical Assistance Disbursement Handbook (2010, as amended from time to time).

The TA facility will support project preparation, including capacity-building, undertaking due diligence, and increasing project readiness for ensuing investment projects, including those identified in the country operations business plan for India, 2019–2021. It will initially support:

- i. Ara Canal Water Productivity Improvement Project (formerly Bihar Irrigation Project)
- ii. Himachal Pradesh Subtropical Horticulture and Irrigation Value-Addition Project
- iii. Capacity Development for Irrigation Management and due diligence for new projects including Upper Bhadra Project and Lower Suktel Irrigation Project
- iv. Assam Flood and Riverbank Erosion Protection Project (follow-on loan 2020)
- v. Maharashtra Sustainable Coastal Protection and Management
- vi. Maharashtra Rural Connectivity Improvement Project; and
- vii. Preparation of Maharashtra Agribusiness Network Project (MAGNET)

There are few ongoing projects that will also be supported by this TA facility. The list of these ongoing projects are as follows:

- i. Assam Integrated Flood and River Erosion Risk Management and Investment Program
- ii. Madhya Pradesh Irrigation Efficiency Improvement Project
- iii. Climate adaptation in Vennar Subbasin in Cauvery Delta Project; and
- iv. Karnataka Integrated and Sustainable Water Resources Management Investment Program

B. Objectives of MAGNET

The project aim to support FPOs and value chain players by improving a network of post-harvest marketing and value chains focusing on the selected horticulture crops.

Core Objectives

- Addressing remaining poverty and reducing inequalities
- Accelerating progress in gender equality
- Tackling climate change, building climate and disaster resilience and enhancing environmental sustainability
- Promoting rural development and food security
- Strengthening governance and institutional capacity

Core Outputs

- Output 1: Institutional capacities of agribusiness institutions and farmer producer organizations strengthened
- Output 2: Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened

- Output 3: Agriculture value chain infrastructure improved and operational

Core Outcomes

These outputs are designed and expected to result in the following outcome: Maharashtra's horticultural production values and FPOs' profits increased. The project will be aligned with the following impacts: achieve average agriculture sector growth rate of 5 percent, promote agriculture produce export, and establish fair, competitive and accessible agriculture markets.

C. Background of the Project

Under project Selection 154635: TA-9738 IND: Strengthening Capacity to Design and Implement Water and Rural Infrastructure Facility, Maharashtra Agribusiness Network Project (53145-001) has been taken up for the borrower Ministry of Finance. The project targets to support FPOs by improving a network of post-harvest marketing and value chains focusing on the horticulture crops identified in the pre-feasibility study.

ADB has engaged Grant Thornton, a consulting firm in accordance with ADB Procurement Policy and Procurement Regulations for ADB Borrowers (2017, as amended from time to time) and its associated project administration instructions and staff instructions. The consulting firm is expected help the government and ADB in the preparation of a loan project to be approved in 2020.

The consulting team will refine the project concept and design described in the concept paper by incorporating international best practices and innovative technologies fit to the local context in Maharashtra, India. The team will conduct technical, safeguards, economic, financial, and other due diligence to meet governments and ADB's project processing requirements. As the main beneficiaries (farmers' organizations and agriculture value chain operators) are in the private sector, sufficient involvement of and consultation with private stakeholders will be critically important to make the project design relevant to the local context. The consultants should also learn lessons and incorporate the inputs from ADB's past projects (e.g. MFF 0045-IND, Grant 9147-IND), pre-feasibility study ("mapping study"), and ongoing technical assistances (e.g. TA 9057-REG).

D. Our Understanding of MAGNET

The proposed Asian Development Bank (ADB) Loan project titled Maharashtra Agribusiness Network Project (MAGNET) has the objective of assisting in doubling farmers' income by building their capacities through farmer collectives, facilitating access to finance to players along the Agriculture value chain and rehabilitate post-harvest facilities to be used by farmers. There is a specific focus on certain horticulture crops including banana, custard apple, green and red chili, guava, okra, orange, pomegranate, sapota, strawberry, and sweet lime. These crops have a potential to improve income of huge number of farmers across the state.

The project aims to achieve three specific 'Outputs':

Output 1	Output 2	Output 3
• Institutional capacities of agribusiness institutions and farmer producer organizations strengthened	• Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened	• Agriculture value chain infrastructure improved and operational

As the Transaction Technical Assistance (TRTA) Consultants, and taking inspiration from ADB's Project Concept Paper, we are playing a key role in assisting the Bank to prepare the overall loan project. This would include refining the overall concept paper keeping in mind the core problem to be addressed and in turn contributing to the

improvement of horticulture production in the state of Maharashtra. We have deployed a team of highly experienced personnel that shall play an overarching design and development role across all 3 project components/ solutions identified by ADB, which are also presented as the 3 outputs above. This section shall detail out our overall approach towards designing the loan project keeping in mind core aspects namely technical and Value Chain oriented support, Financial Design, Safeguarding (Environmental and Social), ICT solutions and overall Capacity Building. A major key to success in most development projects has been to structure and adopt a multi-stakeholder approach provided the project hosts multiple facets. Our approach, detailed below, shall provide a framework that adopts such stakeholder-based strategy.

Multiple Stakeholder Environment

Various initiatives of the State as well as Central Government through specific entities such as Maharashtra State Agriculture Marketing Board (MASMB), Department of Agriculture and Department of Marketing, APEDA, SFAC, NABARD etc. are in place to promote farmers easy access to market through common facilities, access to finance and technology and various other support schemes.

Multiple other stakeholders including the private sector, impact investors, philanthropic organizations, international donor agencies and Corporate Social Responsibility (CSR) wings of various organizations also invest in initiatives which have similar developmental goals and objectives. It is hence crucial to integrate MAGNET interventions to these relevant initiatives driven by other stakeholders to bring about a multiplier effect on the proposed outcomes.

MSAMB is the nodal agency in the state of Maharashtra which is responsible for post-harvest improvement in the value chain of multiple crops in the state. With this understanding of the importance of horticulture crops in improving the livelihoods of large number of farmers and enhancing the potential of agribusiness in the state, MSAMB and ADB conceptualized the MAGNET project. MSAMB is the executing agency for this project and hence it is essential that the goals and objectives of MAGNET and MSAMB are perfectly aligned. Important Goals and Objectives (among others) of MSAMB are as under:

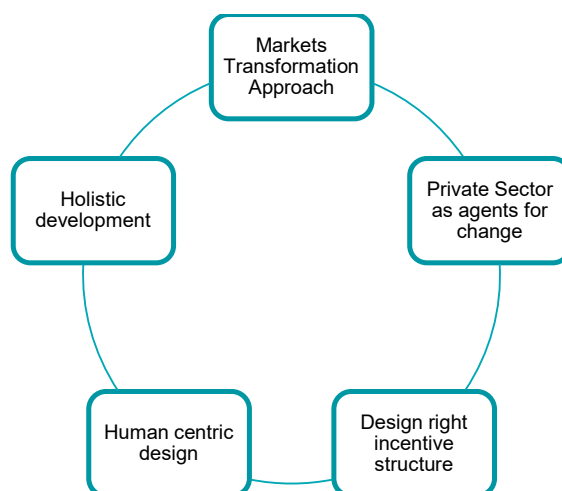
- To co-ordinate the functioning of the Market Committees including programmes undertaken by such Market Committees
- To undertake State level planning of the development of the agriculture produce markets
- To grant subventions or loans to Market Committees for the purposes of this Act on such terms and conditions as it may determine

The transformation of the proposed value chains will require an overall investment that exceeds the proposed loan amount. At present, there are a lot of efforts in place towards the same goal of improving farmers' income by tightening the post-harvest value chain. However, these initiatives have been small, dispersed and un-coordinated across the value chains. This has inhibited the extent of potential impact which they could have on the goals and objectives. Therefore, MAGNET can play a critical role to improve the organization and coordination of the transformation of the value chains:

- Integrating the initiatives already in place and proposing ways to scale them up
- Channelling disruptive market and value chain innovation
- Unlocking and integrating funding from multiple sources (Government, corporations, investors, philanthropy, donors)

E. Approach & Methodology

1.3.1. Approach to achieve the MAGNET objective



There are several paradigm shifts required to transform the agribusiness ecosystem in the State and these should be attempted through MAGNET by ADB and MSAMB:

- **Market's Innovation Approach:** Traditionally, the market driven approach has been used across the world for Market systems development. This means that the production systems are linked to the end consumers top down which makes them responsive to the needs of the market players. This approach makes sure that there is a market ready to absorb the agricultural produce. However, this does take care of the existing market alone. There are several shifts in tastes and preferences taking place continuously. There can also be newer product categories which can be introduced in the market. The Markets Transformation approach takes care of both the current and the latent/potential demand for various existing and new products.
- **Private Sector as an agent of change:** The agribusiness organizations which are typically the private sector have a direct stake in ensuring the right volume, quality and temporal spread of associated crop systems. They must be viewed as agents of change rather than as profit making entities. Their interests are aligned with those of the production side; just that they need a specific value proposition to realize the synergy.
- **Designing the right incentives:** The right kind of incentives need to be built for each player along the value chain to develop the whole ecosystem organically. This would include incentives for farmers to produce as per market needs, incentives for traders to pass on larger share of the value to the producer, incentives for the private sector to invest in creating shared infrastructure and systems and so on. This will entice them to invest in developing a market system.
- **Human Centred Design:** Each intervention designed will be taken up by the respective actors along the value chain. Human centred design needs to be considered at each stage to ensure easy and quick adoption of the interventions and thereby ensure potentially greater impact.
- **Holistic/ Systemic Political and Economic Transformation:** In addition to economic outcomes expected, the socio-political environment and outcomes also need to be considered. Each intervention needs to be viewed from systems theory perspective whereby it is a part of the larger ecosystem. This makes sure all parts of the machine work towards the same end goal. This means we also consider social aspects such as poverty reduction, gender equality and justice and environmental aspects such as pollution control and greenhouse gas emissions.

Methodology for designing the project

Value Chain Development Strategy

Commodity value chain-based gap analysis and interventions is required to appropriately tap the vast potential. These are required to redress gaps and constraints in terms of policy, infrastructure and logistics, synergies between Government Departments as well as other stakeholders, cluster focus, value-addition, branding, ease of doing business and intelligence dissemination, etc. In this context, a review of the “mapping study of agribusiness and value chain players” will also be undertaken.

Cluster focused interventions are required within a value chain perspective. In this context, a cluster may be visualized as a sectoral and spatial concentration of farmers/ producers or firms, their related support firms and service providers. A cluster may be a production cluster or a processing cluster of firms. The clustering phenomenon in horticulture value chain is evident. Apparently, more than 66 per cent of pomegranate is produced in Nashik, Solapur and Aurangabad districts of the major producing districts in the State of Maharashtra; and more than 67 per cent of banana is produced in Jalgaon, for example. A value chain basically includes the range of activities necessary to bring a product or service to its final consumer. In simple terms, a measure of the value offered/derived is often reflected in earnings of relevant stakeholders.

A cluster level approach within a value-chain perspective will facilitate realising suitable economies of scale in production and post-harvest activities and is required to help realise actual benefit and empowerment of the farming community to enhance their incomes. It will also encourage Farmer Producer Organizations which are an institutional innovation to help small holders overcome scale disadvantages and extend their reach to competitive inputs, credit, modern technology and distant markets directly.

These production and/or processing clusters could be the pillars on which technical and physical infrastructure may also be optimally developed through PPPs and via SPVs of the private sector as well as FPOs. The approach of developing product specific clusters within specific value chains in different agro climatic locations of the state would also help in dealing with various supply side issues in horticulture value chains viz., soil nutrients management, productivity, adoption of market-oriented variety of crop in an aggregated manner, deployment of good agriculture practices, etc.

The value chain gap analysis and intervention plan will cover, among others, a profile and role of different stakeholders, value accruals, SWOT analysis, PESTEL (Political, Economic, Social, Technological, Environmental and Legal analysis).

The value chain gap analysis assessment will study competitiveness determinants that may be broadly considered in terms of the business environment as well as factor and demand conditions.

The parameters in the context of the business environment may be considered as follows:

- Macro-economic and industrial policy and regulatory conditions (viz. exchange rate, fiscal policy-public expenditure, market entry – for e.g., trade and investment regime, competition policy) and schemes.
- Factor conditions (availability, quality, cost) viz. of raw material, labour, capital, power, generic/specialised infrastructure, and support firms, service providers and institutions.
- Demand conditions, market size and growth trends (also in the light of accessible international market).

The gap analysis in the context of these horticulture value chains will particularly also consider constraints in terms of:

1. Policy and schemes at the Central and State levels
2. Infrastructure and logistics
3. Value addition

4. Branding (Promotion and protection) options
5. Ease of doing business and market Intelligence Dissemination
6. Quality and conformance
7. Institutional governance mechanisms at the central, state and cluster level to also ensuring convergence in efforts
8. SPS and TBT response mechanisms
9. Scope for sea protocols
10. Developing a “farmer centric” approach ensuring standards and aggregated supply volumes through FPOs; implementing packages of practice to minimise pesticide residue.
11. Climate change and social and environment aspect

A range of “hard” and “soft” interventions are necessary to enable the horticulture commodity value chains to realize their potential. Hard interventions may be viewed in terms of those involving creation of fixed assets such as common facilities and physical infrastructure. Soft interventions cover the gamut of other required Business Development Services (BDS).

A. Soft Interventions

By way of illustration:

1. Study and delineate basic contours, mapping on the basis of critical parameters related to greater market orientation. This has been also elaborated in the subsequent section.
2. Processor mobilisation and capacity building (including in areas requiring joint action).
3. Producer i.e. farmer mobilization and capacity building (including in areas of joint action); evolution of FPO/s to implement various interventions. This is in terms of ensuring that they provide a range of services to farmer members including: input facilitation, custom hiring, aggregation and direct marketing, quality seed production, credit linkages to avoid distress sale, adopt good package of practices in agriculture, quality and compliance, traceability system, statutory and legal compliance, spot/ futures market trading/ hedging, use of various technology and information apps etc.
4. Means to ensure synergised interventions by MSAMB, state agriculture universities, and the food processing department, as well as Central Government Departments.
5. Scope to develop and deliver entrepreneurship, management and export orientation training and skill development programs for producers and processors, facilitating required study tours and exposure visits to benchmark best practices and technology.
6. Reflect on areas where business plans may be developed and successfully implemented as to ensure that processors adopt appropriate technology and package of practices.
7. Promotion of value-added organic exports, registration of cluster commodities under the GI Act for generic brand promotion and undertaking brand equity promotion campaigns.
8. Options for skill development of producers, manpower as well as of typical MSME processors themselves on export marketing to specific countries.
9. The focus will also be on the deployment of best practices in smart agriculture, density plantation, Integrated Pest and Disease Management, use of mobile apps for pest management, use of Artificial Intelligence, drones

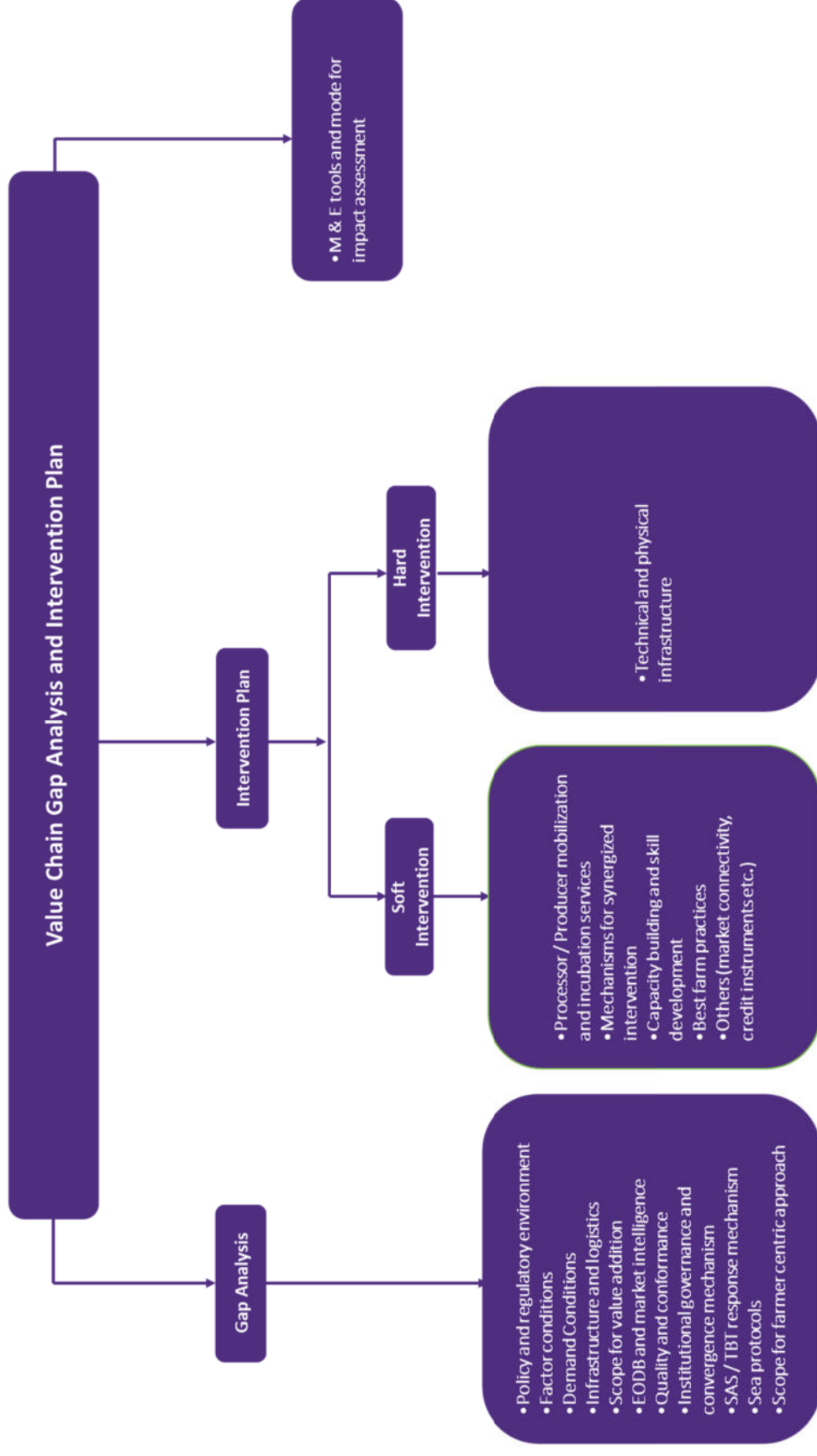
for monitoring, adoption of newer farm level technologies like laser land levelling, propelled sprayers, precision seeders and planters, transplanters for seedlings, multi-threshers, etc.

10. Other measures to favourably orient factor and demand conditions as to benefit specific value chains and its stakeholders.

B. Hard Interventions

By way of illustration:

1. Scope for preparation of bankable business plans to help IAs/SPVs to implement specific interventions. There may be in terms of large pack houses, specialized storage, integrated cold chains and agri processing clusters.
2. Scope for establishment of other necessary technical and physical supporting infrastructure like testing labs, etc. on PPP mode through private sector investment. This could also be through twinning with the PPP-IAD scheme of the RKVY, PMKSAMPADA of MoFPI, TIES of DoC, MIDH of DA & FW and IDMF of the DAHDF, etc. as to ensure market-oriented production and processing with conformance to Phyto-sanitary aspects.



Rapid Market Assessment

1. Methodology Brief: Rapid Market Assessment of commodity value chain potential

The analysis will summarily comprise largely secondary data analysis in term of indicative domestic and export market demand potential and trends for the identified commodity value chains (in term of commodity/value added products).

2. Analysis of export and domestic market demand

A. Export Market Analysis Tool

“Trade Map” is a market analysis tool to assess demand as well as potential market in export and/or global terms. Trade Map was developed by the International Trade Centre UNCTAD/ WTO (ITC) with the objectives of facilitating strategic market research, monitoring both national and product-specific trade performance, revealing comparative and competitive advantage, identifying the potential for market or product diversification and designing and prioritizing trade development programmes for both firms and trade support institutions representing different countries.

Market analysis tool (International Trade Centre, Trade Map)



By transforming the large volume of primary trade data into an accessible, user-friendly, and interactive web-based format, Trade Map provides users with indicators on country or commodity or value-added product performance, demand, alternative markets and the role of competitors. It presents information in tables, charts and maps, and allows queries based on product, group of products, and in country and regional country groupings for exports or imports.

In this context, data will be compiled and analyzed in terms of Import (quantity and value). Also, in terms of related countries over a period (3 years). This will also help estimate Relative Export Oriented (EO) - Revealed Comparative Advantage (RCA). This may be defined as follows:

$$EO-RCA = \frac{\text{country's export of product} - \text{country's import of product}}{\text{country's export of product} + \text{country's import of product}}$$
 controlled for incentives to export and disincentives to import that distort RCA. Ideally, trends may have to be studied over a period. The ratio ranges from (-) 1 (completely imported product – Comparative Disadvantage) to (+) 1 (completely exported product – Comparative Advantage).

Ideally trends in measures over a period (3 years) may be studied. The analysis will be pursued for product categories at appropriate digit level- Harmonized Commodity Description and coding system (HS) code.

B. Domestic market potential analytical tool

Tools and parameters such as growth trends in per capita or domestic consumption of specific commodities as well as of processed form would help identify potential increase in National or domestic demand. Also, the difference between domestic consumption levels of specific commodities and processed produce as against that in the global perspective is a proxy to study domestic consumption trends and demand. National Sample Survey Organization, India Statistica, Agriwatch, etc. data sources will also be studied. In addition to ITC data, Export Promotion Council (EPC) and customs data may also be sourced to study demand trends.

Financial aspects of the overall project and design and due diligence of Financial Intermediation Loan Component

The methodology with reference to financial aspects of the overall project and design and due diligence of the financial intermediation loan (FIL) component shall involve corporate due diligence and review of existing relevant reports and financial statements (of MSAMB [Implementing Agency], participating FIs, FI Guarantors), clubbed with desk research, extensive consultations with a broad range of stakeholders, key informants interviews, external reviews, field work, steering committee meetings. The section below broadly outlines the approach in this regards:

1. Financial Management Assessment and Financial Analysis

1.1. Financial Management Assessment and Financial Analysis (based on historical financial performance) of Executing Agency/Implementing Agency

Financial management systems include the policies and practices regarding financial planning, programming, accounting, reporting, auditing, funding, organization, and personnel of the Executing Agencies/Implementing Agencies. Effective financial management within the IA is a critical success factor for project sustainability, both in the effective use of funds and in the safeguard of assets once created. The general objective of the assessment is to ensure that IA are technically, managerially, and financially capable of efficiently and effectively implementing the proposed project. The financial management assessment shall include of analysing the IA structure and management framework with regard to financial management; assessing the agencies' resources, including the number, quality, and technical capabilities of its staff, the extent of financial and budgetary support it obtains, the nature of technology, equipment, and software in use assessing the agencies' operating results and identifying specific performance shortfalls or variances. The process shall involve use of ADB's Financial Management Assessment Questionnaire (FMAQ) as a basic template and reference to gather information relevant for assessing financial management capacity of the implementing agencies. If an FMA exists, same shall be reviewed and, in particular, any work done to overcome previously identified weaknesses shall be checked. The original FMA can then be updated accordingly.

Initial preparation for the Financial Analysis would include gathering existing information available from a variety of secondary sources—such as past ADB assessments, assessments by other agencies, information available from online financial data libraries, reports from the executing agency and/or implementing agency on existing projects, as well as study of balance sheet/statement of financial position, income statement, and cash flow statement.

1.2. Risk Assessment & Risk Management

The task here shall involve understanding risks involved in Financial Management, Procurement, other and overall project; say for example, Inadequacy in financial management, Project cost overrun, Delay in project implementation, etc. The Risk Assessment shall involve assessing on scale of Low to High and shall be accompanied by Mitigation Measures or Risk Management Plan (and residual risk rating on scale of Low to High post implementation of the plan).

1.3. Preparation of cost estimates for the Projects

The approach here shall involve assisting concerned team, experts and authorities (also with COSTAB) in preparation of estimates comprising of base cost, contingencies and financial charges during implementation. The estimation of base cost shall consider Incremental recurrent costs, Civil works, Institutional development and strengthening, Audit costs, Taxes and duties, Project management, capacity development, consulting services, Safeguards-related costs, etc. while the estimation of contingencies shall comprise of both physical and price contingencies.

The approach shall involve identifying and defining the appropriate cost categories (considering the government's own accounting, classification, and project reporting systems); Estimation of the local and foreign currency base costs on the basis of the unit costs and quantities required, etc.

The base cost estimates shall be prepared using actual market prices for various project inputs prevailing at the time of preparation.

1.4. Preparation of financial projections for the project components

A financial model, comprising projected balance sheet, income statement, and cash flow projections, including projections of key financial ratios, shall be prepared in order to assess the impact of the proposed project on the MSAMB's financial performance and financial position. Preparation of financial projections shall involve assessing and preparing financial projections for the project components in accordance with ADB guidelines and carrying out financial evaluations (financial cost-benefit analyses) including sensitivity analyses for the project over the construction and operation period by calculating the financial internal rate of return and comparing it with a weighted average cost of capital.

1.5. Developing appropriate design/ model for Fund Flow, Disbursement Mechanism, accounting, auditing, and financial reporting arrangements

The task here shall involve understanding the model of Funds Flow, Disbursement Mechanism, accounting, and audit systems in existing projects of MASAMB as well as that of externally aided projects. This assessment is expected to suggest the weaknesses (if any) which in turn shall help in developing the most appropriate design (including appropriate covenants) to follow the budget mechanism of the government to ensure that funds flow smoothly and are subject to the effective fiduciary oversight of the government's internal control systems and the external audit.

2. Design and Due Diligence of Financial Intermediation Loan

One of the critical components of the project is Output 2 that intends to address the issues/challenges with regard to access to finance, more particularly, credit, by FPOs and other value chain operators, with a view to implementing

their business plans. Towards this end, the project envisages provision of financial support, in the form of a financial intermediation loan (FIL) and a matching grant.

Modalities of extending financial support under the project, for the purpose of enabling the FPOs and other value chain operators to access financial services, will be designed by following a holistic approach, which would entail the following steps.

2.1. Environment Scan

Before designing the FIL, it proposed to undertake the following rapid/quick exercises, with a view to authenticate the available data/ information and to further strengthen our understanding of the FPO movement in the country, in general and in Maharashtra, in particular. This will also provide an opportunity to revalidate our learnings/hypothesis.

A. Data Collection/Validation – Before suggesting/designing any intervention to enhance the access of financial services by FPOs and other value chain operators, it would be pertinent to obtain authentic/validated information/data on the current status of the *target group*, in terms of number, membership, promoting/resource institution, value chains, district-wise/region-wide spread, infrastructure (available/required), types of activities/businesses, volumes handled, need for working capital or Term Loan, financial/funding arrangements, etc. It is pertinent to mention that Maharashtra has FPOs/ FPCs of all hues, who operates in various agricultural value chains across the state. About 1694 FPCs were registered (till Nov. 2019) in the Maharashtra as of January 2020. By and large, promotion/formation of FPOs/FPCs in the country is spearheaded by two institutions viz., the Small Farmers' Agri-Business Consortium (SFAC) and the National Bank for Agriculture and Rural Development (NABARD). Several FPCs have also been formed/ promoted under projects like Maharashtra Agricultural Competitiveness Project, while some FPCs are also promoted under CSR efforts (for instance, FPCs promoted by the Tata Trust, Reliance Foundation, etc.)

Methodology – Literature review, discussions with the officials concerned in the Maharashtra Regional Office of NABARD in Pune and MSAMB (and, if feasible, with the SFAC), with a view to not only ascertaining the current status of FPOs and other value chain operators in Maharashtra, but also capturing information on the future plans with regard to promotion and development of FPOs.

B. Existing Financial Support System

- i. Although, the concept of FPOs/FPCs, as a mechanism to address the challenges faced by small/marginal farmers (more particularly with regard to horticultural crops), is of recent origin. It has the potential to resolve many of these challenges. In this backdrop, the Government of India has initiated a variety of steps to ensure the availability of financial support to FPOs through its Ministries/Departments concerned, including the SFAC and financial institutions (FIs) comprising Commercial Banks, Regional Rural Banks, Cooperative Banks/Financial Cooperatives, Non-Banking Finance Companies, Micro Finance Institutions, etc. Similarly, many State Governments (including Maharashtra) have also initiated various measures to improve the access to financial services by the FPOs and other value chain operators.
- ii. At present, financial support is available to FPOs and other value chain operators in the form of:
 - Equity support (Equity grant scheme under the SFAC)
 - Credit/loans
 - Grants-in-aid (for promotion, capacity building, creation of post-harvest infrastructure, transport facilities)

- Venture Capital Financing
 - Credit Guarantee
 - Insurance.
- iii. In addition, the SFAC and NABARD signed a Memorandum of Understanding (MoU) in October 2018, which, among other obligations, also provides for the development of sustainable financing mechanisms for FPOs and partnering with other FIs for providing financial services to the latter, across the country.
- iv. Similarly, the SFAC has also signed separate MoUs with individual banks, thereby designating them as **'preferred banks'**, for the purpose extending financial services to FPOs in a particular state. In this context, the SFAC signed a MoU with the Bank of Baroda in February 2018, thereby designating it as a **'preferred bank'** for the state of Maharashtra.
- v. Further, the loans extended to the FPOs by banks are also reckoned towards the computation of priority sector requirements of the banks.
- vi. Keeping in view the above, it would be appropriate to examine/study the existing financial services framework with reference to the FPOs, more particularly in terms the outreach of FIs, regulatory norms, credit policies, products & services, risk mitigation mechanisms, etc., and also the challenges faced by them in extending financial services to the FPOs.

Methodology – Literature/data review; *One day workshop* for the officials concerned of the important/major FIs and other service providers, with a view to understanding their perspectives with regard to extending financial services (an illustrative list of the likely participants is given below).

- NABARD, Maharashtra Regional Office, Pune
- State Level Bankers' Committee (SLBC) Convener (i.e. the Bank of Maharashtra), Head Office, Pune
- Bank of Baroda (the *'preferred bank'*) Head Office, Mumbai/Zonal Office, Pune
- Maharashtra *controlling offices/zonal offices* of the major public sector commercial banks having a sizable presence in Maharashtra (like the State Bank of India, Bank of India, Central Bank of India, Union Bank of India etc.)
- Private sector commercial banks having a fairly good outreach in the state and a substantial exposure to the financing of agri-business and food processing sector (like the HDFC Bank, ICICI Bank, Axis Bank, RBL Bank etc.)
- Maharashtra State Cooperative Bank, Head Office, Mumbai
- Non-Bank Finance Companies (NBFCs) and Micro Finance Institutions (MFIs) like NABKisan, Samunnati Financial Intermediation & Services Ltd., Friends of Women's World Banking (FWWB) etc.
- Resource institutions (like the College of Agricultural Banking of the RBI, Pune, National Institute of Bank Management, Pune).

3. Approach towards Financial Intermediation Loan

Under Financial Intermediation Lending, ADB provides funds to eligible participating financial intermediaries for on-lending, at the financial intermediary's credit risk, to final borrowers (sub-borrowers) for eligible subprojects. In the context, the assessment scope entails undertaking review and integrity due diligence on candidate Banks, NBFCs and other Financial intermediaries. The list of probable FIs may also involve exploration and assessment of some FinTech organizations that have focused agricultural value chain financing products. The data and information

generated by the review will be used to identify suitable partners to support ADB intervention in financing support to farmer organizations and value chain operators.

1. Referral to market research and assessments to identify investment needs

A diagnostic analysis at the sector level can help identify and prioritize challenges and can be the key to understanding the context and identifying the rationale and objective for a possible intervention. A clear economic rationale will help narrow the possible alternative ways of addressing a development problem, focus project design and appraisal, and identify key performance indicators. Market research and referrals to past assessments may be used to increase the reliability of estimates and to assess the demand response to price changes and income growth. In this context, the task at hand shall involve analysing/proposing a proper amount for the FIL component. The assessment shall also involve closely interacting with FIs, FPOs and other value chain operators in understanding the barriers faced by stakeholders; for instance - high capital investment, Lack of credit access due to various factors like inadequate financial management or lack of collateral, etc.; and shall accordingly recommend interventions to reduce such barriers.

2. Financing Mechanism and customized financial instruments for farmers organizations and value chain operators

Most financial institutions (with few exceptions) are wary of lending to FPOs or other micro/small scale value chain operators, largely due to their inability to provide adequate documentation on activities collateral to cover the lender's risk. Some NBFCs have experimented with innovative financial products targeted at FPOs, but these are isolated examples which have not been mainstreamed. Also, NBFCs are not presently covered through credit guarantee schemes. NABARD has created a dedicated corpus to provide loans to producer organizations, but it seeks proposals from mature FPOs with a credit history of at least three years. SFAC's own venture capital fund in-principle remains open to financing FPOs but the condition of clubbing VC with a bank loan has resulted in poor response from FPOs. Also, the minimum membership base of 500 specified under SFAC guidelines leaves the credit guarantee scheme out of the reach of many FPCs. New FPOs in particular face insurmountable hurdles in accessing start-up capital and suffer rapid member attrition within a year (or so) of registration, as no tangible benefits materialize to justify and sustain the effort of aggregation. It is therefore important to develop an appropriate financing mechanism which shall include a loan, matching grant scheme, savings and credit unit, and/or guarantee fund. These mechanisms can be financed not only through a FIL but also through a project loan, as appropriate.

3. Financing plan for the FIL

The Project Cost Table will provide as its bottom line, the total financing required for a project. In this context, essentially, the means of financing this total expenditure will be specifically defined in the report. This shall be prepared taking into account the co-financing and counterpart funding from the participating FIs, sub-borrowers, and/or any entities.

4. Preparation of detailed FIL implementation guidelines

The Task here shall involve closely interacting with IA, experts and preparation of comprehensive implementation guidelines and sub-project financing agreement templates between the participating FIs and sub-borrowers under the FIL. The templates shall reflect the requirements stipulated in the Loan Agreement, Project Agreement, and Project Administration Manual for the project, and environment and social safeguard management system for sub-projects.

5. Financial management assessments for the participating FIs/ FI –guarantor

The approach shall involve analysis of the financial statements of each participating banks and financial institution and compute relevant ratios to determine the profitability, solvency, liquidity, and capital adequacy of the entities, and undertaking a CAMELS assessment for each participating FI. The task on hand shall also involve reviewing of the historical financial information and preparation of projected financial information to determine whether the entity's performance is, and will continue to be, effective, efficient, and sustainable.

6. Propose institutional and governance arrangements

The task here shall involve an assessment of the adequacy of accounting and internal control systems with respect to project expenditures and other financial transactions, and to ensure safe custody of project financed assets; a determination as to whether the project EAs/IAs have maintained adequate documentation on all relevant transactions; confirmation that expenditures submitted to ADB are eligible for financing and identification of any ineligible expenditures; and compliance with loan covenants and ADB's requirements for project management. The task shall involve evaluation of the systems and operating procedures for accounting, custody of assets, the control environment and internal financial control, financial reporting and related systems. Based on the assessment, appropriate institutional and governance arrangements shall be proposed to ensure fiduciary oversight and safeguard compliance for the FIL.

7. Financial covenants for the loan

The approach shall involve assisting in developing special covenants for the loan that specify actions important for efficient project implementation and for the realization of the expected objectives and benefits. Special covenants may include matters such as institutional and staffing arrangements for project execution; distribution and marketing arrangements or supporting services; sector or regional policy matters; operational and management matters; co-financing arrangements and other financial measures.

4. Sub-project selection criteria, subproject screening, selection, approval, administration procedures (MAGNET Project)

The selection criteria shall involve selection of eligible sub-projects under Output 1, Output 2 and Output 3. This shall include techno-economic feasibility appraisal, compliance to project guidelines, compliance to sub-project specific related government regulations, compliance to lending FIs requirements, social and environmental safeguards, etc. The assessment shall involve collecting and analysing baseline data to assess feasibility and expected impact, using methods and tools established for the similar sub-projects implemented under other schemes. A comprehensive checklist and procedure for the selection process shall be prepared based on joint consultation with project officers, executing and implementing agencies, project consultants and other stakeholders. The approval of sub-projects shall be based on satisfactory technical, economic, social, and environmental assessments compliance with eligibility criteria.

1. Eligible SME subprojects to be financed by the FIL

The task here shall involve closely interacting with IA, experts, FIs, FPOs and other value chain operators and preparation of an exhaustive list of possible sub-projects in the targeted crop value chains. The assessment here shall also involve understanding the complexities faced by targeted beneficiaries in leveraging finance from FIs/other available channels, ongoing grant and credit guarantee schemes, etc. The short-listing process shall also take into account the ratings of SMEs against the criteria (for selection process) and prioritizing the eligible

subprojects in multiple batches allowing revolving the FIL proceeds for financing eligible subprojects after the sub-loan for the first batch of subprojects is repaid.

2. Preparation of the cost estimates of subprojects

The task here shall involve closely interacting with IA, experts, FIs, FPOs and other value chain operators and preparation of broad cost estimates of subprojects in accordance with the requirements and guidelines. The approach here shall involve preparation of estimates comprising of base cost (of all components), contingencies and financial charges during implementation.

Macro Economics, Sector Context and Economic Analysis

This aspect of assessment will involve assessment of basic parameters of the business environment in the context of selected horticulture value-chains. The basic parameters considered will include:

- Macro- economic and agriculture and industrial policy and regulatory conditions (i.e. exchange rate, fiscal policy- public expenditure orientation, market entry- for example, trade and investment regime, competition policy) and schemes. The latter supporting schemes of the Government of India and Government of Maharashtra may include market development and market access schemes, PPP schemes for specialised infrastructure, investment subsidy and tax holidays for start-ups, and farm productivity and performance promoting schemes.
- Status of existing Free Trade Agreements, Preferential Trade Agreements and Preferential Market Access options vis-à-vis horticulture value chains.
- Ease of doing business, specifically in terms of trade procedures and facilitation and grievance redressal documentation and operational procedures at ports and scope to implement 24x7 single window clearance of perishable imports and exports at relevant ports; scope for greater alignment with the Trade Disputes Cell in the DGFT.
- Scope of developing Sea Protocols particularly vis-à-vis long-distance export markets. Export of horticulture produce requires special storage, transportation and handling at desired temperatures. Time is a major constraint and air freight proves costly for exporters while low volumes and poor infrastructure makes it inviable for airlines to transport produce. Horticulture (fresh) produce exports may grow exponentially if sea protocols may be developed also indicating at what maturity levels harvesting can be done for transportation by sea. Exercise may have to be carried out with shipping lines, reefer service providers, ICAR and APEDA etc. Further, trials may have to be held at strategically important ports.
- Institutional status in terms of response mechanism to rapid alerts and warnings related to SPS and TBT issues. If not temporary restrictions/ bans may prove a huge burden on horticulture exporters. Also, assessment of mechanism for enhancing pace of submission of pest risk analysis and addressing safety concerns of importing countries is vital.

The following will be the scope of project economic analysis:

1. Macro-Economic factors influencing target sectors and vice versa

Understanding is required of a country's and regional (state) economy's overall performance and outlook, and how macro-economic factors (and parameters) may affect project performance. This analysis will include how

the horticulture sector and VCs contribute to economic growth, and to macro-economic performance. Related macro-economic parameters at the national level include exchange rate, fiscal or public expenditure policies that could impact projects. Other related parameters have been delineated earlier.

2. In the Sector context, constraints to functioning of markets and efficient and equitable provision of public services

Important sector production, supply and processing systems, prices and incentives influencing producer and consumer behaviour, and the supporting market and institutional framework will be assessed. Industry structure and global circumstances of value chain products and policy induced price distortions (if any) will be considered (in the light of possibly distorting financial and economic prices). Key influence on private sector performance such as performance of supporting institutions, regulatory environments effect on costs and risks of doing business will be assessed. Public goods delivery mechanism and performance and public expenditure management and efficiency of service delivery is also important. Market and institutional failures (if any) in this context will also be studied.

3. Demand Analysis

Demand analysis underline projections of economic benefits from a project. Basic contours of such analysis have been delineated in detail earlier.

4. Economic Rationale

The major rationale for public sector intervention is to redress the failure or limitations of markets, perhaps by way of uncompetitive structures, high transaction costs and information gaps. This will be assessed, and the value added of ADB support to public and private sector interventions will be captured.

5. Identification of project alternatives

With and without project situation will be considered as well as project alternatives in terms of location, scale and timing of investments, policy flux, etc. will be studied. Further, inputs and output will be considered as tradeable/non-tradeable and their being incremental and non-incremental in nature. Alternative C-B will also be considered.

6. Benefit Cost Analysis

Benefits of the project will be identified and measured in a without-project alternative scenario. Valuation of input and output will distinguish between output that are incremental and non-incremental with respect to present supply. External effects such as environmental impact will also be valued to the extent feasible. The price level (domestic or world) and unit of account (numeraire), INR or USD will be consistently used in comparing alternate scenarios. The analysis will estimate sub-component wise ENPV and EIRR understanding ADB typical norms of Economic Opportunity Cost of Capital (EOCC) at 12 per cent. An EIRR between 10-12 per cent could be considered acceptable in the case of significant benefits which are difficult to quantify. The project implementation time frame and C-B implications will also be specified.

7. Financial and institutional sustainability

The analysis will also involve estimation of the Financial Internal Rate of Return (FIRR) and comparison of the same with the Weighted Average Cost of Capital (WACC). Differences between EIRR and FIRR will be analysed. The financial returns to different project stakeholders (farmers, private processors and public institutions etc.) will be studied. Also, the basis for subsidies will be evaluated. The rationale for user charge measures, where relevant will be delineated as well as will the rationale for subsidies, if any. Financial

sustainability with/without subsidy will be studied. Furthermore, the fiscal impact and sources of funds will also be analysed. Notably, the role of institutions and structures and capacities of project related agencies including MSAMB for project implementation will also be assessed.

8. Sensitivity and risk analysis

The range of variability of key parameters or assumptions will specifically be scrutinised. The key parameters affecting financial and economic performance will also be studied as well as monitoring measures identified. Institutional risks and capacity limitations will be assessed. Quantitative risk analysis in terms of key parameters and measures of mitigation will be undertaken.

Safeguards

1. Environment Safeguards and Climate Change

Approach – Initial due diligence by ADB suggests that the project is classified as “category B” vis-à-vis the environment as the adverse environmental impacts from ‘Output 3’ are manageable and can be mitigated. Further, both involuntary resettlement and indigenous people categorization are “C” as the project does not anticipate any land acquisition. Additionally, under ‘Output 2’, the project does not envisage large investment through FIL and or matching grant components that will require land acquisition and or significant civil work causing any irreversible environmental impacts. Thus, to ensure that the Project complies with ADB’s Safeguard Policy Statement (2009), the project Safeguard Team (including the Environment and Social Experts) has undertaken an initial due diligence of all project components through both structured discussions with relevant stakeholders of the project as well as through field audits.

Stakeholder Interactions – The Safeguard Team conducted various discussions with MSAMB, other experts in the team designing and detailing other outputs/ deliverables of the project, a few financial intermediaries (FIs) and value chain operators including one FPC.

Discussion has also been with other team members, such as Horticulture Agribusiness and Marketing Specialist, Agriculture Value Chain (AVC) and Logistics Facility Specialist, Finance Specialist, Agricultural Economist, focused on capturing the scope of the project (under Output 1 and 2) and identifying any component that could lead to any potential irreversible environmental and or social impacts at the project location during the implementation phase. Simultaneously, a shared-learning dialogue was also steered among all the team members to identify the potential safeguard and climate change interventions that can be integrated in ‘Output 1 and 2’ to enhance the impact and sustainability of the overall project. Detailed discussions were held with FIs to understand their process of assessing safeguard and impacts of climate change on agri-businesses of the borrowers. The two-way learning and sharing facilitated the team to appreciate the importance of mainstreaming safeguards and climate change measures in the project design as well as identify the components that will require further research for quantifying climate financing amount for both mitigation and adaptation based on Guidance Note on Counting Climate Finance of ADB.

As an outcome of the discussions, the Safeguard team structured a questionnaire for all MSAMB facilities which would capture all information including aspects relating to environmental, social and climate change components of each of the agriculture value chain (AVCs) selected by the project. The questionnaire feedback will facilitate the team to understand and assimilate real-time experience of the stakeholders and “as-is assessment” of the current conditions. The approach is to present the findings of these questionnaires in the Interim stage.

The team also proposes to study the findings from other similar development projects such as SMART, POCRA etc., to enhance the understanding of the AVCs and issues therein in regard to safeguard and climate change.

Field Audits – The Safeguard teams conducted field visits to MSAMB facilities (2 out of the 16 proposed upgradation/ expansion facilities) during the week of 6-10 Jan'20, to get a preliminary understanding of the activities/ processes are managed/ controlled by the facilities and their potential impact on the given environmental and social ecosystems. Prior to conducting the field visit a formal discussion was held with the MSAMB to select the potential facilities those that be visited by the team keeping in mind the time and capacity limit of the team (number of members). The team was split into two groups ensuring environmental, social and climate change expertise available within both the groups. A questionnaire was designed and used to capture the required information during the field visit and discussions with the representatives and workers of the facilities. Additionally, the team also visited a facility founded and managed by an FPO to discuss and understand the safeguards and climate change strategy being practised by market players.

The Safeguard team continues to study and be guided by the following ADB's guidelines for drafting the given outputs (reports):

- ADB's Safeguard Policy Statement (2009)
- Involuntary Resettlement Policy (1995)
- Policy on Indigenous Peoples (1998)
- Environment Policy (2002)
- Environment Safeguards - A Good Practice Sourcebook
- Handbook on Resettlement and Environment Assessment Guidelines (2003)
- ADB's Operations Manual, 2006 – Sections F1: Environmental Considerations, F2: Involuntary Resettlement, F3: Indigenous Peoples

Furthermore, the TRTA consultants will visit the remaining facilities, so that we are able to capture all information that is required for us to carry out the Initial Environmental Examination (IEE) under our mandate.

The preliminary screening exercise suggests that generally, the Project will not generate any severe environmental impacts on the environment during both construction and operational phases. The most significant environmental impacts during the construction phase will be caused by the loss of soil cover (wherever new storage facilities will be constructed), emissions to ambient air, and noise generation resulting from different types of construction activities. These impacts have been preliminary assessed as being minor. Other construction environmental impacts (i.e. impacts on surface water and terrestrial vegetation/wildlife) have been assessed as negligible. Additionally, the project does not expect acquisition of any new land. All expansion and upgradation will be done in the existing facilities and or land beside the facilities owned by APMC.

To collect baseline and other information on the 16 facilities proposed for upgradation and expansion, a questionnaire has been developed. Same is annexed to this report.

Thus, IEE will be drafted based on assessment of the questionnaire-feedback and in-depth discussion with MSAMB on the current status of the facilities and proposed expansion/ upgradation. Similarly, ESMSA will be drafted based on IEEs and EMPs thus finalised and later produce a synthesised comprehensive version in a handbook format such that it remains easier for the FIs and MSAMB to follow and apply.

2. Climate risk and vulnerability assessment (CRVA) of agricultural value chains (AVCs) and adaptation strategy:

The state has 22.6 million hectares of land under cultivation (gross cropped area) which can be divided in to nine agro-climatic zones based on rainfall, soil type and vegetation. Agriculture in Maharashtra is mainly dependent on rainfall, presently irrigated area in the state is just 17% which is expected to increase to 23%. This means more than 75% area will remain dependent on rainfall, and the key parameters relating to agriculture vulnerability are temperature and precipitation.

The State's agricultural sector continues to face problems due to climate change, especially occurrence and intensity of draught that has increased over the years and changing pattern of precipitation, i.e. more intense rain concentrated in a short period of time. The worst drought affected districts in Maharashtra are Sholapur, Osmanabad, Nanded, Aurangabad, Ahmednagar, Sangli, Satara, Beed, Nashik, Buldhana, Latur, Jalna, Jalgaon and Dhule.

These concerns have grown in recent years, increasing the likelihood of short-run crop failures and long-run production declines. Small, Marginal farmers and agricultural labourers, who are poor and have few assets and limited access to credit and insurance, are the worst affected.

For a detailed assessment of climate risk and vulnerability assessment (CRVA) of the given agricultural value chains (AVCs), it is proposed to analyse the evidence and causes established by the secondary studies available in public domain supplemented by focused interviews with select FPOs, FPCs and other value chain operators. While desktop studies will focus on identifying the impacts and causes, the focused interviews will be conducted to ascertain the facts and information collated from secondary sources as well as discuss the viable solution(s) towards adaptation. The climate team also proposes to study international best documentation, those that are relevant to the project and draw out best practices that can be imparted through Output 1 of the project.

Additionally, to assess the possible GHG mitigation measures those that be integrated under Output 3 will also be identified in consultation with MSAMB and other technology experts.

3. Social Development and Safeguards

1. **Background to the approach inclusion** – Inclusion is at the core of the project design to ensure that, through MAGNET, women, men and marginalised segments of the population can contribute to and benefit from the growth of the Maharashtra horticulture markets. Gender, poverty and select social development issues will be mainstreamed in the project design.

The approach to inclusion in the project design is aligned with:

- The State Government of Maharashtra' Vision 2030 – which focuses on eliminating gender, income, rural-urban and social inequalities. The project design will build on the action points identified in the vision such as protecting labour rights, promote safe and secure working environments for all workers, including migrants, increase skill development and policy reforms to support and incentivise SC/ ST and women entrepreneurs.
- ADB's India Country Partnership Strategy (2018-2022) – which entails support to strengthening gender equality and social inclusion outcomes through gender and social analysis and action planning, inclusive monitoring frameworks, as well as the provision of human and financial resources for effective implementation and knowledge creation.

- ADB's Strategy 2030: Operational Plans – which sets to address remaining poverty, reducing inequalities and accelerating progress in gender equality. The project design will endorse ADB's operational priorities.
- ADB Gender Equality and Women's Empowerment Operational Plan, 2013–2020.

Further, the approach to inclusion in the project design follows and implements:

- ADB's Social Protection Strategy (2009)
- ADB's Operations Manual – C2, C3
- ADB's Policy to Gender and Development

2. Global Best practices for inclusion

Initial observations from preliminary desk-based review, field visits and stakeholder engagement and technical implications were significant. With reference to social safeguards the initial due diligence and poverty and social analysis from ADB concluded that the project is rated:

- C for Involuntary Resettlement – as no physical or economic displacements will occur.

The preliminary field visits and review of documentation, especially for Output 3, confirms such rating. Social due diligence will be conducted for the financial intermediaries, an environmental and social management system arrangement will be developed, and social safeguarding mainstreamed as relevant and necessary across the project outputs.

- C for Indigenous People – as the project is not anticipated to have the potential to negatively affect the dignity, human rights, livelihood systems and culture of Indigenous people.

The preliminary field visits and review of the documentation agree with such rating. The environmental and social management system arrangement developed for the FIs and the overall safeguards will ensure that such risks will continue to be monitored and addressed should any emerge. The visits and initial analysis also identified the potential to positively impact Indigenous people, specifically through output 1 (access to knowledge and improved markets) and output 3 (access to job opportunities as a result of increased capacity of MSAMB's facilities). Therefore, the TRTA consultants will: i) map IPs present in the project areas; ii) engage in participatory consultations to understand the extent to which IPs are currently participating in the prioritized AVCs, and; iii) identify specific constraints faced by IPs, if any, which should be integrated in the design of project outputs.

Other Social Issues and Risks:

1. **Exclusion of Marginalised groups** – The IPSEA highlights that there is a risk that the project excludes marginalised groups, such as women farmers. The preliminary assessment confirms that should gender not be adequately mainstreamed, and should capacity be insufficient at the implementation stage, the risk is significant for the project and it may achieve suboptimal results and may potentially exacerbate gender inequality.
2. **Creating decent jobs and employment and Adhering to core labour standards** – Although the IPSEA does not identify the above as risks that should be addressed by the project design, the TRTA proposes to address decent jobs, employment, and core labour standards in virtue of the expected employment

creation directly through output 3 and directly and indirectly through the improvements across the AGVs. Social safeguards screening for the facilities, FPOs and VC operators will include labour safeguards, as necessary.

Therefore, among the social issues analysed, the TRTA consultants will particularly focus on gender.

- Gender – the project is assigned the Effective Gender Mainstreaming Category

To ensure that MAGNET achieves its results and contributes to sustainable and inclusive growth the design will embed tailored activities and outputs to enable women in Maharashtra to increase their participation, representation, voice, and influence in decision-making as farmers, members and leaders of FBOs, and VC operators and labour.

The Poverty, Social and Gender Analysis will inform the key Social Development and Safeguards outputs for the project design.

Starting from the Initial Poverty and Social Analysis included in the Project Concept paper the TRTA will conduct a Poverty, Social and Gender Analysis (PSGA) to i) assess the social, poverty and gender equity status of the target beneficiaries, and; ii) assess positive and negative impacts of the Project on the target beneficiaries and the wider community in the project areas. Based on this assessment, the PSGA will identify and prioritise the key issues and propose corresponding interventions across the three project outputs to ensure that the needs of the target beneficiaries are integrated in the design and opportunities for inclusion are harnessed.

The analysis will first focus on secondary relevant data available, including recent census and household survey data, relevant sector and thematic studies conducted by ADB and others, and reports from similar projects and projects implemented in the same geographical area.

The stakeholder engagement will continue and include interviews with key informants and focus group discussions to triangulate and delve deeper into the findings from the secondary data analysis.

Tailored engagement led by the Social Development and Safeguarding Specialists will focus on gender, in line with the risks identified in the project concept paper, initial observations and cross-learning from similar projects. Using ADB tools and guidelines, including the ADB's agriculture gender checklist, as well as following global best practices, the analysis will seek to assess gender constraints as well as opportunities i) at the farm level; ii) at the FPO's level; iii) at the VC operators' level, including MSAMB facilities.

The results of the analysis will be addressed by the Gender Action Plan and the overall Summary Poverty Reduction and Social Strategy and ESGA

Overall, at this stage of inception it is proposed that the project design's approach to inclusion follows a three-pronged approach:

1. The adoption of Social Safeguards to ensure No Harm

The project design will clearly set out Safeguarding Principles to be followed by MAGNET and provide tools to be used across all outputs planning and implementation. The safeguards aim to:

- Avoid adverse impacts of the project on the environment and affected people
- Minimise, mitigate, and/ or compensate for adverse project impacts on the environment and affected people
- Support all relevant stakeholders to strengthen their safeguard systems and develop the capacity to manage safeguarding risks.

2. The development of gender and social inclusion design features and targets to maximise project results and contribute to women's empowerment and inclusive growth

The project design will also develop strategies across all outputs that will specifically focus on gender and social issues as well as opportunities. These can include:

- Provision of additional support to the establishment and operations of women led FPOs
- Provision of financial incentives and technical assistance to increase women farmers' access to inputs
- Tailored mobilisation measures to facilitate participation of women and other marginalised segment of the population
- Performance based incentives for FPOs which show progress with inclusion i.e. increased number and participation of women/ marginalised groups

3. The facilitation of dialogue to challenge the root causes of gender inequality

This approach will be used to organise dialogue with MAGNET's public and private sector stakeholders about the roles of women in agriculture and their contribution to growth. Success stories from the project will be leveraged to challenge misconceptions about women as well as to foster the adoption of business inclusive practices. MAGNET can use this approach also by leveraging and supporting existing initiatives which mandate, and mission are empowering women and the marginalised.

Procurement Process

Procurement Approach – The Terms of Reference outline the procurement inputs clearly. The procurement support from the TRTA Consultant is expected to centre mostly on the following:

1. Assessment of capacity, systems and processes that exist within the Executing Agency and Implementing Agencies and suggest improvements if any
2. Assessment of Risks and share a risk management/ mitigation plan, and the project administration manual.
3. Propose an appropriate structure for procurement
4. Prepare the Procurement Plan
5. Prepare Model Bidding Documents
6. Deliver Procurement Capacity Building as required
7. Participate in Strategic Procurement Planning (SPP) workshop led by ADB's procurement specialists and assist in preparing and finalising the SPP report following the workshop.

Our Procurement Specialist will carry out the above in close consultation with the relevant stakeholders. The Procurement Specialist will be guided by the ADB's Procurement Policy (2017) and the Procurement Regulations for ADB Borrowers (2017), as required in the TORs, which are also consistent with Global Best Practice. Our expert will provide best practises in short easy to understand knowledge material, for example, sharing easy to understand Procurement Advisory notes, infographics, etc. These can also be stored as knowledge products on internal shared drives, for easy access and reference.

Detailed tasks and/ or expected outputs of the Procurement Specialist shall be as follows:

S. No.	Tasks/ Outputs
1	Assess the procurement capacity of the executing agency and the implementing agencies including assessment of the efficiency and prudence of the procurement carried out by the implementing agencies under previous ADB and World Bank financed projects in reference to the timelines, procurement process, quality of bid evaluation, and complaint response mechanisms.
2	Assess the institutional arrangement for procurement, government procurement systems including standard operating procedure and national standard bidding documents, procurement approval mechanisms and recommend improvements.
3.1	Conduct procurement risk assessment
3.2	Provide inputs for the risk assessment and risk management plan, and the project administration manual.
4	Propose an appropriate implementation structure for procurement.
5	Prepare procurement packages based on the market assessment and in consultation with other specialists.
6	Prepare a procurement plan based on above.
7	Prepare model bidding documents in different procurement methods related to the completed detailed engineering designs, submit to ADB for review, and finalize for advance procurement actions.

2. Horticulture Sector Assessment

A. Sector Overview and Current Scenario

1. Indian Scenario

India's economic security continues to be predicated upon the agriculture sector. Even today, agriculture is the largest source of livelihood in the country. Currently, 54.6% of the total workforce is engaged in agricultural and allied sector activities (Census 2011)⁴. India's agricultural growth has steadily been growing at a rate of about 3%, annually, since the last forty years. However, its contribution in the economy has been steadily declining. The sector growth has decreased from 30% in 2000 to 14% in 2012. Furthermore, a continuous decline in the share of agriculture and allied sectors in the Gross Value Added (GVA) at current price from 18.2 percent in 2014-15 to 17.8 percent in 2019-20. The decline was mainly due to decrease in share of GVA of crops from 11.2% in 2014-15 to 9.4% in 2018-19⁵.

Gross Value Added by agriculture, forestry and fishing is estimated at INR 19.48 trillion (US\$ 276.37 billion) in FY20⁶. The share increased to 19.9 percent in 2020-21 from 17.8 percent in 2019-20. The sector has also witnessed a growth of 3.4% during 2020-21 despite the Covid-19 pandemic and economic slowdown caused due to the national lockdown. India with a large and diverse agriculture is among the world's leading producer of cereals, milk, sugar, fruits and vegetables, spices, eggs and seafood products.

Horticulture in India is growing at a fast pace in recent years. There has been a shift in area from food grains towards horticulture crops in the last five years (2014-2018). Horticulture sector contributes to 33% to gross domestic product of agriculture and 41% in the total agriculture production. The area under cultivations under horticulture crops is growing at a CAGR of 1.7% as compared to food grains which is declining at a CAGR of 0.1% (2014-2018).

Globally, India ranks 2nd in terms of total horticulture production, contributing to 11.2% share in world production⁷ following China. In the last decade, horticulture production in India is growing at a CAGR of 3.5% (2009-2018). In the year 2018-19, India produced 98.5 million MT of fruits and 185.8 million MT of vegetables, with total horticulture production of 313.8 million MT cultivated across 25.4 million hectares⁸. India has been bestowed with a wide range of climate and physic-geographical conditions, which leads to the diversification of horticultural crops such as fruits, vegetables, flowers, nuts, spices and plantation crops (coconut, cashew nut and cocoa) across the country.

India ranks first in the production of banana (25.7%), mango (including mangosteens and guava) (40.4%), papaya (43.6%), pomegranate, lime & lemon, okra, chickpea, spices etc., second in the production of other horticulture commodities. India horticulture production is on the rise since the past few years and this has enhanced the production area significantly. This increase in production is due to the growing demand of related food by the Indian middle class and changing consumption pattern towards fruits and vegetables. The per capita consumption of fruits in India stood at 67.34 kg per year in 2017-18, compared to the global average per capita consumption of 85.47 kg per year with regard to vegetables, the per capita consumption stood at 100.40 Kg per year as against the global average of over 152.37 kg per year. Per capita consumption level has a long way to go before they even meet global average

⁴ Agriculture statistics at a glance, 2018, Ministry of agriculture & farmers welfare, GOI

⁵ Economic Survey of India, 2020

⁶ Agriculture in India: Information About Indian Agriculture & Its Importance , India brand equity foundation, 2021
<https://www.ibef.org/industry/agriculture-india.aspx>

⁷ Horticulture statistics at a glance, National Horticulture Board, 2018

⁸ Area and production of horticulture crops for 2018 - 19 (3rd Advance Estimates), Department of Agriculture Cooperation & Farmers welfare, India

levels. According to a horticulture report, the Indian food demand is likely to grow over by 2.5% year-over-year over the next 10 years⁹.

Figure 1: Indian horticulture production in last 10 years

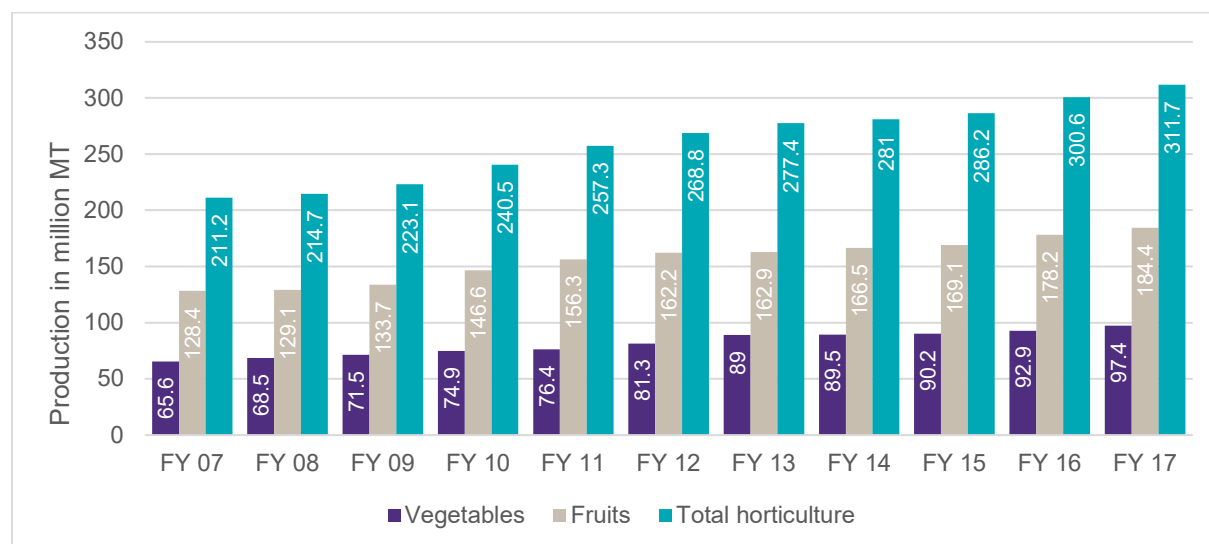
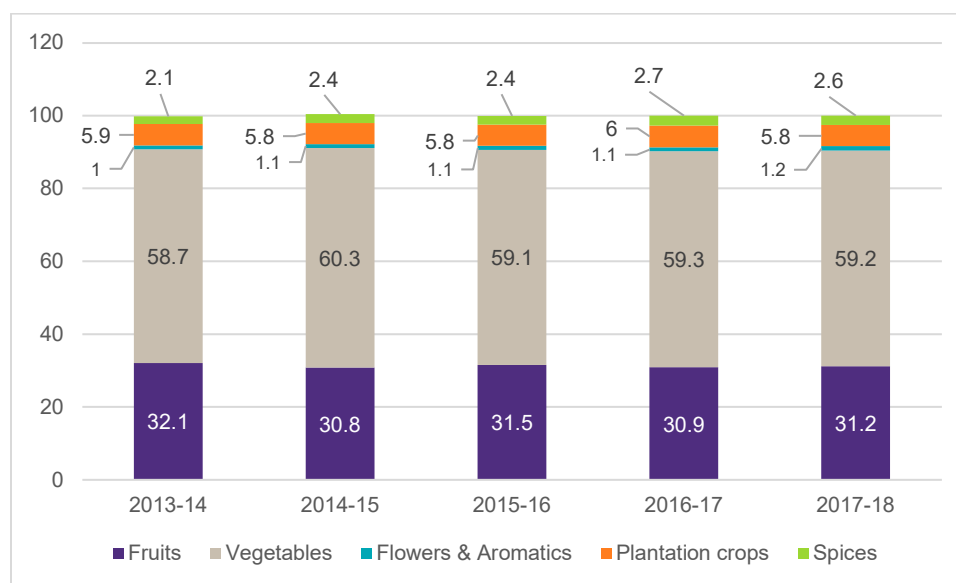


Figure 2: Percentage share of various horticulture crops in total horticulture for last five years



Though India's share in the global market is still 1%, there is increasing acceptance of horticulture produce from the country. In the recent years, India has gained significant importance in terms of varietal preference and quality of some horticulture produce. During 2018-19, India exported fruits and vegetables worth 1,469.33 USD Millions which comprised of fruits worth 692.01 USD Millions and vegetables worth 777.25 USD Millions in 2018-19. Grapes occupies the premier position in fruit exports followed by Mango, pomegranate, Banana, and Oranges, while Onions,

⁹ Mckinskey & Company, 2017: Harvesting golden opportunities in Indian agriculture: From food security to farmer's income security by 2025

Mixed Vegetables, Potatoes, Tomatoes, and Green Chilly contribute largely to the vegetable export basket. India's exports of processed food were Rs. 31111.90 Crores in 2018-19, which including the share of products like Mango Pulp, Processed Vegetables, Cucumber and Gherkins (Prepd. & Presvd), Processed Fruits, Juices & Nuts, Pulses, Groundnuts, Guar gum, Jaggery & Confectionary, Cocoa Products, Cereal Preparations, Alcoholic Beverages, Miscellaneous Preparations, and Milled Products.

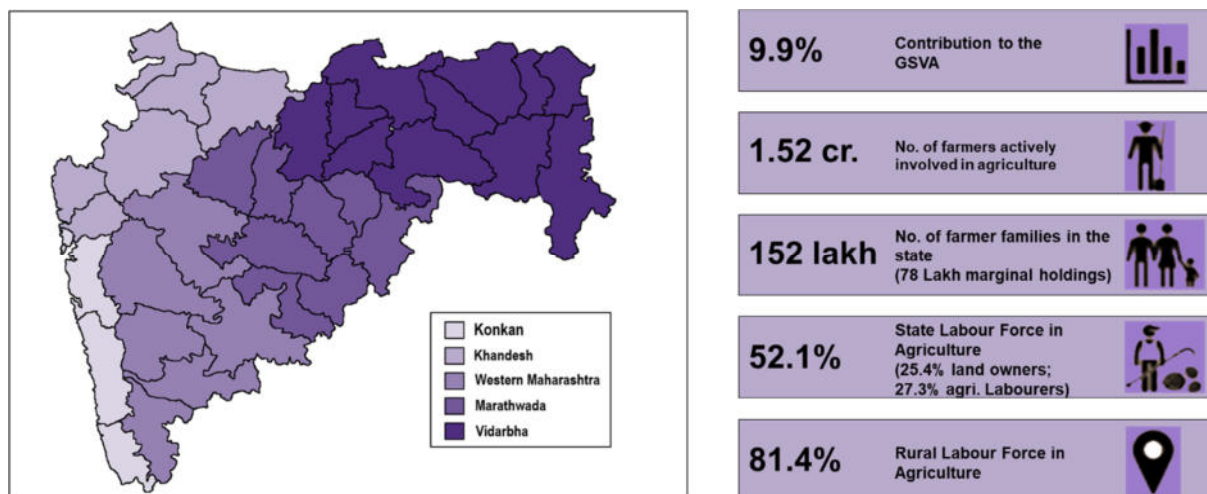
The major destinations for Indian fruits and vegetables are Bangladesh, UAE, Netherland, Nepal, Malaysia, UK, Sri Lanka, Oman and Qatar. Apparently, however, Indian export potential is yet to be realised and exports are shared more towards smaller markets such as the Middle East, than the USA and EU for most horticulture commodities. Also, despite being a world leader in production its presence in global trade and world exports is marginal. For example, in Banana, Indian exports stood at USD 55 million while Ecuadorian exports crossed 2.5 billion in 2018.

2. Maharashtra Scenario

Maharashtra's population in 2020 is estimated at 124.7 million, of which approximately 53 per cent is engaged in the agriculture and allied sector. Significantly, over 80 per cent of the rural population is dependent on agriculture.

There are 1.36 crore farmers in the State, of which 48.9 per cent and 29.5 per cent are marginal and small farmers, respectively (Agriculture Census 2015-16). The total area of small and marginal farmers (with land holdings up to 2 ha) stands at 89.25 lakh hectares and constitutes 45.2 per cent of the total area under agriculture. As per Agriculture Census 2015-16, Maharashtra, with an average size of operational land holding of 1.34 ha, ranks 11th amongst all States in terms of size of land holdings¹⁰. The total area under horticulture crop is 16.50 lakh hectares with an expected production of 242.71 lakh MT in 2019-20.

The share of agriculture and allied activities sector in the total Gross State Value Added (GSVA) is about 9.9 per cent during 2018-19. Agriculture and its allied sector together comprise four sub-sectors i.e. crops (horticulture and field crops), livestock, forestry, and fishing and aquaculture. Contribution to GSVA from different sectors is as follows: Horticulture and agriculture crops (60 per cent), livestock (24 per cent) and the forestry, fishing and aquaculture sector (17 per cent). Horticulture holds a significant share of about 30 per cent in GSVA of the crop sector¹¹.



¹⁰ Agriculture Census 2015-16

¹¹ Economic Survey of Maharashtra 2019-20

The State has emerged as one of the country's largest producers of fruit and vegetable crops. In terms of production, the State accounts for 11 per cent of total fruit and 5 per cent of total vegetable production in the country. In this regard, it is important to note that Maharashtra is the largest producer of seedless grapes and pomegranates in India. The State is also the 3rd leading producer of citrus fruits such as mandarin (orange). It is also a robust producer of other fruits such as banana, custard apple and strawberry. Furthermore, Maharashtra is the largest producer of onions in the country. Tomato, green chillies, ginger are among other major crops grown in the state. The State is also the leading exporter of fruits and vegetables such as Alphonso mangoes, grapes, pomegranates, oranges, bananas, onion, green chillies etc. from India to the European Union, Thailand, Netherlands, Doha, Bahrain etc.

The State of Maharashtra has a robust agri marketing infrastructure that includes 305 main market yards and 603 submarket yards to facilitate marketing of agri-produce. The State has also an established network of computerized Agricultural Produce Market Committees (APMCs), called 'MARKNET' which provides daily arrival and price information to farmers and has built greater efficiency and transparency in the functioning of APMCs by computerizing the system.

The state has about 581 cold storage units with an overall installed capacity of about 8.9 lakh MT. In addition, the State has about 158 pack-houses, which are registered with APEDA. However, these are mostly for specific fruits such as grapes, mango and pomegranate. Review of secondary information highlights that Government of Maharashtra is already undertaking significant measures to address the infrastructure requirement in the State. MSAMB has established about 21 export facility centres, and 20 fruit and vegetable modern market facility centres in the State. A Capacity of about 1919 MT in cold storage, 225 MT in pre-cooling and 200 MT in ripening chambers has been created in the State by the MSAMB¹².

Maharashtra has a dynamic food processing industry comprising of around 3040 registered small, medium and large food processing units that employ around 2.4 lakh workers, which is 15 per cent of the total formal workforce in the state. However, these are mostly concentrated in 11 out of 36 districts of the State, which include Mumbai, Pune, Kolhapur, Sindhudurg, Satara, Nashik, Jalgaon, Ratnagiri, Thane, Nagpur and Sangli. The Ministry of Food Processing Industries (MoFPI), Government of India is also facilitating development of agri-infrastructure projects for furthering value chain development in the State. Notably, it has sanctioned 3 Mega Food Parks in the State; one Mega Food Park has been sanctioned in each of the districts of Aurangabad, Satara and Wardha. Out of these 3 Mega Food Parks, the one in Satara is operational and the other two are under implementation. Moreover, 6 Agro-processing Clusters have been sanctioned by MoFPI in the districts of Amravati, Nashik, Nanded, Kolhapur, Osmanabad and Nagpur. Additionally, the state also hosts 6 Food Parks, 6 Industrial Areas and 1 SEZ for food processing.

Over the last one decade, the Government of Maharashtra has invested resources through various central and state government schemes, programs and multi-lateral funded projects such as the Maharashtra Agricultural Competitiveness Project (MACP), Convergence of Agriculture Initiatives in Maharashtra (CAIM), Asian Development Bank & Japan Fund for Poverty Reduction (JFPR). These efforts have led to institutional collectivization of farmers through Farmer Producer Organizations /Companies, Farmer Groups, Women Self Help Groups (SHGs) Federations etc. Currently, the State has over 1700 Farmer Producer Companies (FPOs) and over 600 women based SHG Federations that are actively engaged in enhancing value accruals to a farmer member base of over 10 lakh farmers.

3. Challenges faced by the State

¹² MSAMB, Government of Maharashtra, <https://www.msamb.com/Export/Facilities>

The share of the agriculture and allied activities sector in the total GSVA stood at 15.3 per cent in 2001-2002 but has fallen to 11.9 per cent in 2017-18. This declining trend, together with high dependency of the population on agriculture for livelihood, is worrisome and points to low productivity of agriculture. Reduction in average size of agricultural holdings from 4.28 ha to 1.34 ha, increasing number of marginal and small farmers, dependency on monsoon and weather and low productivity are some of the major concerns of the agriculture sector in the State. Though the share of “allied activities” within the agriculture and allied activities sector is comparatively less, its contribution with reference to livelihood is of immense importance. The increasing consumption of fruits and vegetables, milk and milk products, poultry, meat, fish and flowers due to changing lifestyle indicates substantial growth potential. This potential needs to be tapped to a greater degree for enhancing the income of farmers.

Small and marginal farmers dominate Maharashtra's agriculture, and commodity downturns significantly impact them as the State's agriculture is diversified and relatively integrated with global value chains. Women face a number of additional barriers to the transition to High Value Agriculture (HVA) and agribusiness. Women are less able to transition to HVA than do males, and their ownership of agricultural assets has stagnated. Males, in addition to production, also serve as actors in the upper levels of the value chains and play an active role as intermediaries or village-level traders and processors, wholesalers, retailers, or exporters. Unlike men, women are generally concentrated at the lower levels of the value chains. This division of labour is mostly a reflection of social and cultural norms, which discourage women to travel by themselves or to own land. These factors curtail access to resources and services, including credit, training, extension, inputs, and trading and marketing networks for women. Women do not have access to collateral to offer for security loans or the opportunities to participate in extension training because selection for such opportunities is often based on land ownership titles or other formal records. Moreover, there are few or no women service providers in extension, credit, input supply, or marketing. Despite the crucial roles that women play in harvesting and post-harvest processing, there is little or no training on quality control (including hygiene, sanitation) and on higher-value varieties of crops targeted at women.

As per the comprehensive vulnerability assessment study carried out under the Maharashtra State Adaptation Action Plan on Climate Change (MSAAPCC), the State also faces significant adverse risks from climate change. The results of the MSAAPCC climate modelling for 2030, 2050 and 2070 show that temperature and rainfall are projected to increase across the State, with important regional variations resulting in potentially significant adverse impacts on agriculture performance. Impacts will be further aggravated by the projected increase in the frequency of extreme climate events (droughts, hailstorms, floods, delays in the onset of monsoons, higher rainfall intensity) already experienced in the State in the recent past, as illustrated by the three severe droughts that hit the State over the last five years. Given these uncertain shifts in weather and climatic conditions, the small and marginal farmers are disproportionately exposed to higher risk and farm distress.

Despite the state having the largest number of farmer organizations including FPOs/ FPOs that are actively engaged in striving to enhance value accruals to its member base, very few number of FPOs have sustainably integrated within the organised supply chain of value adding industry, SMEs or even Start-Ups for that matter

The focus of the Government, at the Centre as well as State, has mostly been on enhancing productivity rather than on market-led production; there seems to be a disconnect between what the farmer produces and what the market demand. Going ahead, it will be important to create extension activities around the type of commodities demanded in domestic and international markets. Towards such a goal, it is also very important to reduce distortions and strengthen the linkages in the existing value chains.

B. Government Initiatives and Strategies

In the wake of the Covid-19 global pandemic, in order to boost the economy and to make India self-sufficient and self-reliant, the Government of India launched a mission named as '**Aatmanirbhar Bharat Abhiyan**' (Self-reliant India Movement) on May 2020¹³ with a special economic & comprehensive package of Rs 20 lakh crores. Under this mission the government also aims to transform the agriculture sector into a sustainable enterprise, and in order to do so GOI has taken landmark initiatives towards the development of **Aatmanirbhar Krishi** (Self-reliant farmers) in India. This initiative includes the following components:

- a) Farmers' Produce Trade and Commerce (Promotion and Facilitation) Ordinance, 2020¹⁴ to allow farmer to freely purchase and sell agriculture produce giving farmers multiple market options
- b) The Farmers' (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance, 2020¹⁵ to provide legal framework for agreements between farmers and buyers including processors, wholesalers, large retailers etc.
- c) The Essential Commodities (Amendment) Ordinance 2020 and revision of the APMC law will enable farmers to get the best price for their produce, be it local, national, or global markets¹⁶

These reforms will help farmers in doing free trade at farm gate and as per their will. This in turn will enable better price realization for farmers, attracting investment and make agriculture competitive. The government also provided a financial stimulus package to boost infrastructure support in agriculture and allied sectors, which includes¹⁷:

- The Rs 1 lakh crore agro infrastructure fund will help in strengthening farm gate infrastructure for farmers and benefit both supply and demand.
- The provision of Rs 50,000 crore for animal husbandry and fishery will enhance the scope for alternate income avenues for rural population.
- The Rs 10,000 crore scheme for the formalisation of micro food enterprises (MFE) and the cluster-based approach will help in building capacity at regional levels and better supply chain integration.
- Extension of Operation Green to all fruits and vegetables will enable farmers to diversify their produce and add much needed quicker cash generation, which comes with shorter sales cycles of fruits and vegetables.
- Several additional and emergency working capital funding schemes have been announced to improve the liquidity with the farmers.

In February, 2020 the government announced a new central scheme titled "**Formation and Promotion of Farmer Producer Organizations (FPOs)**" to form and promote 10,000 new FPOs with a total budgetary provision of Rs. 4496 crore for five years (2019-20 to 2023-24) with a further committed liability of Rs. 2369.00 crore for period from 2024-25 to 2027-28 towards handholding of each FPO for five years from its aggregation and formation¹⁸. FPOs will

¹³ <https://blog.mygov.in/atmanirbhar-krishi-aatmanirbhar-bharat/>

¹⁴ THE FARMERS' PRODUCE TRADE AND COMMERCE (PROMOTION AND FACILITATION) ORDINANCE, 2020, Ministry of law and Justice, Government of India
http://agricoop.nic.in/sites/default/files/The%20Farmers%20Produce%20Trade%20and%20Commerce%20%28Promotion%20and%20Facilitation%20Ordinance%2C%202020_0.pdf

¹⁵ The Farmers' (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance, 2020, Ministry of law and Justice, Government of India.
http://agricoop.nic.in/sites/default/files/The%20Farmers%20%28Empowerment%20and%20Protection%29%20Agreement%20on%20Price%20Assurance%20and%20Farm%20Services%20Ordinance%2C%202020_0.pdf

¹⁶ https://consumeraffairs.nic.in/sites/default/files/file-uploads/essential-commodities-order/EC_Ordinance.pdf

¹⁷ <https://www.hindustantimes.com/india-news/nirmala-sitharaman-live-8-point-agricultural-reform-announced-in-3rd-tranche-of-aatma-nirbhar-bharat-pkg/story-cOEhN5XEy4alkL4kmyJGzH.html>

¹⁸ <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1605030>

be formed and promoted through Cluster Based Business Organizations (CBBOs) engaged at the state/cluster level by implementing agencies. The CBBOs will have five categories of specialists from the domain of Crop husbandry, Agri marketing / Value addition and processing, Social mobilisation, Law & Accounts and IT/MIS. These CBBOs will be platform for an end-to-end knowledge for all issues in FPO promotion.

Additionally, Government of India (GoI) and Government of Maharashtra (GoM) have launched a number of programs, policies, and reform initiatives under the overarching vision of **“Doubling Farmer’s Income by 2022”**. New initiatives to address the production risks include a crop insurance scheme with enhanced coverage and use of technology; and a dedicated long-term irrigation fund with an initial tranche of US\$3 billion¹⁹. Further, to liberalise the regulated agriculture market, the GoI launched and GoM adopted, second-generation marketing reforms, including the move towards integrating the country into a unified national market. Further, 100 per cent Foreign Direct Investment (FDI) is allowed to enhance investments in agribusiness/food processing sectors. The Government of India is targeting doubling of agriculture exports to 4 per cent (US\$ 60 billion) of global agriculture exports by 2022. Government of India has also come out with Agriculture Exports Policy 2018 that aims at doubling the agri exports from India from USD 30 Bn to USD 60 Bn by 2022 by focussing on specialised cluster and value chains in different states to augur growth the exports.

Government of Maharashtra has developed a Vision 2030²⁰ document for the state which envisages promotion of sustainable agriculture. It also envisages ensuring availability and sustainable management of water in line with Sustainable Development Goals (SDGs). In this context, the State government has proposed various major initiatives for enhancement of crop productivity, improving yield and quality of horticulture and floriculture, reducing cost of cultivation, integrated farming system approach, promotion of group farming, soil and water conservation for moisture security, creation of quality infrastructure for storage and processing to control wastage, post-harvest technology for value addition, promotion of value addition chain, promoting export of agriculture produce, agriculture credit and risk mitigation as part of 2030 vision strategy.

Further, Government of Maharashtra has issued the Maharashtra State Agriculture Export Policy to establish Maharashtra as agri export hub in the country. The policy is framed with a focus on agriculture export-oriented production, export promotion, better farmer realization and synchronization within policies and programs of Government of India and Government of Maharashtra. It is focused to have a “Farmers’ Centric Approach” for improved income through active involvement of farmers in export²¹.

Moreover, the State government has launched various programmes and schemes for targeting agriculture and rural transformation as mentioned below:

1. **State of Maharashtra’s Agribusiness and Rural Transformation (SMART) – The World Bank**

Government of Maharashtra has launched State of Maharashtra’s Agribusiness and Rural Transformation (SMART) Project in order to transform agriculture and livelihoods sector in Maharashtra assisted by The World Bank. This project aims to revamp agricultural value chains, with special focus on marginal farmers across 1,000 villages of Maharashtra aligned with the Government of India’s efforts towards doubling of farmers’ income by 2022. The objectives of the project is to support development of inclusive and competitive agriculture value chains focusing on smallholder farmers and agri-entrepreneurs in Maharashtra. This would be achieved

¹⁹ https://niti.gov.in/writereaddata/files/document_publication/DOUBLING%20FARMERS%20INCOME.pdf

²⁰ http://14.139.60.153/bitstream/123456789/12412/1/Vision%202030_Maharashtra.pdf

²¹ <https://www.msamb.com/Documents/bc513f39-b929-4e4b-9a2b-98e2b914a5a3.pdf>

by expanding access to new and organized markets for producers and enterprises with complementary investments in provision of technical services and risk management capabilities. The broader project interventions identified are expanding of market access of the producers and entrepreneurs to a range of technical and business development services to strengthen risk mitigation measures to respond to commodity-price fluctuations and agriculture sector crises and build the State capacity for evidence-based agribusiness reforms²².

2. Project on Climate Resilient Agriculture (PoCRA) – The World Bank

Maharashtra has been facing periodical draughts and floods in various region of the state. The Government of Maharashtra along with the World Bank has launched a project with a project loan amount of US\$ 420 million which will be spent on enabling farmers to mitigate the adverse effects of climate change. The project objectives involve:

- Promotion climate resilient agricultural systems
- Climate smart post - harvest management and value chain promotion
- Institutional development, knowledge and policies for climate resilient agriculture.

The project aims to address issues leading to production loss as a result of erratic weather patterns and changing cycles.

Funds will be used for development of min water shed projects, on farm climate resilient technologies and agronomic practices, development of climate resilient catchment areas, developing and promoting climate resilient commodity value chains, improving performance of and making supply chains climate resilient, establishing a Maharashtra climate innovation centre.²³.

3. Nav Tejaswini Rural Women Empowerment Programme – International Fund for Agricultural Development (IFAD)

The overall goal of the project is to enable one million poor rural households to overcome poverty (sustainable in economic, social, and environmental terms, including climatic resilience). Through this project, the government aims to improve the capacity of rural women to diversify into sustainable enterprises or engage in remunerative employment and enhance their access to markets. The project will focus on three components: a) Market driven enterprise development for micro and small enterprises; b) Enabling support services at enterprise and household levels to optimize SHGs member household participation in the enterprise development process; c) Institutional strengthening of MAVIM and project management²⁴.

C. Value Chain Assessment

Introduction

Many of the horticulture value chains in Maharashtra are the most export-oriented in the country. However, in a global context and given production volumes, exports are rather marginal. Furthermore, the rapidly growing domestic market is yet to be adequately tap through commodities and value-added produce. While National and global demand

²² <https://projects.worldbank.org/en/projects-operations/project-detail/P168310>

²³ <https://projects.worldbank.org/en/projects-operations/procurement-detail/OP00077703?id=OP00077703>

²⁴ Nav Tejaswini Maharashtra Rural Women's Enterprise Development Project, Government of Maharashtra, 2019 <https://www.ifad.org/en/web/operations/project/id/2000002980>

conditions are favourable, various factor conditions in terms of productivity, farming skill and GAP, access to credit and limited post-harvest and processing infrastructure have been constricting the potential of value chains. In addition, the absence of an enabling environment in terms of favourably orienting FTAs and developing Sea Protocols have been restraining global market access to the extent desired. Value chain upgrading will involve using “enablers” like farmer skill sets, developing value chain organisations like FPOs with the MSAMB as an accelerator leveraging private and government investment as well as technology. These enablers’ need intervene at the farm, post-harvest and processing levels as well as market connectivity and penetration levels to exploit the vast domestic and export market for commodity and value-added produce. Appropriate interventions to restructure and transform value chains will increase value accruals at the National level as well as contribute to farmer livelihood. This section speaks about a brief on the various values chains selected under MAGNET. Provided below is a snapshot of the targeted value chains: -

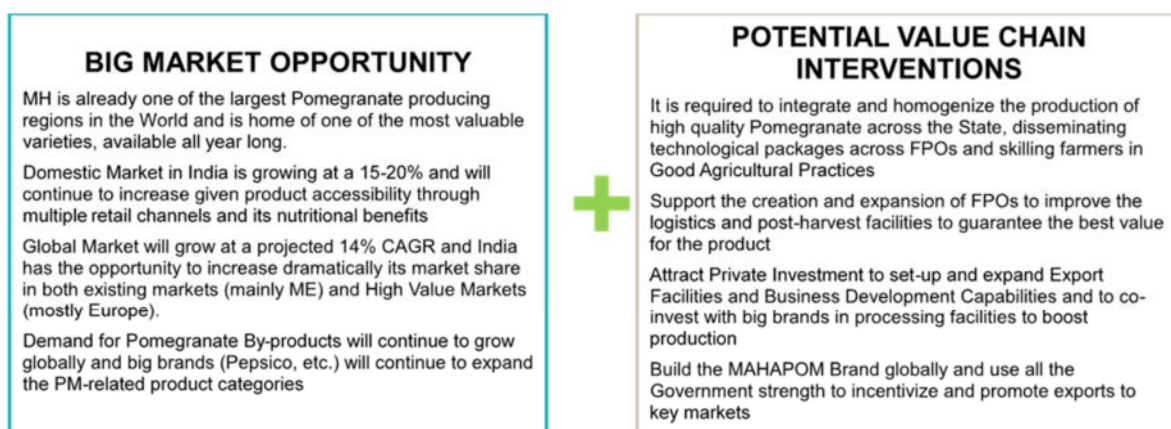
1. Pomegranate

India is the largest producer of pomegranate in the world, following Iran and Thailand. However, its share in world exports is barely 3 per cent. The global market was pegged at USD 8.2 Billion in 2018. While leading pomegranate producing states in India are Maharashtra, Gujarat and Karnataka, Maharashtra is the leading exporter. Major producing districts/clusters in Maharashtra comprise Nashik, Solapur, Ahmednagar, Pune and Sangli. Notably, pomegranate is produced year around in Maharashtra and this lends the state off-season advantages vis-à-vis other producing states. This advantage also prevails with respect to other countries where supply is for a limited period (fall and early winter). Pomegranate demand has been growing with its importance as a “superfood” owing to its nutritional characteristics. There is scope for processing into a range of value-added products including arils, pomegranate powder, jams, wine, anardana and nutraceuticals.

Major challenges in the Pomegranate value chain across different stakeholders:

- Yield is relatively low in India @ 12.16 MT per hectare, when compared Turkey’s 27.26 MT per hectare. Yield per hectare even in Tamil Nadu stood at 23.3 MT per hectare. Hence, there is apparently scope for productivity enhancements.
- While India is the largest producer of pomegranate, it accounts for a meagre 3 per cent share in global exports at a mere USD 99.98 Million. Global exports stood at USD 3.96 Billion. Export potential is yet to be tapped. Vietnam and Thailand are leading exporters. Per capita, fruit consumption in India stood at 67.34 per cent per year in 2017-18. This is even while the average global per capita consumption stood at 85.47 kg. Hence, there is also great scope to tap the growing domestic demand.
- Limited availability of disease-free planting material, varieties resistant to biotic and abiotic stresses.
- Lack of adoption of standardised PoPs or PHM as to ensure the quality of produce.
- Limited grading and sorting as well as pack house facilities.
- Limited FPO focused interventions to facilitate appropriate primary processing on the basis of colour and size.
- Lack of adequate cold store and IQF infrastructure.

Figure 3: Value Chain Transformation – Strategic Vision for Pomegranate

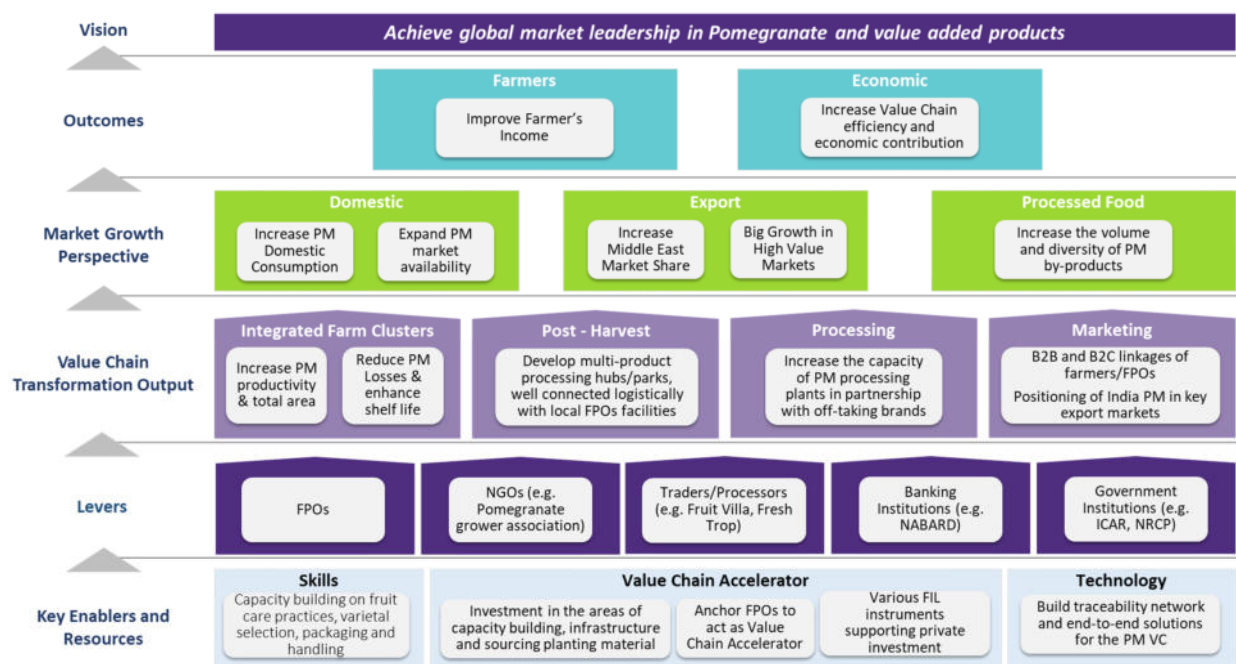


THE POMEGRANATE VALUE CHAIN VISION 2030

Achieve global market leadership in Pomegranate and value added products

As part of the action plan to upgrade the value chain there is a need for enhanced extension services for the dissemination of better cultivation practices, fruit care activities etc. The need for infrastructure and technical support to encourage a greater degree of processing; need for pack house, cold store and refer van facilities to reduce PH losses and increase the shelf life of products; and generic global brand promotion of the “Bhagwa” variety known for its taste and quality. It is also necessary to integrate and homogenise the production of quality pomegranates. There is also scope to promote the MAHAPOM brand along with the private sector as well as promoting evolution of FPOs to strengthen the supply base. As part of Vision 2030, India can aspire to be the global leader in the production and processing of pomegranate and its value-added products.

Figure 4: Value Chain Transformation - Strategic Map for Pomegranate



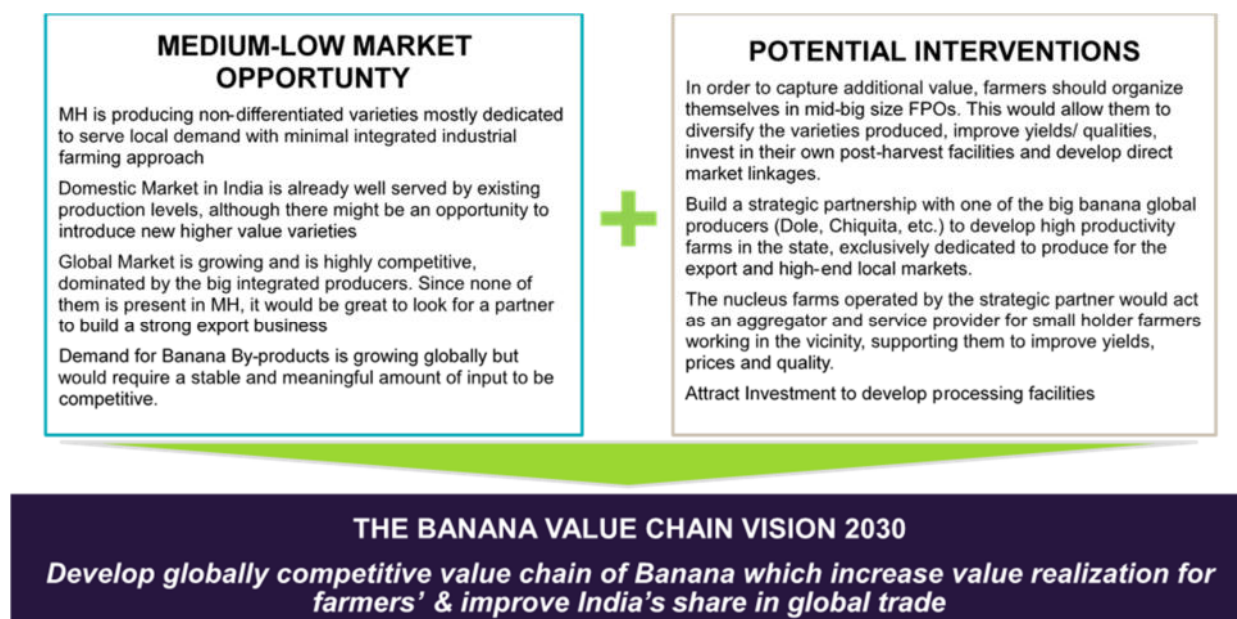
2. Banana

India is the largest producer of banana followed by China and Indonesia. The country produces about 27 percent of global output. However, its share in world exports is barely 0.57 percent. The global banana market was pegged at USD 12.31 Billion in 2018. Leading banana producing states in India are Andhra Pradesh, Gujarat and Maharashtra. Nevertheless, Maharashtra is the leading exporter of fresh banana and produces 14 percent of national output. Major producing districts/ clusters within Maharashtra include Jalgoan, Nanded, Solapur, Nundurbar and Akola. Banana is popular not only for its nutritional value but also because of its economic importance to small holder farmers. There is scope for processing banana into a range of processed products such as banana puree, powder, jam, juice, sauce and vinegar. Importantly, banana is grown around the year in Maharashtra.

Major challenges in the Banana value chain across different stakeholders:

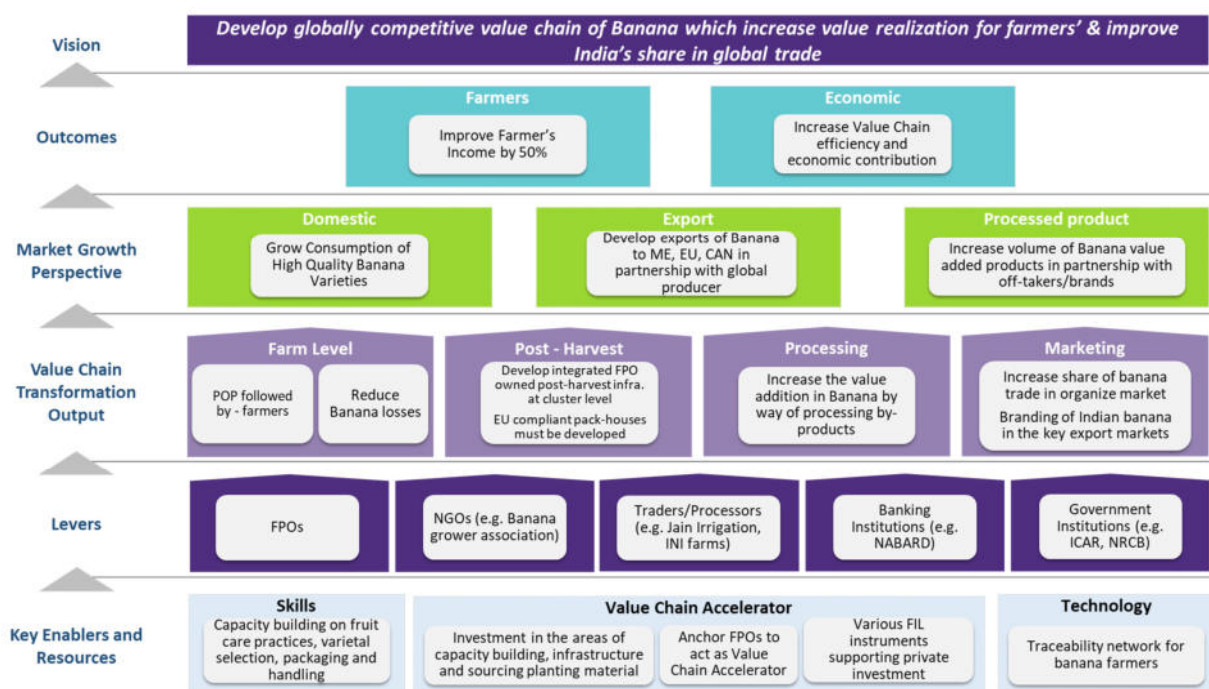
- Productivity in India falls short of global productivity levels in the range of 65 MT/Hectare in Turkey, Nicaragua and Indonesia. Yield in Maharashtra is barely 52.25 MT even while yield in other leading states like Gujarat and Andhra Pradesh matches benchmarked global levels.
- The value accrued to typical farmers is only about 21.81 percent of total value while the value accrued to marketing stakeholders like traders, wholesalers and retailers is over 35 percent. Farmers' share in consumer price is rather low. Also, India's export is less than 1 percent of world exports and is far behind Ecuador, Philippines and Costa Rica. Also, Indian exports are skewed more towards the UAE and Nepal and not towards large and premium destinations like the USA and the EU. Ecuador exports over USD 3.1 Billion (2018).
- India is yet to exploit logistical and shipping advantages, and exploit FTAs to penetrate the USA and EU markets.
- The sector is dependent on pre-harvest contractors and suffers from the withdrawal of rail rake facility for economical transport across India.
- Best quality banana is sourced at the farm gate by traders, and there is no auction in market yards.
- Farmers have to resort to sale during harvest period and market glut and hence earn lower value.
- Lack of PoPs and SOPs in pre and post-harvest segments of the VC.
- There is inadequate infrastructure facility for pack houses, transport, refer containers, cold storage and artificial ripening facilities to reduce post-harvest losses.
- There are also inadequate facilities to meet the demand for planting material.

Figure 5: Value Chain Transformation – Strategic Vision for Banana



As part of an action plan to upgrade the value chain: capacity- building of farmers in modern cultivation, fruit care and PHM is required; there is scope to introduce new high-yielding varieties for exports; encourage private and public investment in pack houses, cold stores to reduce post- harvest losses. Setting up tissue culture unit in the major production clusters to ensure propagation of quality planting material. There is also scope to tie-up with global producers like Dole and Chiquita to develop export-oriented farms. FPOs need also to be promoted to ensure better farm and farm level outcomes. In addition, there is also huge scope for innovation in value added products and to increase initiatives towards by-product processing such as wine, fibre, paper etc.

Figure 6: Value Chain Transformation - Strategic Map for Banana



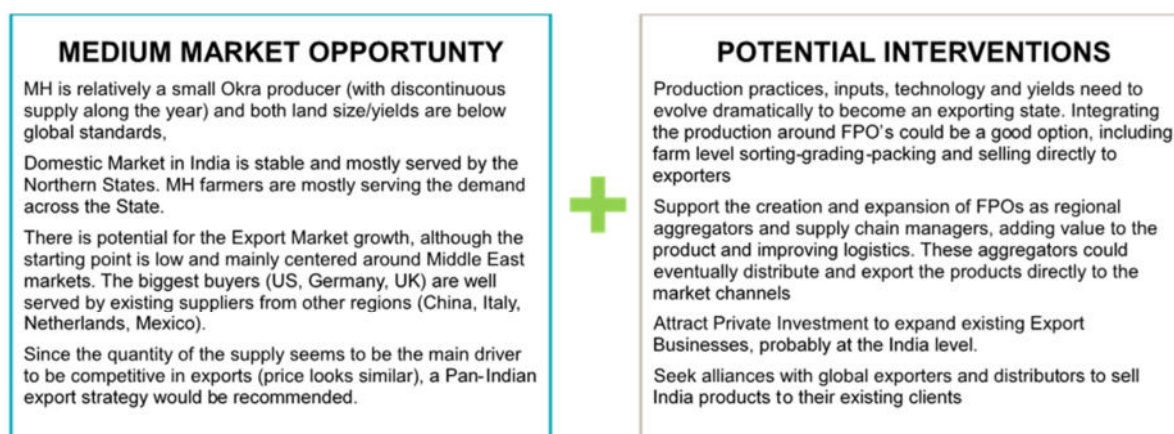
3. Okra

India is the largest producer of okra followed by Nigeria in a global context. Total global exports account to about USD 2.13 Billion (2018) of which India contributed to less than 7%. The leading exporters are China, Italy and the Netherlands. Within the Country, Gujarat, West Bengal and Bihar are the top 3 okra producing states. Maharashtra is the leading exporter of okra from India despite producing only about 2.2 percent of total production in the country. Okra is produced around the year and major producing districts / clusters in Maharashtra include Pune, Jalgaon, Thane, Nashik and Satara. Okra is a multipurpose crop due to its various uses of fresh leaves, dubs, flowers, pods, stems and seeds. Immature fruits are consumed as vegetables and can be used in salads, soups and stews, fresh or dried, fried or boiled. Often the extract from the fruit is added to different recipes like stews and sauces to increase consistency. It also has medical application related to cholesterol, and plasma replacement therapy. Okra gum is also used as an industrial lubricant

Major challenges in the Okra value chain across different stakeholders:

- Average yield in Maharashtra is only 9.97 MT / hectare compared to countries like Senegal with productivity of hectare. In fact, even Jharkhand has a yield of 17.10 MT per hectare.
- Pesticide residue is an aspect of concern.
- There are inadequate sorting and grading facility at the farm level. So also, are inadequate storage and transport facilities (for storage at 8 - 15°C)
- Limited GAP and traceability initiatives and compliance initiatives with EU norms.
- India is yet to tap premium export markets.

Figure 7: Value Chain Transformation – Strategic Vision for Okra

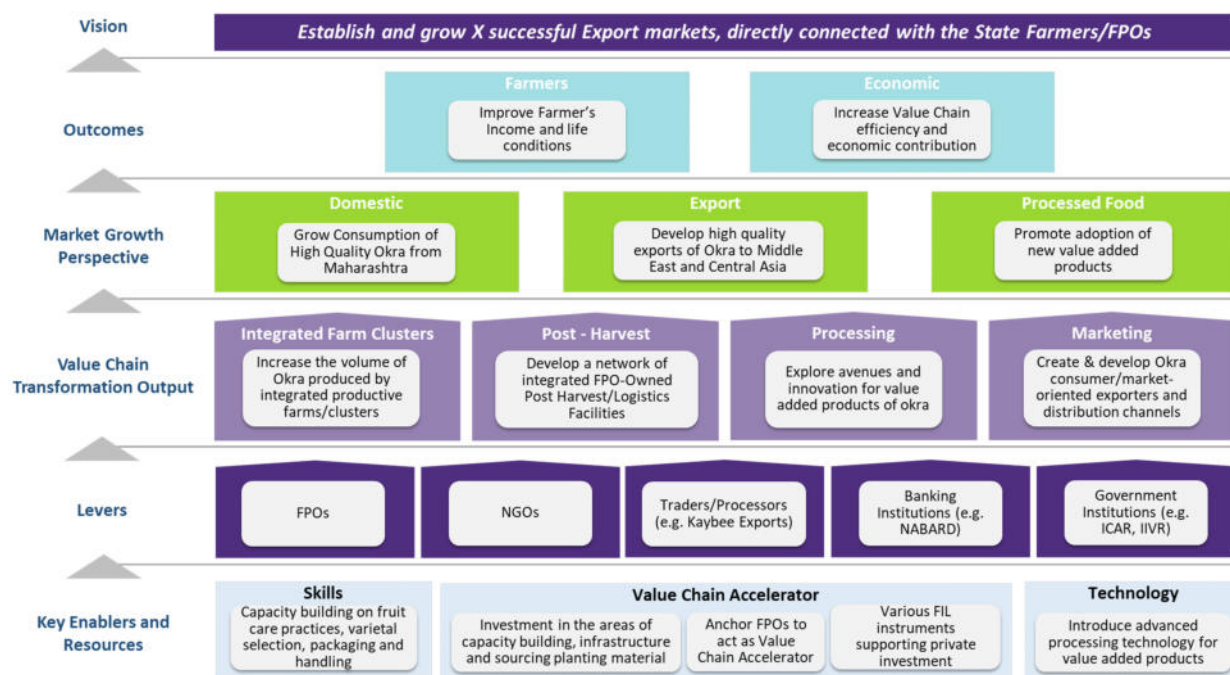


THE OKRA VALUE CHAIN VISION 2026

Establish and grow successful Export markets, directly connected with the State Farmers/ FPOs

As part of an action plan to upgrade the value chain: there is need to enhance productivity and compliance levels through farmer training in GAP, IPM and MRL; private investment need be channelled into post-harvest infrastructure and value addition activities; need to penetrate export markets which is presently cantered around the Middle-East towards USA and the EU. These premium markets are presently catered to by China, Italy, the Netherlands and Mexico. Also, FPO led initiatives have good scope.

Figure 8: Value Chain Transformation - Strategic Map for Okra



4. Orange

India is the largest producer of oranges in terms of production area, and the third largest in terms of production volume in the world. India contributes to about 11 per cent of global production. Orange is grown significantly in Brazil, China, the USA and Mexico. In India, the leading states are Madhya Pradesh, Punjab and Maharashtra. In fact, Maharashtra produces 16 per cent of total production in India. Brazil produces 22 per cent of global production, and India about 11.06 per cent. Spain, South Africa, Egypt and the USA are the leading exporters. Oranges account for more than half of the world production of all citrus fruits, of which, other important species are lemon, grapefruit and mandarin. Nagpur and the Vidharba regions are referred to as the “California” of Maharashtra state. Of the 75 million tonnes of oranges produced globally every year, about 1/3rd is processed into juice and balance consumed as table variety. Oranges also have medicinal applications related to fever, skin diseases and chronic illnesses. Nagpur Mandarin is the most popular mandarin variety in the world. There are two major seasons for orange every year in Maharashtra.

Major challenges in the Orange value chain across different stakeholders:

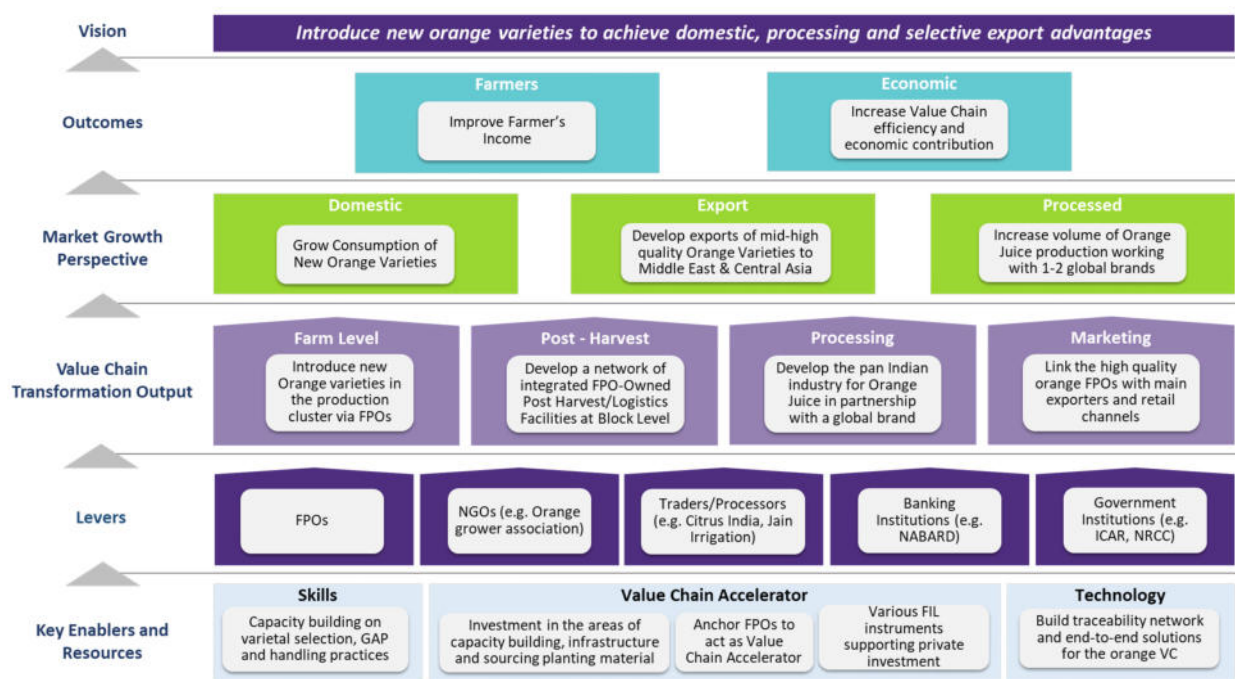
- The average productivity of oranges in India is 11.90 MT/hectare while Maharashtra has a yield of only 7.4 MT/hectare. Punjab enjoys a yield of even 23.40 MT/hectare. Brazil has the highest productivity in the global context due to special varieties.
- Poor irrigation infrastructure in the orange growing regions and inadequate implementation of GAP.
- India contributes to less than 1 per cent of global orange exports.
- India's exports are skewed towards Bangladesh, Nepal and the Middle-East, and not towards more premium and large markets like the EU.
- Typical Indian variety of orange is not suitable for exports due to loose skin.
- High pesticide residue and inadequate adoption of GAP is an area of concern.
- Limited cold storage facilities are also a critical gap.

Figure 9: Value Chain Transformation – Strategic Vision for Orange



As part of the action plan to upgrade the value chain: processing infrastructure need to be established through encouraging the private sector; FPO based operations may be promoted; and technology application, even basic ones such as mechanical grading facilities is important. There is also potential to diversify the varieties produced and undertake initiatives to increase yield. There is also scope to build strategic partnerships with global value chain leaders like “PepsiCo” to serve as an accelerator and encourage the establishment of high productivity farms, value added products etc.

Figure 10: Value Chain Transformation - Strategic Map for Orange



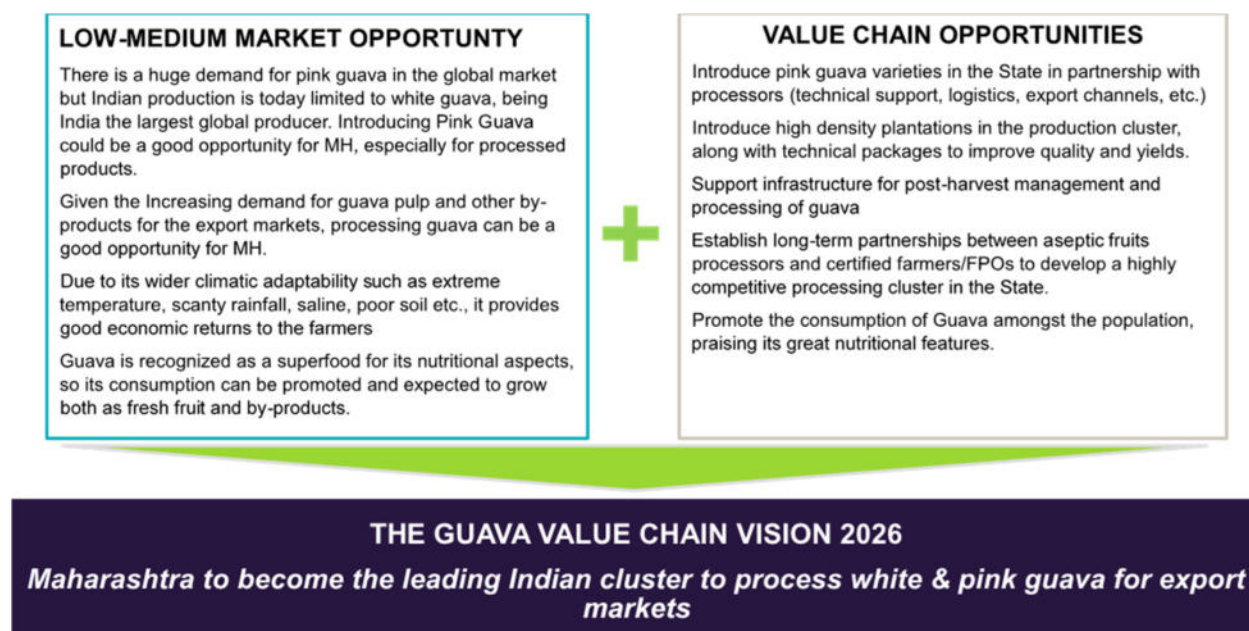
5. Guava

India is the largest producer of guava in the world in terms of production area with the global export share of less than 1 per cent. Guava is currently being cultivated in more than 60 countries with India, China and Thailand as the major producers. Leading exporting countries include Mexico, Netherlands (re-export), Vietnam, Thailand and Peru. In India the leading guava, producing states are Uttar Pradesh, Madhya Pradesh, Bihar, Andhra Pradesh and West Bengal. Maharashtra contributes to only 3 per cent of the total National production and ranks 12th in the country. The guava production in Maharashtra is declining at a CAGR of 15.6% over the last 5 years (2014-2018) this may be attributed to low productivity, aberrant weather conditions and poor price realization to farmers. The major guava producing districts in Maharashtra include Ahmednagar, Nundurbar, Jalgoan, Nashik and Pune. The export of guava has been on rise in Maharashtra in the last 6 years and it is growing at a CAGR of 22.6% (2014-2018) in quantity. Maharashtra accounts for 61% of the total exports in the country. Leading export destinations include Middle East, Germany, Netherlands and Maldives. Guava is also exported widely in the processed form, which includes jam, jellies, marmalade, and guava squash. The processed guava export market in India is growing at a CAGR of 28.3% whereas in Maharashtra the processed market growth is at 6.8% (2014-2018). Guava has a high nutritive value crop and is a rich source of vitamin, minerals, protein and anti-oxidants. Due to its wider climatic adaptability and hardy nature, it can provide a handsome economic return per unit area to the farmers. However, a precise management is needed to produce a highly profitable crop.

Major challenges in the Guava value chain across different stakeholders:

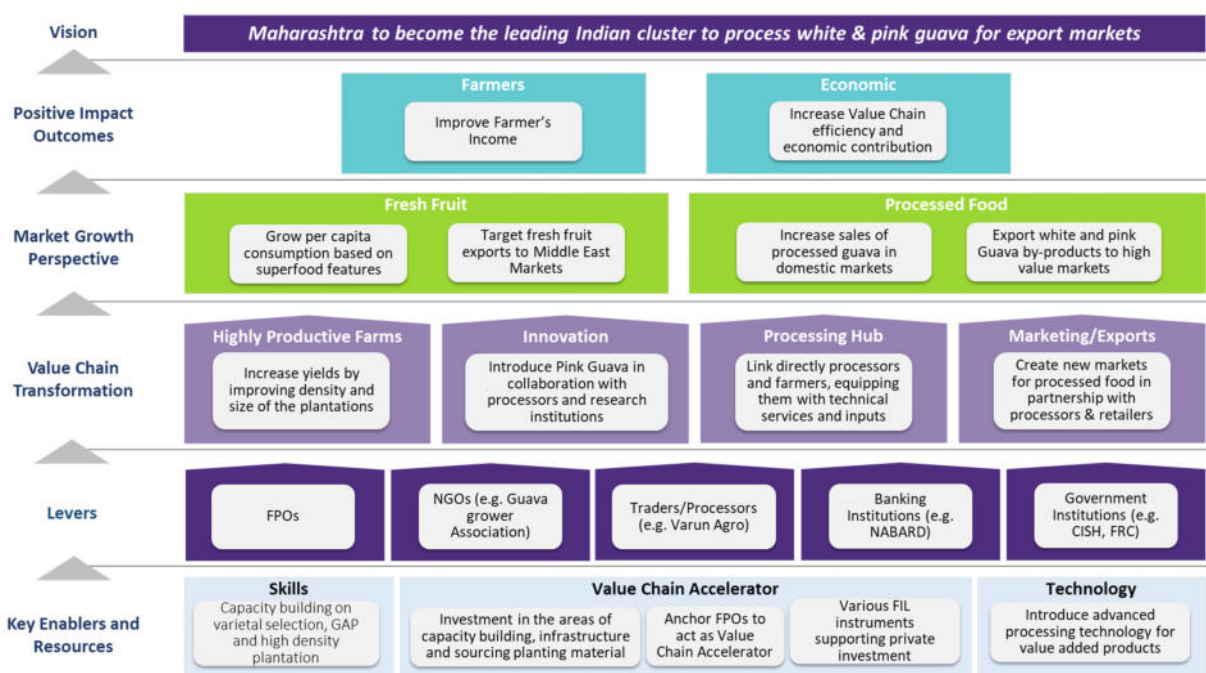
- Productivity in Maharashtra at 13.5 MT/ hectare is lower than even the National average of 15.3 MT/hectare.
- In the global export market there is a huge demand of pink guava but Indian production is only limited to white guava production
- India's exports are marginal. Only 0.023% of the total produce was exported in 2018
- Lack of quality planting material and knowledge on improved cultivation practices leads to poor productivity and higher losses
- Currently, farmers in Maharashtra are not using post-harvest management practices for guava and the lack of dedicated infrastructure leads to post-harvest losses
- There is huge demand of processed products e.g. guava pulp in domestic and export market but there is no infrastructure support for small and marginal farmers to capitalize on it

Figure 11: Value Chain Transformation – Strategic Vision for Guava



As part of an action plan to upgrade the value chain: there is need to enhance productivity and compliance levels through farmer training in GAP, IPM and establish farm level infrastructure for post-harvest and processing. There is also a huge scope to introduce pink guava varieties in the state in partnerships with processors (technical support, logistics, export channel etc.). Introduce high-density plantations in the production clusters and establish long-term partnerships between aseptic fruits processors and certified farmers/FPOs to develop a highly competitive processing cluster in the State.

Figure 12: Value Chain Transformation - Strategic Map for Guava



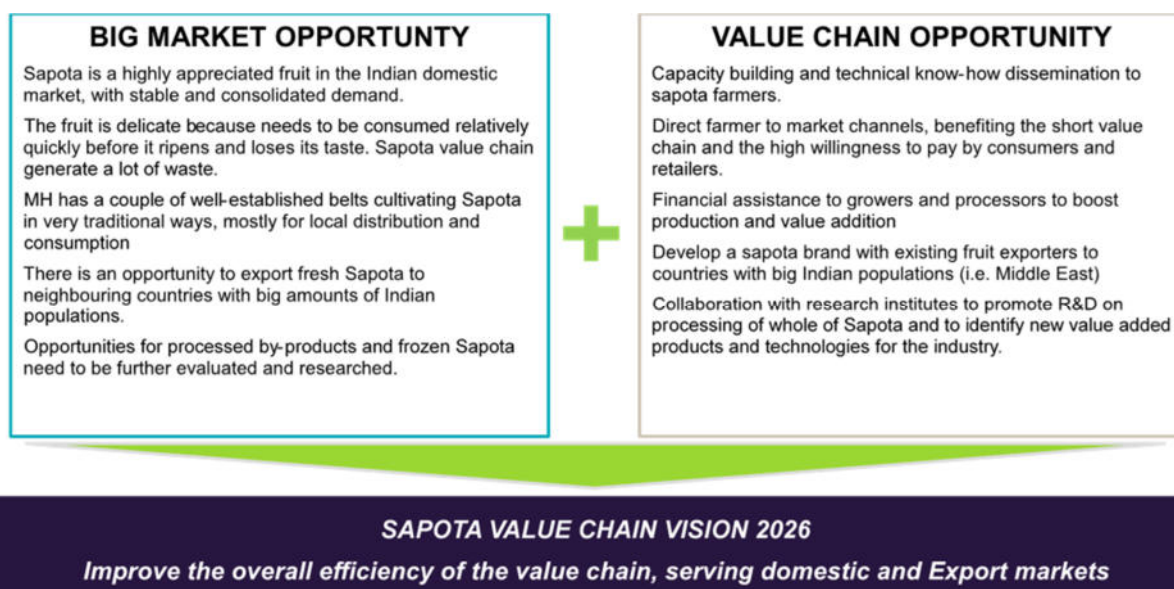
6. Sapota

Sapota/Sapodilla is currently being cultivated in many countries such as Pakistan, India, Thailand, Malaysia, Cambodia, Indonesia, Vietnam, Bangladesh and Mexico. In majority of the countries, it is commercially grown for the production of chicle, which is a gum like substance used from preparation of chewing gums. In India, it is mainly cultivated for its fruit value. Gujarat, Karnataka and Tamil Nadu are leading producing states in the country. Maharashtra ranks 4th and produces 12 per cent of total production in the country. The major sapota growing clusters include Palghar, Pune, Ahmednagar, Solapur and Aurangabad. The sapota production in Maharashtra is growing at a CAGR of 0.4% compared to the national CAGR of -5.7% (2014-2018). The export market of sapodilla is limited because of its indigenous consumption. India exported 0.13% of the total sapota production in 2018 of which Maharashtra contributed to 95% in the total export volumes. Leading export destinations include Middle East, Canada, Singapore and USA.

Major challenges in the Sapota value chain across different stakeholders:

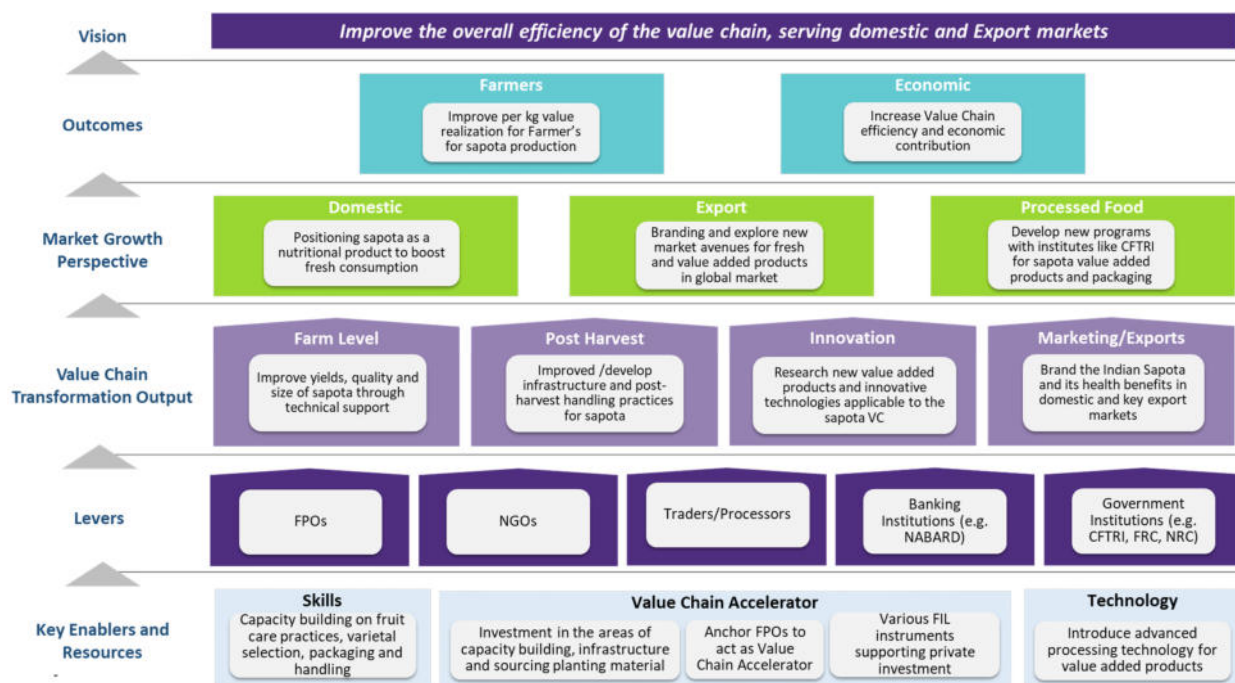
- Average yield in Maharashtra is about 8.21 per hectare, which is lower than the National yield of 8.87 MT/hectare.
- Farmers lack knowledge and experience on improved cultural practices
- Sapota is a highly perishable fruit which leads to a lot of wastage due to improper handling and post-harvest practices
- Commercial processing is negligible due to the sensitivity of the fruit.
- Sapota as a fruit is not well known in the export markets
- Lack of dedicated infrastructure for sapota post-harvest management and backward & forward linkages, which leads to reduce efficiency and price volatility.

Figure 13: Value Chain Transformation – Strategic Vision for Sapota



As part of an action plan to upgrade the value chain: there is need of capacity building, knowledge dissemination to sapota farmers on GAP, IPM and establish farm level infrastructure for post-harvest management. There is a need for direct farmer to market channels, benefiting the short value chain and the high willingness to pay by consumers and retailers. Develop a sapota brand with existing fruit exporters in countries with big Indian populations (i.e. Middle East). Introduce high-density plantations in the production clusters and collaborate with research institutes to facilitate R&D on processing of whole of Sapota and to identify new value added products and technologies for the industry.

Figure 14: Value Chain Transformation - Strategic Map for Sapota



7. Green Chilli/ Red Chilli

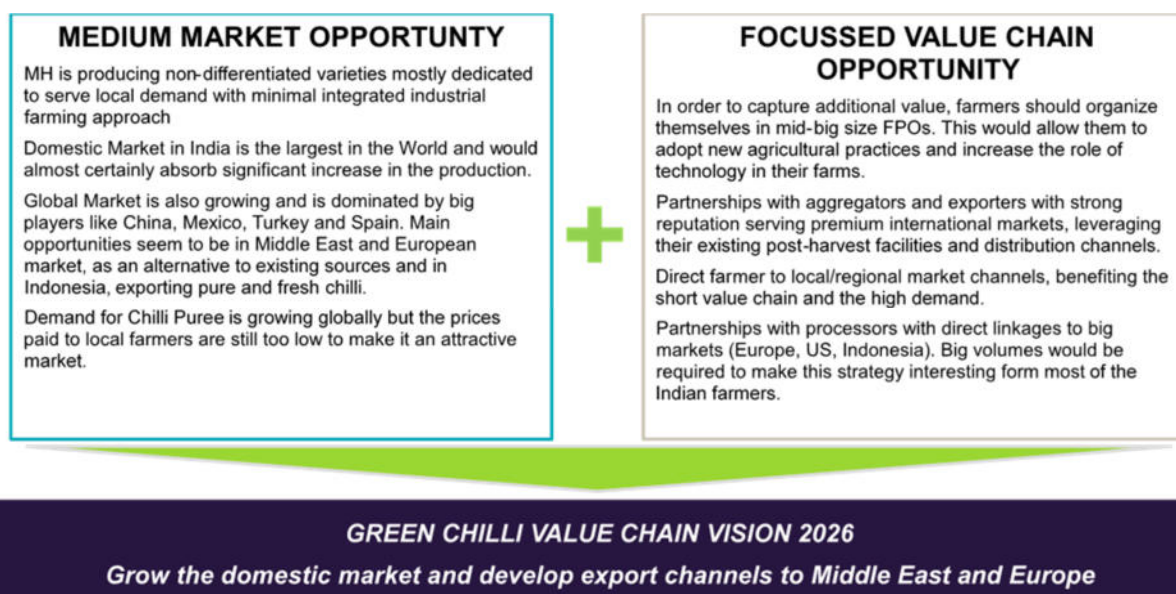
Chillies are cultivated across the globe with China, Mexico, Turkey, Indonesia, Spain, Nigeria, Egypt and USA as the largest producer. India is the largest consumer of green and red chillies. India shares 0.22% in the global production of chillies and pepper²⁵ and 1.1% in the global export market as of 2018. Besides this, India is the largest producer of dry chillies and shares 43% in the total global production. In India, Madhya Pradesh, Andhra Pradesh and Bihar are the top 3 green chilli producing states. Maharashtra accounts for 10 per cent of total Indian production with the average productivity of 11.2 MT/ha equivalent to the national average (11.6 MT/ha). The important chilli producing districts in Maharashtra include Nagpur, Nandurbar, Pune, Jalgaon and Nashik. In terms of export quantity, Maharashtra contributed 86% of the total volume exported from the country in 2018. Major exporting countries include, Spain, Mexico, Netherlands, Canada and USA and major importing countries include, USA, Germany, UK, France and Canada. India's leading export destinations include Middle East, Bangladesh, Italy, Belgium and Australia. Chilli is produced year around. India exports chilli in the form of dried chilli, chilli powder, chilli paste, pickle chilli and chilli oleoresins.

Major challenges in the Green & red chilli value chain across different stakeholders:

- Though Indian chilli is preferred for its colour and pungency levels, sustainable supply and specification mismatch is of concern
- Lack of farm level infrastructure for farmers for primary processing, value addition etc.
- Lack of dedicated infrastructure for processing and post-harvest management of fresh chillies
- Maharashtra farmers are only dedicated to growing green and red chillies whereas there is also a growing export market opportunity for Jalapenos
- Lack of market information and market intelligence to farmers on export potential
- Lack of traceability and farmers' database to understand the production practices and quality specifications
- Poor forward and backward linkages of farmers with processors, exporters etc.
- Price volatility in markets and low-price realisation to farmers is of concern.

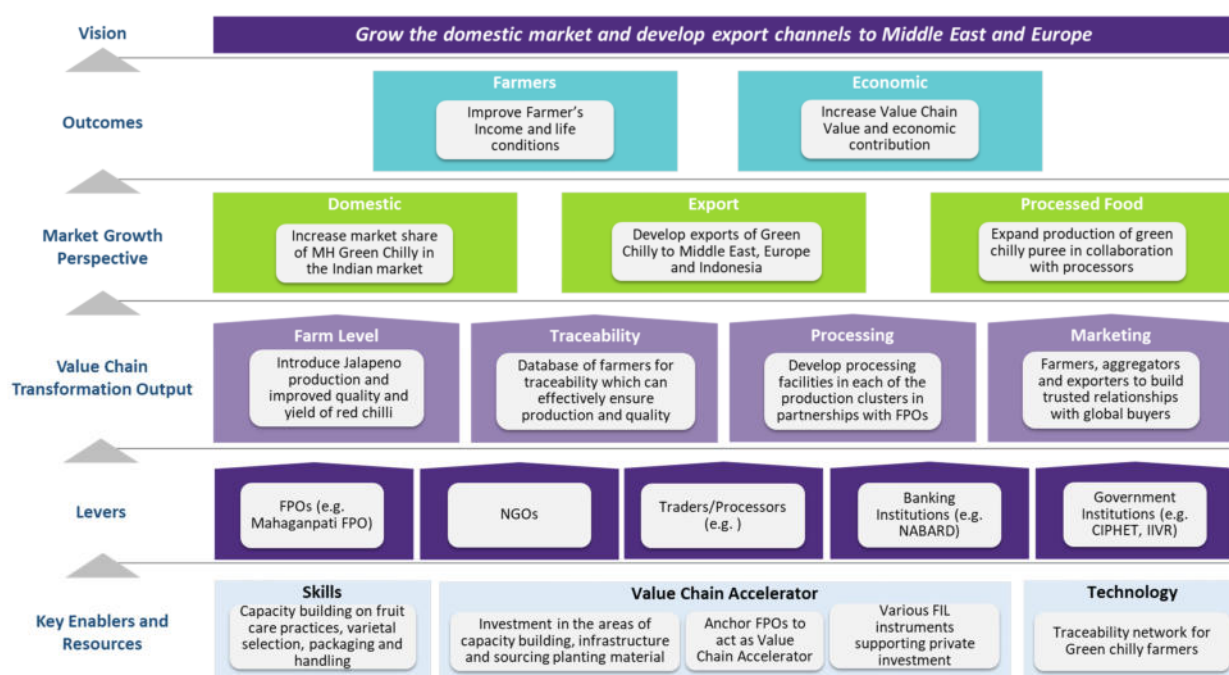
²⁵ FAOSTAT, 2018 (Code: 0401 CHILLIES, PEPPERS (GREEN) *Capsicum annuum*; *C. frutescens*; *Pimenta officinalis*)

Figure 15: Value Chain Transformation – Strategic Vision for Green Chilli



As part of an action plan to upgrade the value chain: there is need to establish dedicated infrastructure in the production clusters. Building capacity of farmers and FPOs on GAP, export compliances, MRLs etc. Traceability systems should be established to ensure farmers database and uniformity in cultivation practices meeting quality standards. Partnerships with aggregators and exporters with strong reputation serving premium international markets, leveraging their existing post-harvest facilities and distribution channels. There is huge demand of value added products such as chilli flakes, paste, puree, oleoresins etc. Thus encouraging private sector investment towards processing infrastructure and help farmers in higher price realization.

Figure 16: Value Chain Transformation - Strategic Map for Green Chilli



8. Sweet lime

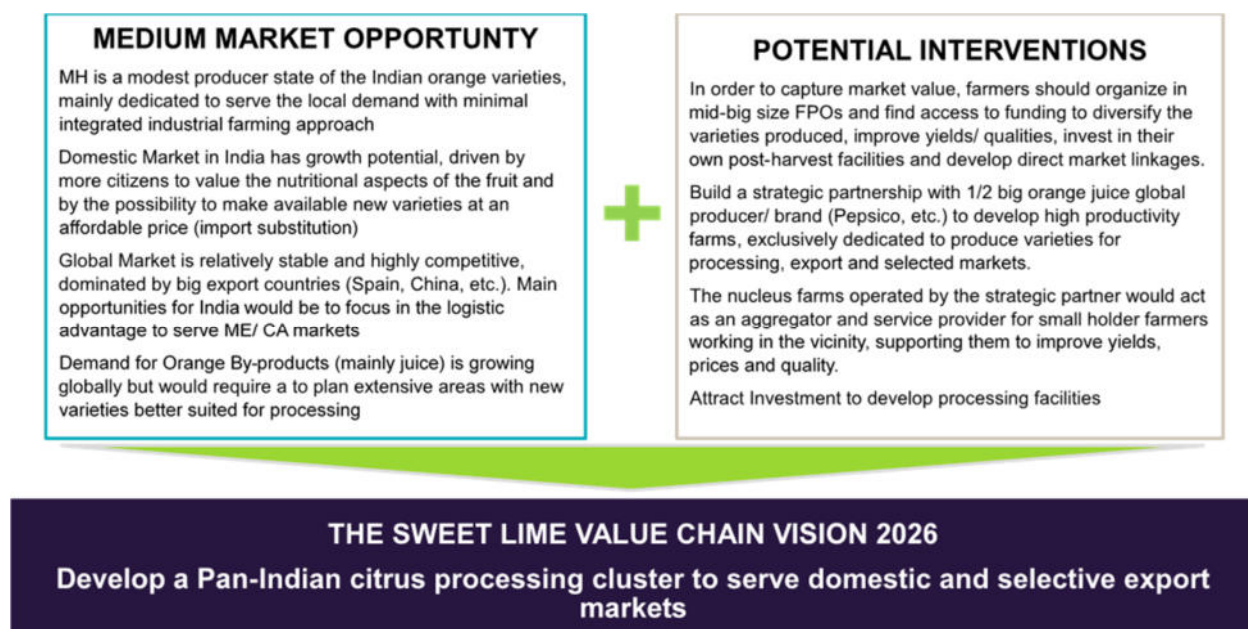
India is one of the largest producers of sweet lime along with Brazil, China, Mexico, Spain and Egypt. Andhra Pradesh, Maharashtra, Telangana, Madhya Pradesh and Karnataka are the largest producing states in the country. Maharashtra ranks 2nd in production and contributes to 21% of the total production in India. The average productivity sweet lime in Maharashtra is 12.4 MT/ha which is lower than the national average (17.7 Mt/ha). Major producing districts in Maharashtra include, Satara, Jalgaon, Aurangabad, Latur and Akola. Satara alone accounts for 52% of the total state production. The major consumption of sweet lime in India is through fresh juice and less than 1% goes into processing. The main sweet lime growing season is between September to December. Despite being the largest producer of Citrus fruits, India ranks far behind other major producing countries in the global export. Maharashtra ranks 5th in the country and shares 2.8% in total export quantity of oranges²⁶. The export quantity of citrus in India is growing at a CAGR of 20.1% whereas in Maharashtra it is growing at a CAGR of 68.1% (2014-2018). Major export destinations include Bangladesh, Nepal, UAE, Qatar, and Kuwait.

Major challenges in the Sweet lime value chain across different stakeholders:

- Low adoption of improved technology by farmers
- There is a decline in production area and quantity in the state due to water scarcity, changing climate, erratic rainfall patterns and temperature stress
- Very less primary processing is done due to the lack of storage facility and post-harvest infrastructure in the production clusters
- Farmers lack knowledge in pricing of different grades in the market and sell their produce to the pre-harvest contractor at farm gate leading to poor price realization
- Long chain of middlemen and intermediaries leading to lower price realization and post-harvest losses at each stage
- Indian sweet lime variety is not suitable to export market
- Lack of value addition and processing infrastructure for sweet lime. Many stakeholder and processors are not able to capitalize on sweet lime market due to the lack of suitable technology to produce value added products such as oil, fibre, marmalades etc.

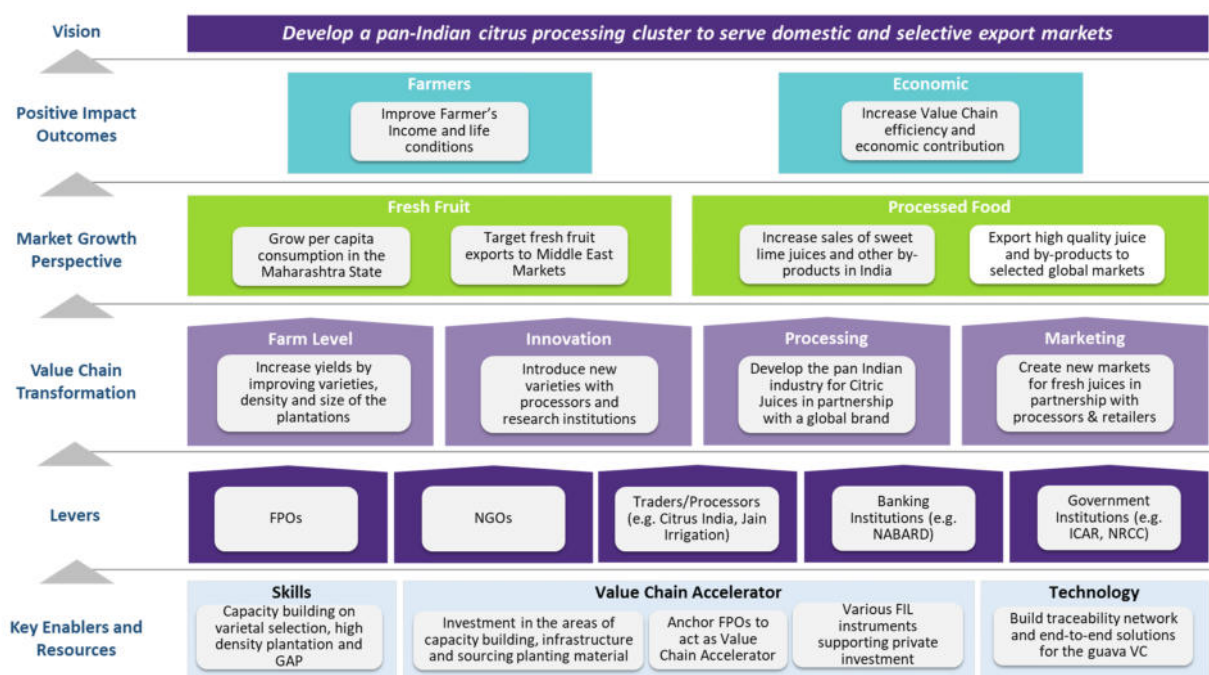
²⁶ (HSN Code: 0805100 includes common orange, sweet lime (*Citrus sinensis*); bitter orange (*C. aurantium*))

Figure 17: Value Chain Transformation – Strategic Vision for Sweet lime



As part of the action plan to upgrade the value chain: Build capacity of FPOs/farmers on GAP, fruit care and post-harvest management practices to improve yield, enhance quality and reduce losses. Attract investment from private sector to develop post-harvest infrastructure to meet domestic, export demand and improve overall efficiency of value chain. Introduce new improved varieties and setup nurseries for the propagation of quality planting material to increase yield and quality of the produce. Introduce high-density plantations demo farms in the production clusters. There is also scope to build strategic partnerships with global value chain leaders like “Coca cola, Unilever or PepsiCo” to serve as an accelerator and encourage SMEs and value chain operators to develop processing facilities and cater the selected markets.

Figure 18: Value Chain Transformation - Strategic Map for Sweet lime



9. Custard apple

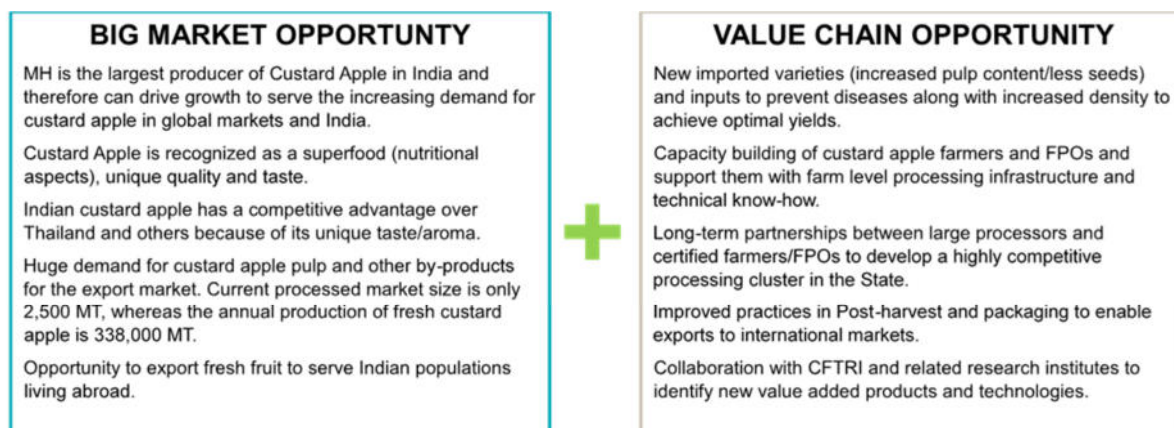
Custard apple also known as sugar apple is believed to have originated between Southern Central America and tropical South America. Custard apple is commercially grown in West Indies, Florida, Middle East, India, Thailand and Malaysia. Maharashtra is the largest producer of Custard Apple in India followed by Madhya Pradesh, Gujarat and Chhattisgarh. Maharashtra contributes 28% in the total custard apple production in India. The average productivity of Maharashtra is 7.3 MT/ha which is less than half of Tamil Nadu's (17.9 MT/ha), Kerala (17.5 MT/ha), and Madhya Pradesh (13.3 MT/ha). The major Custard apple-producing districts include Pune, Ahmednagar, Nandurbar, Osmanabad and Jalgaon. Custard apple is grown between the months of September to December/January with the peak harvesting season being November to December. Despite the export quantity of custard apple increasing at a CAGR of 1.4% from 2014 to 2018, India contributes less than 1% of the total national production in terms of exports. Maharashtra shares 98% in the total export quantity of the country and 7% of the total state-production. Custard apple is recognized as a superfood due to nutritional value, giving an opportunity to establish the fruit in other export markets. Custard apple pulp has various uses in food industry in the form of ice cream, rabadi (Indian dessert), nectar and smoothies.

Major challenges in the Custard apple value chain across various stakeholders include:

- Low farm productivity due to poor quality of planting material
- Lack of improved cultivation practices and adoption of new technology
- The maturity indices of the fruit need to be standardized to improve its shelf life and reduce losses
- Inadequate infrastructure for processing and post-harvest management in the production clusters
- Farmers are not aware of the value added products and lack farm infrastructure for primary processing
- Lack of infrastructure and technology for processing. E.g. aseptic pulping

- High cost of transportation because the produce is transported via flights to distant markets due to high perishability

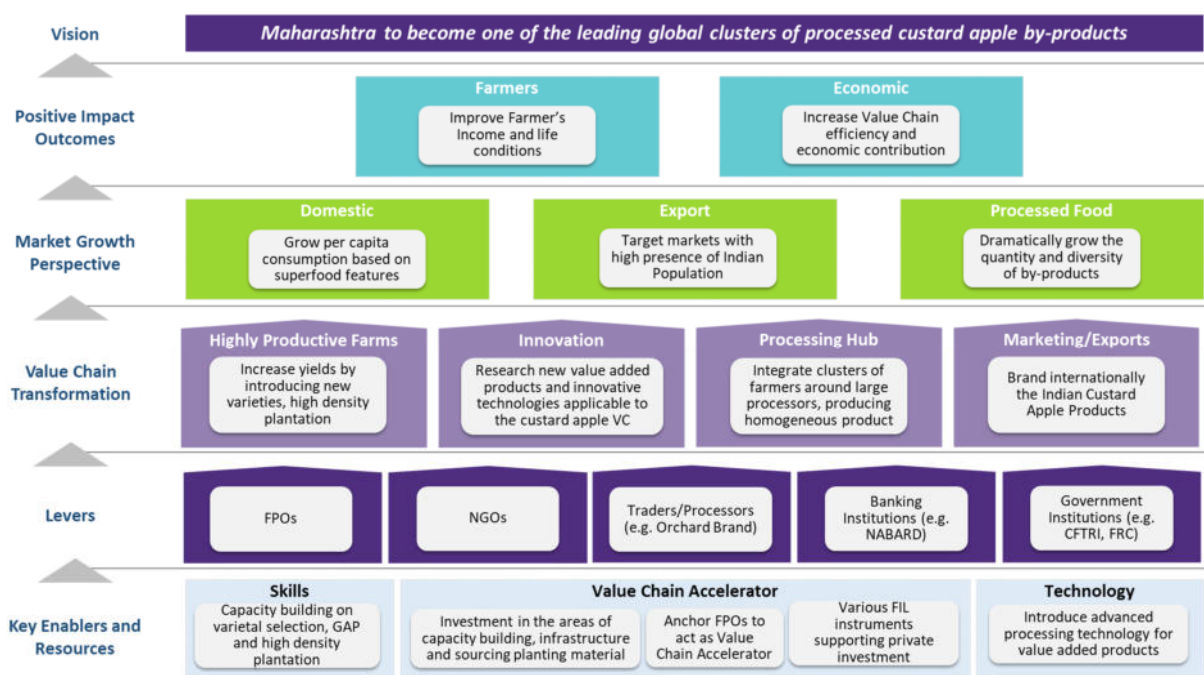
Figure 19: Value Chain Transformation – Strategic Vision for Custard Apple



CUSTARD APPLE VALUE CHAIN VISION 2026
Maharashtra to become one of the leading global clusters of processed custard apple by-products

As part of an action plan to upgrade the value chain: Establish dedicated infrastructure at farm level and cluster level towards post-harvest management and processing by leveraging investment via FPOs and value chain players. Build capacities of FPOs/farmers' on GAP, harvesting indices, fruit care and post-harvest management to avoid losses. Introduce high-density plantations demo farms in the production clusters and collaborate with research institutes such as CFTRI to facilitate R&D on processing techniques such as aseptic pulping, varietal improvement and new value added products. Branding and marketing the superfood features of custard apple in key export markets and countries with huge Indian populations.

Figure 20: Value Chain Transformation - Strategic Map for Custard Apple



10. Strawberry

Strawberry is an economically important fruit crop worldwide and its commercial production is only in temperate and sub-tropical areas in the country. Globally, China is the largest producer of strawberries followed by USA, Mexico, Turkey, Egypt and Spain. India produce very small quantities of strawberry compared to other countries and ranks 53rd in terms of productivity. India strawberry production is mostly concentrated in Haryana, Mizoram, Meghalaya, Kerala and Himachal Pradesh. Though, strawberry is being cultivated on a very small scale in India, the production is increasing due to its high economic value and increasing demand. Maharashtra is slowly catching up with the strawberry production. In Maharashtra Mahabaleshwar and Panchgani region in Satara district accounts for highest strawberry production in the state. The average area under strawberry cultivation in Mahabaleshwar-Panchgani is 1000-1200 hectares producing 20000 MT annually²⁷. The average productivity in the region is around 10-15 MT per acres. Besides, Mahabaleshwar, Wai and Patan region are also producing strawberries in smaller quantities. There are two main growing seasons for strawberry in Maharashtra April to May and October to November. Total global export market of strawberry amounted to USD 2.58 billion in 2017 of which India contributed to less than 0.01% in the international strawberry trade. Indian fresh strawberry export is declining at a CAGR of -27.9% and in Maharashtra at -26.5% in terms of quantity whereas the processed strawberry²⁸ export is growing on a positive scale in Maharashtra. Leading exporting countries include Spain, USA, Mexico, Netherlands (re-export), Belgium and Egypt. Leading export destinations include Netherlands, Germany, Belgium, USA and Philippines. Strawberry cultivation can bring a huge opportunity to farmers in Maharashtra considering the growing demand in domestic and export market.

Major challenges in the strawberry value chain across various stakeholders include:

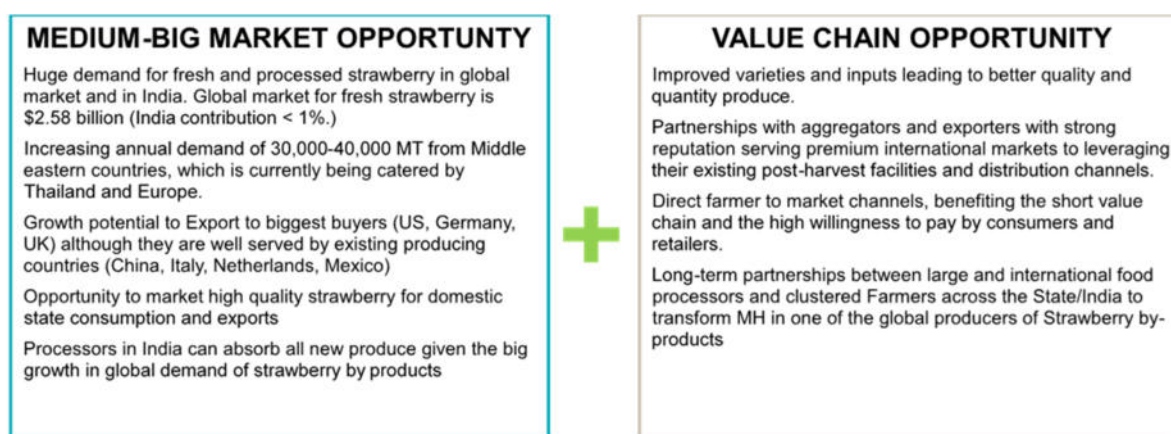
- Farmers have minimal understanding on strawberry cultivation practices and harvesting indices

²⁷ Based on stakeholder consultation.

²⁸ HS Code: 08111010(Strawberries, Uncooked/Cooked by Steaming/Boiling), 08111020(Strawberries, Uncooked/Cooked by Steaming/Boiling), 08111090(Other Strawberries Whether or Not Cooked Or Uncook), 20088000(Strawberries, prepared/Preserved, Whether Or Not C)

- Lack of good quality disease free planting material which leads to short growth cycle, poor quality, and high cost
- Indian strawberry does not meet the export market requirement in terms of size, taste and quality when compared to USA, China and other major producing countries
- Farmers lack access to quality packing material such as punnet packaging which can help maintain quality
- There is only one pack house in the production cluster which leads to inadequate primary processing
- Lack of sufficient infrastructure such as pre-cooling units, cold-storage and reefer vans for the transportation (Only 5% of the produce undergo pre-cooling and transported via reefer vans)
- Farmers lack knowledge and experience on proper handling and packaging practices
- Lack of transport infrastructure to transport strawberry to distant markets

Figure 21: Value Chain Transformation – Strategic Vision for Strawberry

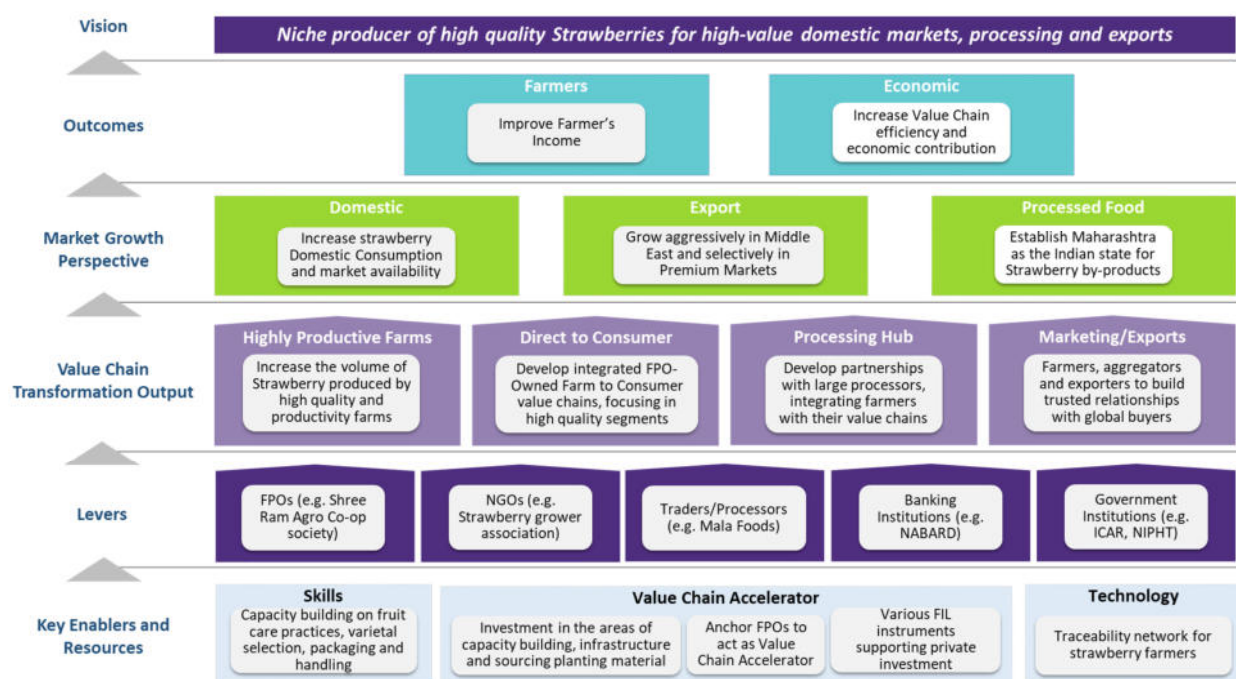


STRAWBERRY VALUE CHAIN VISION 2026

Niche producer of high quality Strawberries for high-value domestic markets, processing and exports

As part of an action plan to upgrade the value chain: there is need of capacity building, knowledge dissemination to strawberry farmers on varietal selections, GAP, IPM, fruit care and post-harvest management. Need to introduce new improved varieties in production clusters and setup nurseries for the propagation of planting material. Develop traceability systems to maintain farmers' database, and transparency across the value chain in terms of cultivation practices. Branding and promotion of Indian strawberry (E.g. Mahabaleshwar GI) in key export markets. Encourage private and public sector infrastructure development for post-harvest management and upgradation of logistics infrastructure for transportation to distant markets.

Figure 22: Value Chain Transformation - Strategic Map for Strawberry



11. Floriculture

Floriculture is a multifaceted enterprise and accorded with 100 percent export oriented status in India. Within India, floriculture industry has extensive demand throughout the year as consumption of flowers is on a daily basis by people of all religion besides marriages, social gatherings and official functions. Floriculture contributes to 1.2% in the total horticulture production (2017-18), producing 278.4 million MT across 0.3 million ha. At the national level, the leading producers include Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh and West Bengal. The area under sector is expanding at a rate of 7% while the trade in the sector is growing at a steady pace of 10% per annum.

Maharashtra ranks lower in cut and loose flowers production, producing 86 thousand MT across 5.29 thousand ha. Major growing districts across Maharashtra include Pune, Nashik, Satara, Ahmednagar, Kolhapur and Nagpur which are currently emerging as hi-tech floriculture districts. Primarily the flowers grown in Maharashtra are marigold, rose, tuberose, chrysanthemum, gladiolus, aster, jasmine, kagda, mogra, gerbera, carnation etc. Due to the varying soil types and agro-climatic conditions, there is a tremendous potential for floriculture growth across the state. The state also leads in area under protected cultivation. Model floriculture unit, hi-tech floriculture unit at College of Agriculture, Pune are leading examples in the state. The floriculture at Talegaon, Pune is another classical example of state intervention for promotion of floriculture. In regards to the floriculture value chain, the flower markets are reduced to roadside markets across the urban and rural landscape due to the unavailability of organized infrastructure. Thus to cater these challenges there are new supply chain models are being established by the private sector such as Le fleur who are integrating the flower market with supermarkets to enhance the value chain efficiency and profitability of primary producers.

Major export destinations from India include US, Netherlands, Germany, UK, UAE etc. Maharashtra contributes to 8% in terms of volume and ranks 4th in the country in terms of export of floriculture produce. In 2019-20, Maharashtra exported 1433 MT of produce valued at 16.06 million USD. The export from Maharashtra is declining at a CAGR of -

3.1% in terms of volumes but growing at a CAGR of 7.7% in terms of value since 2015-2019. The leading importers of floriculture produce from Maharashtra are Netherlands, USA, UK, Italy, Australia and Middle East.

Major challenges in the floriculture value chain across various stakeholders include:

- Despite growing demand and export potential the state face challenges in the form of changing climates affecting the production of loose flowers. The high temperature, heat waves and water scarcity due to sub-par rainfall affects the open field cultivation thus resulting in poor flowering, improper floral growth and color development, and reduction in production.
- Low level of awareness is the greatest hurdle in the downward dissemination of technical know –how and application of improved techniques in production process. Additionally, there is no support price for floriculture produce by the government.
- Inadequate supply of quality planting material of improved varieties from recognized institute is creating great loss to cultivars for improving their production as there are many low quality seeds and planting material available at cheaper rate in market and most of the growers prefer it due to cheaper rate.
- Poor linkages between farmers and research institutes for quality planting material and improved cultural practices.
- Poor post-harvest management and handling of produce. Farmers still follow primitive age old packaging material for the storage and transport of produce thus leading to losses.
- The major challenges at market level include difficulties in transportation and lack of logistics infrastructure due to high perishable produce, commission agents, delayed in payment after sell of flowers, inadequate arrangements for grading and storage due to such factors growers have to sell their produce at very cheap prices to the wholesalers or commission agents.

A more detailed Value Chain Assessment and proposed Value Chain Development Strategy has been included as an Annexure.

D. Overall Horticulture and Agribusiness Marketing Strategy

Vision 2030 of Government of Maharashtra aims at “**Achieving average sector growth rate of 5% in agriculture and allied sector**” and “**doubling farmers’ income by 2022**” (from present one lakh to two lakh INR). This vision statement has become the basis to serve as the guiding principle for the policymakers and stakeholders while formulating policies and initiatives in the horticulture sector in Maharashtra.

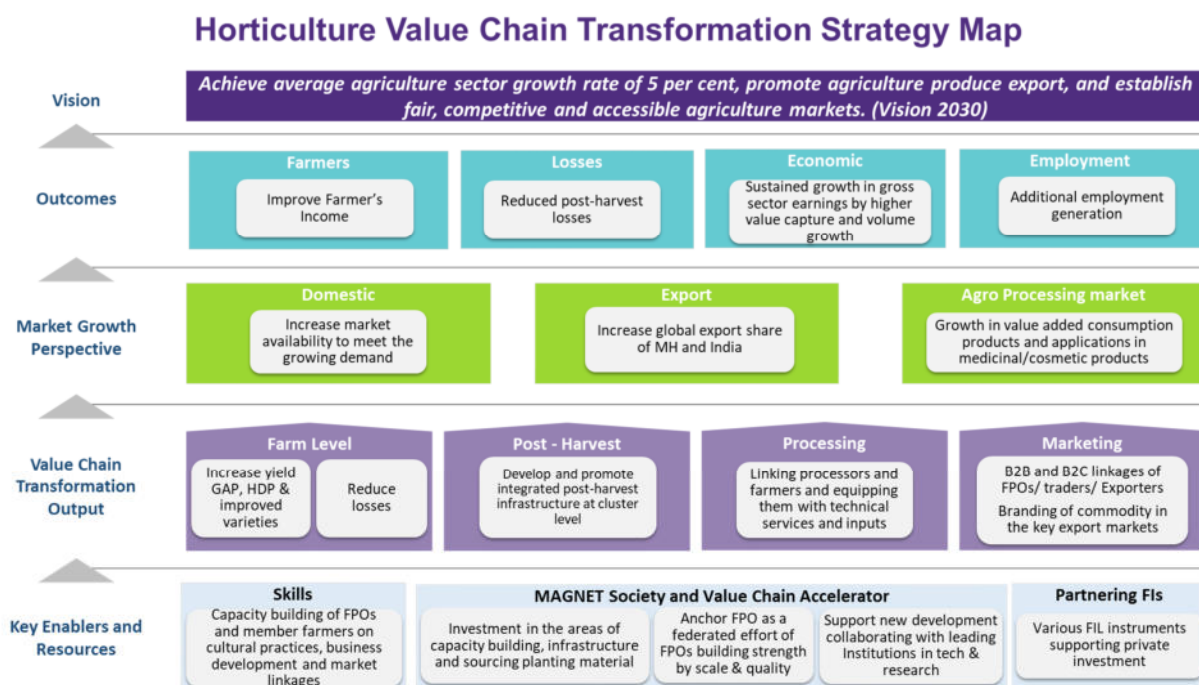
In pursuance of the Vision 2030, the government need to adopt multiple strategies that will act as an enabler over the next few years. Accordingly, these strategies and implementation of action plan shall lead to the State moving towards self-sufficiency in food processing segment and becoming a leading exporter of fruits and vegetables through sustained efforts in bringing improved cultivation practices, increase productivity, varietal interventions, post-harvest management, alignment of identified value chains and enabling processing infrastructure.

Project MAGNET as a catalyst for systemic change

Indian food crop production has reached a stage of surplus and together with the population demanding more nutritious items for consumption, area under horticulture and also the production has been witnessing substantial growth. Horticulture crops are found to be more remunerative by the farmers and require much less farm labour which is getting increasingly scarce in rural areas. As a result, there is considerable policy thrust on the growth of the

horticulture sector, backed by the substantial growth potential in the domestic and export markets. . MAGNET has identified 10 horticulture crops presently not performing to potential and are widely cultivated in Maharashtra.

MAGNET shall catalyse a broad transformation, in a holistic manner factoring in various possibilities to uplift the agriculture ecosystems to perform more efficiently. The following figure summarizes our approach under Project MAGNET in an integrated and innovative way to enable Maharashtra horticulture smallholder farmers to improve their economic realisation through higher productivity, lower quality losses and efficient market systems.



Agribusiness Strategy for the ten crops were developed based on the findings of the Mapping Study and the reports of the PHT consultancy, in addition to inputs received during the consultative sessions with Experts and various players along the value chain. Value chain is segmented into four verticals along the process flow, such as a) Production, b) Post Harvest/Logistics, d) Processing/Value addition and d) Market promotion identifying the weaknesses and gaps that needs to be addressed in the project including the needs for capacity development (output 1), financial support (output 2), and value chain infrastructure development (output 3).

Market Growth Perspectives

- Domestic Market:** Indian population is projected at 1.65 billion by 2050, an expanding urban population projected to be over 50% in the same period supported by rising incomes with most or all of them likely to be dual income, all of these factors are set to shift food consumption in favour of more nutritive and healthy options of which fruits are an essential part. This rising affluence, population explosion, change in dietary patterns, health consciousness etc., is projected to increase India's overall food consumption by 4% per annum to reach USD 483 billion by 2030²⁹. As per the growing trends it is also estimated that the demand for high-value commodities such as horticulture, dairy, livestock is expected to increase by more than 100% till 2030³⁰. According to Kumar et al (2016), the country may suffer a shortfall of nearly 42 million tons of fruits and vegetables by 2030, unless

²⁹ India as an agriculture and high value food powerhouse: A new vision for 2030, FRIDA, 2013

³⁰ Vision 2030, ICAR

there are significant changes in the overall functioning of the horticulture sector. Thus, the government need to take up initiatives to strengthen the production and processing infrastructure and address the key challenges that have plagued the sector for decades.

- **Export Market:** India's share in global exports is far below compared to other countries despite having a sizeable presence in several agriculture and horticulture commodities that are relevant both to the export market and industry. It is also close to some of the largest food importing regions e.g. Middle East, China and South East Asia. India agri export market has the projection to grow 6 folds from 29 billion USD in 2011 to 162 billion USD by 2030²⁹. The table below gives the overview of the export share of India and Maharashtra in the selected commodities. Besides, being the largest producer of several horticulture crops, the state also has an added advantage in terms of connectivity via multiple ports (air & sea), agri export zones handling major consignments of the country. The GoM has drafted an agri export policy with a vision to transform Maharashtra as an Agri Export Hub of the country with set objectives such as diversifying export basket, boost high value and value added produce, establish efficient export oriented infrastructure and utilization of existing infrastructure, provide institutional mechanism for market access, tackling barriers with sanitary and phyto-sanitary issues and providing support to stakeholders through capacity building for making product competitive in export markets. MAGNET interventions are in sync with the draft agri export policy to establish technology enabled facilities, meeting quality and sustainability standards of the potential high value markets.

Commodity	India Export Share %	Maharashtra Share % vs total production
Banana	0.57%	1.06%
Pomegranate	3-5%	1.83%
Orange	0.08%	0.11%
Custard apple	<1%	0.81%
Guava	<1%	0.35%

Figure from 2017-18 Source: APEDA Agriexchange

- **Agro-processing Market:** The processing of fruits is a small proportion of the production in all fruits compared to other perishable commodities in the country. Currently, only 2.2% of fruits are processed across the country compared to other benchmark countries, such as 23% in China, 50% in Indonesia, and 70% in Brazil. Due to the low processing level, Indian farmers realize only 8-10% of their products final value, compared to upwards of 30% in the developed markets. MAGNET through its efforts would promote suitable partnership amongst the value chain actors for cultivation of processing specific varieties as part of the strategy to develop this opportunity. It is also expected over the project period, as the productivity increase led growth in availability would deliver adequate supplies at reasonable cost for processing activities, which can tap markets hitherto unserved. Efforts to develop technology for manufacture of medicinal and cosmetic preparations from fruits and non-edible portions would be initiated in collaboration with Institutions of repute, with necessary inputs from expert consultants in the respective fields. Thus, with infrastructure development, capacity building and backward linkages to farmers there is a huge opportunity for the agro processing industry in Maharashtra to go up the value chain. Creating value from farm waste is another area of interest through localised micro enterprises.

Value Chain Transformational Output

- **Improved Production Systems:** Raising income for farmers in Maharashtra is to be achieved through transformation at the farm levels, mainly around homogenous propagation of quality planting material, improved

farming techniques, introduction of better fruit care practices and capacity building on good agricultural practices to ensure quality and productivity across each value chain.

- **Integrated Post Harvest Infrastructure and Services:** Outputs 2 and 3 of Project MAGNET are fully devoted to funding the development or improvement of post-harvest infrastructure and services. Equipping FPOs, public and private players with modern facilities and their connectivity will have a ripple effect in attracting other investments and transformation to the value chains, namely in the production and the distribution sides. The project not only aims to bridge gap between pre and post-harvest processing but also intend to establish an integrated infrastructure at village and cluster level to ensure reduced post-harvest losses and minimal handling. In order to improve overall value of each value chain and cater the export market, all the dedicated infrastructure will be established as per the export compliances. These integrated facilities would facilitate full traceability and transparency where necessary, meeting quality and sustainability standards of the stricter (and high value) markets. Additionally, providing logistical solutions for the transport of goods to nearby and distant market via reefer vans and CA containers.
- **New Product Applications and Processing:** Most of the target commodities under the project offer economic application in pharmaceutical/nutraceutical products, which shall be untapped through suitable collaborative efforts with research institutions, as part of the strategy to create greater market demand for the produce in segments other than fresh and direct consumption processing avenues. Value extraction from other parts of the fruits and the plant would also be an area of work under the project through suitable collaboration with research institutions. In the fresh segment as well, the project would promote new products and new packaging systems to reach market segments which are not accessible for supply in fresh and also as an option for supplies in off season periods.
- **Multichannel Distribution, Branding and Packaging:** The last group of recommended strategies to improve the performance of value chains is focused in improving the relationships between Farmers/FPOs and the different market channels. In some cases, the opportunity is to establish better agreements with existing actors, normally based on improving the value added of the product (branding, packaging, grade/quality) and in a few others, thanks to the recent technological innovations, FPOs could become a new direct channel to serve the consumer. The project envisage to build an efficient and sustainable supply chain ecosystem by establishing B2B and B2C linkages between farmers/FPOs, value chain operators, Retail Chains and consumers. Thus ensuring competitiveness and better price realization to farmers across each value chain.

Key Enablers

The last piece of a successful agricultural change program is a well-funded and determined investment in the key enablers of the transformation: talent, technology and organization. Output 1 interventions will cover part of the effort required to develop these enablers.

- **Capacity building of FPOs:** FPOs would be last mile institution for delivery of services under the project for various capacity building initiatives, enable an aligned performance to achieve the desired outcomes of higher productivity, better quality and reduced post-harvest losses, also playing a vital role in aggregation and primary processing as well as post-harvest storage of produce. Demonstrations supported, where relevant, training of farmers on Good Agricultural Practices, fruit care practices, post-harvest management would help improve the quality of horticulture produce, meeting quality needs of specific markets. This also includes farmer assistance in implementing various practices for improving the yield of crops.

- **Value Chain Accelerators as Catalysts of the Transformation:** Value Chain Accelerator services will be an arm of the project which will strategize and coordinate all these interventions with market focussed goals and improving the value generation in the system in a coordinated implementation by the FPOs. The strategy is based on VCA services supporting a network of FPOs to excel in productivity, quality and post-harvest, just as a primary co-op does in a Dairy co-operative system, which would serve as vendor to an Anchor FPO which would handle the market challenges with the consolidated scale, also supporting the participating FPOs in finances and other services needed. VCA services would build a network of FPOs led by an Anchor to emerge as the front end, just as an apex dairy coop handling markets and developing brands. All profit in the entire value chain are retained amongst the farmer, thereby maximising the returns for the farmers.
- **Technology Embedded Solutions:** Best-in-class horticulture production resembles just-in-time manufacturing, where retailers place orders to the value chain and are immediately distributed upstream to the farms. In the years to come, consumers across the world and big off takers, processors and retailers will only purchase traceable products supplied by transparent and integrated value chains.

3. Output 1: Institutional capacities of agribusiness institutions and farmer producer organizations strengthened

A. Introduction

Output 1 aims at strengthening of FPOs towards contributing to the overall objective of growth of horticulture sector with inclusive benefits for the small farmers. Reports of the various Consultants of the project identifies areas for interventions that promote productivity, reduce losses due to post harvest management issues and logistics, address marketing inefficiencies by establishing a network of FPOs to build scale of operations and promoting institutional leadership for harnessing the combined potential of individual FPOs rather than attempt to maximise individual FPOs. The project will conduct capacity building and value chain services based on comprehensive value chain growth strategy for ten targeted crops covering aspects of marketing, post-harvest and productivity, besides value addition prospects.

- a) Crop-specific collaborative efforts with relevant institutions for supporting efforts for achieving higher productivity, better harvest quality, postharvest handling, and relevant certification
- b) Introduction of best practices to enhance productivity, quality, and safety to meet the market/ export requirements, training farmers on latest technologies
- c) Promote collective efforts of FPOs through private value chain operators and on their own collective organisations focussed on achieving better profits and price realisation besides quality produce as well. Thereby, building capability of FPOs for efficient management of commercial and financial functions, particularly for small farmers and those led by women to support their growth in long term.
- d) Support digital marketing initiatives collectively by the FPOs, for B2C and B2B trades, in improving the share of farmers in the consumer spend.

B. Interventions proposed under Output 1

Activities to be taken up by the Project is drawn from specific interventions proposed under the crop business strategy for developing the value chain, with inputs drawn from reports of the consultancy on PHT and value chain stakeholder consultation as appropriate. Activities under Output 1 are listed into four group of interventions:

1. Enhancing market led production and improving productivity

- a) **Setting up new nursery and tissue culture units** – The project will support anchor FPOs in setting up high tech nursery units for the selected commodities such as pomegranate, orange, sweet lime, guava, custard apple, sapota and a tissue culture unit for Banana, strawberry etc. It also aims at promoting partnerships with relevant private and cooperative organizations, farms and nurseries for production of quality planting material. This will help in improving the accessibility and availability of quality planting material to farmers and FPOs in the production clusters.

- b) Introduction of new improved varieties** – This aims at varietal improvement of the existing varieties and import of new varieties in orange, sweet lime and strawberry. The project would also draw on the knowledge available with the various national research institutions, in promoting varieties identified by the institutions and support any further development work to be undertaken based on market requirements. The introduction and implementation will be done jointly in partnership with national research centres and the Department of Horticulture, Government of Maharashtra and would suitably engage the institutions under a MOU based on the needs identified by the stakeholders of specific commodities.
- c) Capacity building on good agricultural practices (GAP) and export related compliance** – The project will formulate training material and standards for good agricultural practices suitable to socio-economic and agro ecological conditions and comparable to international safety standards. The project will also give handholding support and build capacity of FPOs towards documentation, technical assistance for global GAP certification, export inspections compliance such as country specific sanitary and phyto-sanitary (SPS) standards, maximum residual limits (MRLs), quarantine laws, accreditation, tools and training of relevant stakeholders. The project intend to build capacity of 30,000 farmers on GAP and provide financial support to 1500 farmers in global GAP certifications and MRL testing during the project period.

Additionally, the project will facilitate and support fruit care management among producer groups especially for crops such as banana, pomegranate, orange custard apple, strawberry and sapota to preserve the quality and yield of produce. The project will build capacity of farmers in FPOs and provide subsidy to selected farmers on tools and material for fruit care practices.
- d) Demonstration of High Density Plantation (HDP)** – This activity will support the establishment of demonstration HDP farms. These demonstration plots will be conducted in volunteer farmer's fields where new technologies can be demonstrated by the participating research institutes, agro-enterprises and Krishi Vigyan Kendra (KVK). Additionally, the project will provide technical assistance to FPOs and provide hands on training on HDP farm design, crop management etc. The project will support 400 acres of HDP demonstration farms in the major production cluster for the selected commodities such as Banana, pomegranate, orange, custard apple, sweet lime, guava etc.

2. Promote post-harvest practices and standards to meet the market/export requirements

- a) Capacity building on post-harvest management** – This include development of commodity specific manuals for crop management, post-harvest handling, processing, packaging, and quality management. Through this, the project will facilitate training of trainers (ToT) and build capacity of MSAMB, PIU, KVK, and field level staff on post-harvest technology through a 5 day training course. Additionally, the training will be given to FPO member farmers and value chain operators at farm and aggregator level to ensure reduction in post-harvest losses and quality of the produce across the value chain.

3. Innovations in new product

- a) Research and development of new products and technologies**

- I. Developing new products and its applications in food and pharma industry** – Product development would cover developing pilot of new products and applications based on the health and therapeutic value of various commodities for food, pharmaceuticals or related industries. This R&D will be driven by the potential of the product in the global market.

- II. **Innovation in packaging** – Support for research and innovation for improved packaging material in all the 10 focussed commodity to facilitate reach of the horticulture produce to a wider market thereby increasing the demand of the commodity.
- III. **Bio-waste to worth** – Facilitate R&D work in technology development for the use of waste products from the plant/fruits that could contribute to the overall economic gain under the crop and well-being of the environment. Collaborative projects with competent agencies to be identified in areas of waste to wealth.
- b) **Support for commercialization of new product** – The project will support the commercialization of the new products developed during the project period in domestic and key export market through agri start-ups, SMEs, processors and other value chain players.

4. Market development and promotion

- a) **Development of e-commerce portal for B2B & B2C** – There is a growing demand for high quality and safe produce that are conveniently delivered to the customer doorstep through various e-commerce channels. Given these facts there is an increasing need to develop an alternative platform for the producers and other value chain players to ensure traceability, safety and quality. Thus, the project aim to establish an integrated e-commerce platform linking producers to processors and consumers promoting B2B and B2C transactions. This will help in improving accessibility and profitability of horticulture farmers and value chain players across Maharashtra.
- b) **Promote appropriate IT solutions for traceability** – The project will work jointly with horticulture department and APEDA to establish farmer's database for the selected commodities to ensure traceability from farm to folk. E.g., Grapenet traceability system for grapes which covers all kinds of stakeholders (farmers, exporters, agriculture department, accredited laboratories, Agmark, Pack houses, National referral laboratory, APEDA etc.,) in the grape export supply chain, ensuring compliances to international standards, faster clearance, credibility and transparency of Indian grapes in export market.
- c) **Buyer Seller meets** – The project will support FPOs for organizing buyer seller meets to enhance links and supply arrangement between committed buyers and FPOs.
- d) **Trade fair and Exhibitions** – The project will be responsible for facilitating the participation of fruits and vegetable farmers in various national and international programs to promote investment and exports and establish opportunities for Maharashtra farmers and stakeholders to participate and learn from other states and countries about advanced and successful horticulture practices and policies. This would also include setting up stalls by FPOs and VCOs to demonstrate and promote the Indian variety.
- e) **Development of export protocols and support for trials** – This include market intelligence study on logistical challenges such as sea protocols in key export markets, potential for diversification of exports of existing products etc. The project will provide financial support in conducting export trials to new markets and avenues.
- f) **Branding and marketing** - This will support demand driven extension services for the selected horticulture commodities through a variety of approaches such as exposure visits, market led training programs, marketing campaigns to promote Indian varieties and its health benefits in domestic and key export markets. This project will also support study avenues on existing market for existing products, new markets

for existing products, market situation and outlook for products, which are produced in Maharashtra and market situation and outlook for new products.

5. Building institutional capabilities of FPOs

- a) **Capacity building and training of FPOs** – The FPOs board of directors will be trained on organization governance, business development, market linkages, financial management etc., and will be given hand holding support in driving business growth and meeting market requirements.
- b) **Export training to women led FPOs and enterprises** – This involves sensitization and training of women led FPOs on various aspects of export-trading vis-à-vis procedure and documentation, phytosanitary requirements of specific markets, and increase awareness around export potential in the targeted value chain.
- c) **Study Tours and Exposure visits** – The project will support training cum exposure visits, and study tours to research institutes, SAUs, model horticulture plantations etc. within state, outside state and outside country for FPOs member farmers and MAGNET staff.

C. Value Chain Accelerator Services

One of the key objectives of MAGNET is to build institutional capacities of the FPOs, which is proposed to be achieved by offering dedicated services in the form of Value Chain Accelerator Services. VCA Services, aimed at building a FPO collective organisation capable of performing the entire set of responsibilities of any value chain player, entirely owned and behalf of the FPOs, therefore the entire economic gains are retained with the farmers and their organisation and delivered to the farmers. VCA would handle the markets, funding of operations, support the FPOs in modernising their post-harvest, and improve post-harvest practices. An innovative collective structure to tap the potential of the sector and generate business growth in value and quality.

VCA services shall drive and deliver on a strategic growth plan for the targeted horticultural commodities, by developing a network of Farming FPOs (FFPO), which are essentially village level entities with no marketing strengths of their own. VCA services would be aimed at supporting overall business growth of the FPOs to achieve business and developmental targets, by being responsible for customer development, consumer market promotion, extending training for excellence in the areas of productivity, post-harvest practices and guide in investments towards reduced storage losses, increased shelf life and meeting market quality needs through FFPOs. The approach to be adopted is similar to the Milk Cooperative structure of Primary co-op and the State level Co-op body; missing gap in the FPOs is the state level agency, which would take care of all front end challenges of marketing, organising and managing finances, allowing the village level FPOs to excel in the areas of productivity and post-harvest. Similar relationship does exist between MSAMB and the APMCs, wherein the former acts as a centralised service provider to all APMCs. The structure would create a shared strategic vision for participating FFPOs besides providing governance oversight and guidance to perform to agreed annual plans and long-term growth targets, besides ease of meeting compliance requirements.

Sahayadri is a lone huge successful player, predominantly working on grapes, while they naturally aspire to grow their range of operations and would plan to grow. However, considering the long-term scope and growth potential for a wide range of items, there needs to be more than one Sahayadri like institutions for the state of Maharashtra, particularly important to develop an institution, which is system driven rather than a single personality based. The

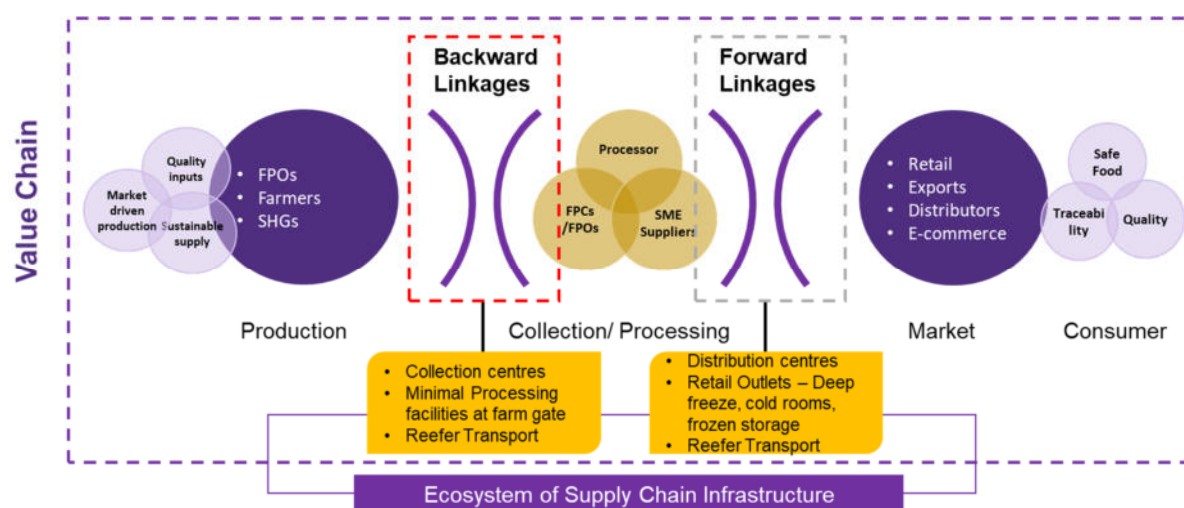
State would want to build more institutions that grow in size on the strength of an organisational momentum and its capacity, which would ensure long-term stability.

VCA services is to be offered through an external agency to deliver outsourced management services, with defined responsibilities, activities and a prescribed organisational structure, details of which is presented in the Annexure.

D. Lead firm - SME linkages

Lead firm SME linkages are relationships between large companies (lead firms) and SMEs with agro processing capacity in which the role of the lead firm is to create a mutually beneficial supply chain structure to penetrate new markets, expand market share or increase profitability. This program aims to promote agribusiness i.e. Value Chain operators (SMEs, Start-ups, Processors, and Exporters) integrate sustainably into value chains with established end-markets and large buyers such as Unilever, PepsiCo, Nestle etc., by supporting their ability to invest in productivity enhancing know-how to meet buyer requirements. The activities will focus on helping the beneficiary value chain operators to improve their commercial viability, financial position and operational efficiency, thereby increasing their productivity, and prospects for increased investments and employment generation. The development of lead firm - SME Linkage also aims to create improved market driven business relationships between off-takers and value chain operators where off-takers benefit from improved and consistent volumes and quality of supply, and the SMEs benefit from higher productivity and access to new markets. It will provide tailored technical support, as well as financial assistance, to support agribusiness SMEs and entrepreneurs to set up new or upgrade existing facilities and improve market linkages with end buyers and backward linkages with FPOs.

It will address the following constraints: (a) inefficiencies along targeted value chains due to inadequate integration of actors, information asymmetries, and coordination failures among stakeholders; (b) limited reliable access to quality raw material in key value chains to support secondary (value addition) sector expansion; (c) limited rural connections to markets, (d) limited knowledge of product specifications required by buyers (particularly sanitary, quality, and technical standards), and modern farming practices; and (e) limited access to finance in agricultural value chains, thereby increasing their incomes, productivity and commercial viability, and prospects for employment generation.



Objectives:

- Improving the capabilities of the agro-processing small medium enterprises in Maharashtra by facilitating the business linkages between SMEs and large buyers
- Enhancing the competitiveness of SMEs, reducing compliance cost, facilitating investment in SMEs, increasing the ease of doing business, and supply chain integration
- Promoting new value addition of products as per the industry requirements
- Promoting institutional reform, streamlining regulations and administrative procedures

Eligibility criteria:

- Selection criteria for SMEs include demonstrated performance over the period of past 3 years, long term commercial arrangements with the lead firms and potential to improve and grow through their access to investment and working capital. The SMEs should also have a minimum statutory compliance on food safety and quality.
- The SMEs should possess strong backward linkages with farmers or FPOs and sizeable procurement of the selected commodities.
- Final selection for assistance to any entity will be based on meeting of above criteria and final discretion of MAGNET Society/Steering Committee for approval.

Key Activities to be conducted as part of Lead firm SME linkages:

- Capacity building of existing and new SMEs on quality assurance compliances to meet quality parameters and standards of lead firms and food processing industry
- Providing support for plant audit on Good Manufacturing Practices (GMP), Hazard Analysis & Critical Control Points (HACCP), food safety management system
- Providing support for sustainable sourcing of raw material and related certification cost such as fair-trade, rainforest alliance, Organic etc.
- Technical due diligence, revealing the technical capacity and investment needed
- Advisory service or technical assistance towards developing plan of improvement, adoption of new processing equipment, agriculture extension activities, certifications, sustainability standards, business plan etc.³¹
- Facilitate business linkages through market seminars, trade fairs, international food processing expos, industry meetings, and dissemination of marketing materials
- Providing support towards firm financing on new equipment, upgradation, processing line for new value added products through MAGNET and other funding agencies

The activities will be customized to the needs of lead firms and SMEs and work toward achieving mutually beneficial results (business benefits). Projects must be designed to achieve outcomes that motivate those actors to participate, including sales growth for SME suppliers; greater market certainty for SME suppliers; greater, more-certain, less-costly, better quality supply to lead firms; fewer risks throughout the value chains; and greater profits for both parties.

The SMEs and agri start-ups can avail term loan and working capital requirement under output 2 in meeting market requirement and as part of an expansion strategy or setting up new unit. This include financing in three areas:

³¹ Note: Technical assistance to processing enterprises includes development of detailed action plans with activities aimed at improving production, finance management, marketing and adoption of international quality standards. Technical assistance envisaged a mandatory agreement and involvement of enterprise managers in enterprise reforms, as well as a mandatory contribution of the enterprise at a level (initially) of some percentage of the technical assistance cost.

(a) setting up new facilities or upgrading existing facilities to meet standards requirements, (b) financing for one-time fixed investments to improve quality and/or productivity, and (c) alternative energy solutions and compliances.

E. Introduction of high-level technologies for horticulture value chain

ADB commenced a study through PwC to identify the technologies that can be implemented at different stages in the value chain i.e. inputs and production stage, aggregation and transportation stage, and processing, logistics and marketing stage. The proposed technologies to be implemented under HLTF fund include: precision agriculture, ICT platforms for farm and supply chain management, drone based chemical spray & image analysis, electrostatic sprayers, solar water pumps, optical camera based fruit grader, solar powered cold storage, ice battery (passive cooling) for transportation of perishables, walk in cooler (Coolbot), digital logistics and supply chain solutions. The target beneficiaries will include farmers/FPOs, and other value chain actors. These technologies have been identified based on the eligibility criteria including innovativeness, suitability and sustainability across the value chain as detailed out in the HLTF draft final report³². The proposed implementation arrangement for the selected technologies include promotion of technology through capacity building and pilot testing/demonstrations on fields at FPO level and through incorporation of these technologies in the business plans of model/anchor FPOs based on their willingness. The detailed report has been attached in the annexure.

F. Nature of Project Support

Financial support to be extended would depend on the nature of the activities. For activities, involving setting up of nurseries and tissue culture units will be facilitated by MAGNET Society. The project would provide 40% subsidy on the overall cost to the qualifying women led FPOs or anchor FPO who display the scale and potential to promote propagation of quality planting material in the production clusters. Activities around institutional capacity building of women FPOs, anchor FPOs on business development activities and capacity building on GAP, fruit care practices, post-harvest management, and demonstration of technology like high-density plantation, will be facilitated by consulting services to farmers from anchor FPOs. The project will support 30,000 farmers on GAP training and lending 50% subsidy to selected 1500 farmers on the global GAP certification cost, MRL testing and fruit care management equipment cost. The project will also support in setting up of 400 acres of HDP demo farms by providing 50% subsidy on the total cost to the anchor FPOs as per the NHB guidelines. Qualifying norms for selection of farmers to benefit from the subsidy are defined under the eligibility criteria.

Activities that involve innovation, R&D, and introduction of new varieties will be supported by grant and would be considered on a case to case, to be achieved within a defined period. The MAGNET Society will spearhead the convergence with various research institutes and draw MoUs with the eligible organizations. In terms of new product and technology development, only those projects will be taken up where the pilot proof of concept is established, but is lagging in commercialisation of the technology for mass adoption. The projects based on such technology being commercialised could be provided grant in investment in machinery & equipment and market development of the new products. Some of the indicative list of organisations to be involved in collaboration under the project are the NRCs for Pomegranate, Banana, Central Citrus research institutes, CISH, CFTRI, FRCs, IIP, IIHR, Value chain players etc.

Consulting service will spearhead the lead firm SME linkage program and support the selected SMEs in technical due diligence, capacity building, business plan development etc. to facilitate business linkages with lead firms and

³² TA-9738 IND: Strengthening Capacity to Design and Implement Water and Rural Infrastructure Facility - Agri Value Chain Technology Specialist (National) for Maharashtra Agribusiness Network Project (53145-001)

meeting their requirements and quality needs. The project will provide 50% matching grant support on compliance, certification cost and market assistance activities.

Activities to promote market development and promotion will be facilitated by MAGNET Society. This will be done by organising competitive technology presentations by various interested service providers pleading to selection of the most comprehensive offer. Project besides hosting the event for selection of best service provider, would also allocate grants for branding and publicity among the consumers, ecosystem development in order to integrate trade channels on the platforms. Activities such as buyer seller meets, trade fairs, exhibitions, study tours, exposure visits will be supported by grant and to be implemented by MAGNET Society. MAGNET Society would form part of the responsibilities to be assigned to the external consultancy proposed for project management services.

4. Output 2 - Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened

A. Existing scenario of financing in Horticulture sector

1. National Scenario: Credit Agri-Business and Food Processing Industries

RBI Guidelines for Loans to Agri-Business and Food Processing Industries:

At present, all Scheduled Commercial Banks are required to meet a target of 40 per cent of their Adjusted Net Bank Credit (ANBC) or credit equivalent of Off-Balance Sheet Exposure, whichever is higher for Priority Sector Lending. RRBs and SFBs are required to meet a target of 75 per cent towards PSL. Besides the overall PSL targets, banks are required to achieve agriculture target of 18 per cent and a sub-target of 8 per cent of ANBC for small and marginal farmers. Under the revised PSL guidelines of 2015, direct and indirect agricultural lending has been dispensed with. The eligible activities include farm credit, agri-infrastructure and ancillary activities.

1. Agriculture

Farm Credit: Loans for pre-harvest and postharvest activities, viz. spraying, weeding, harvesting, sorting, grading and transporting of their own farm produce.

Agriculture Infrastructure: Loans for construction of storage facilities (warehouse, market yards, godowns and silos), including cold storage units / cold storage chains designed to store agricultural produce/products, irrespective of their location.

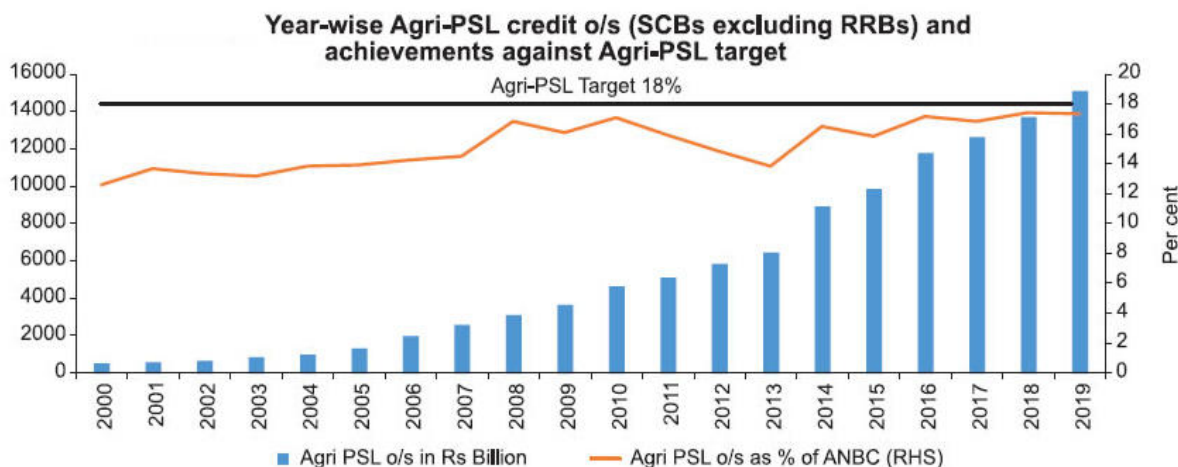
Ancillary Activities: Loans to food and agro processing up to an aggregate sanctioned limit of Rs. 100 crore per borrower from the banking system.

2. Micro, Small & Medium Enterprises (MSMEs)

Loans for food and agro processing are classified under Micro and Small Enterprises, provided the units satisfy investments criteria prescribed for Micro and Small Enterprises, as provided in MSMED Act, 2006.

3. Export Credit

Export credit, which includes pre-shipment and post-shipment credit, up to a specified limit as prescribed under the extant RBI guidelines on Priority Sector Lending (Targets & Classification) is covered under the Priority Sector Lending.

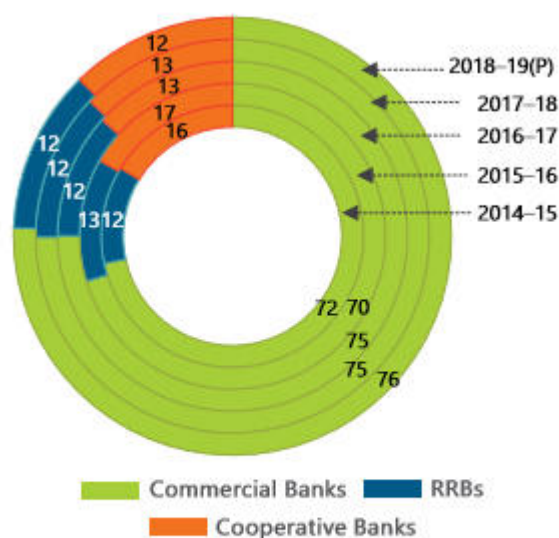


Source: Report of the Internal Working Group to Review Agricultural Credit - RBI

Though at the aggregate level banks have been able to achieve the overall PSL target of 40 per cent, so far, they have failed to achieve the agriculture target of 18 per cent at system-wide level. However, public sector banks have achieved 18.12 per cent as against private sector banks' achievement of 16.30 per cent in 2018–19.

Institutional Credit to Agriculture and Allied Sectors³³

During the year 2018–19, banks disbursed ₹12.55 lakh crore as ground level credit to agriculture (agriculture and allied activities, agri-infrastructure, and ancillary activities), and surpassed the yearly target of ₹11 lakh crore. Agricultural credit disbursement continues to be dominated by Commercial Banks (76%). The share of Regional Rural Banks (RRBs) has remained constant at 12%, while Cooperative Banks have gradually lost out to Commercial Banks and their share in credit flow has declined over the years to reach 12% in 2018–19.



Agency-wise Share (%) of Credit Flow to Agriculture

³³NABARD's Annual Report 2018-19

Agency-wise Ground Level Credit Flow (₹ crore)

Agency	2014–15	2015–16	2016–17	2017–18	2018–19 (P)
Commercial Banks	604,376.00	642,954.00	799,781.00	871,080.00	949,622.00
RRBs	102,483.00	119,260.00	123,216.00	141,216.00	151,258.00
Cooperatives	138,469.00	153,295.00	142,758.00	150,321.00	153,882.00
Total	845,328.00	915,509.00	1,065,755.00	1,162,617.00	1,254,762.00

Source: NABARD's Annual Report 2018-19 (P): Provisional

2. Financial ecosystem in Maharashtra

It would be pertinent to mention that there exists an extensive and widespread network of banks, comprising commercial banks (CBs), regional rural banks (RRBs), local area banks (LAB), small finance banks (SFBs), cooperative banks (both urban and rural) in Maharashtra. Details of the banking profile in Maharashtra, as on 30th September 2019, are given in the table below.

Sr. No.	Type of the institution	No. of institutions	Total No. of branches	Number of branches in the rural/semi-urban areas
1	Commercial Banks (CBs)	31	9133	5684
2	Regional Rural Banks	2	763	685
3	Small Finance Banks	9	517	253
4	Local Area Banks	1	9	6
5	Cooperative Banks**	32	3744	3217

**** Data on the cooperative banks covers Maharashtra State Cooperative Bank (MSCB) and 31 District Central Cooperative Banks (DCCBs)**

Besides the above, 21102 primary agricultural cooperative credit societies (PACS), and a good number of the urban cooperative banks (UCBs), non-banking financial companies (NBFCs) and micro finance institutions (MFIs) also operate in the state.

Institutional lending to the agricultural sector - Maharashtra

As per the extant guidelines of the central bank, the banks must fulfil statutory requirements of lending to the agriculture and priority sectors. Loans to the FPOs/ FPCs also qualify for meeting these stipulations. Details of the loans provided by the formal financial system in Maharashtra, including priority sector and agriculture, are given in the table below.

(Amt. in Rs. Crore)					
Sector	2016-17	2017-18	2018-19	2019-20*	2020-21 (E)**
Agriculture	96778	51017	67914	51565	110640
Of which Crop Loans	42173	25322	31237	25767	74875
Other Priority	147631	168624	248841	165377	436881
Total Priority	244409	219641	316755	216942	547521
Non-Priority	819111	940640	1012373	922254	--
Grand Total	1063520	1160281	1329128	1139196	--

*As on 31 December 2019

**This is the potential for the flow of credit, as estimated by NABARD, for various sectors. Of the total loans estimated to be provided for the 'Agriculture' (i.e. Rs. 110640 crore), an amount of Rs. 4480 crores are likely to go to the 'Plantation & Horticulture' sector.

3. Financial Instruments

Following are some key financial instruments that facilitate finance in the agriculture value chain:

- **Savings Backed Loans:** Producers use retained earnings and savings to finance the production cycle. Savings are the cheapest mode to finance the production cycle. However, savings limit the potential of the producer. Hence, financial institutions may intermediate through savings backed loans and savings-history based loans to meet the gap in the finance required.
- **Financing by Farm Produce Aggregator or by Input Supplier or Marketing Company Credit:** Herein the upstream actors of the value chain finance the production cycle and receive repayment in kind or cash from the producers on harvest. This is normally an informal arrangement. Scope for expansion is limited by the liquidity position of the intermediary. As the intermediaries' core function is not financing, the lending may also be sub-optimal and is also generally offered at substantially high interest rates.
- **Financing by a Lead Firm:** In the Lead Firm Financing or Contract Farming mechanism, the lead firm assures regular supply of input, services and technology and buys the produce as per a pre-agreed arrangement. However, such arrangement is generally restricted to high value crops and to large-farm holdings producers.
- **Farmer Credit Card issued by Banks and Financial Institutions:** Farmers' Credit Card brings in a lot of benefits to the producers such as flexibility of borrowing, longer term (3 to 5 years as compared to a one-year term loan), insurance for crops etc. thus enhancing the export competitiveness of the produce. However, banks and FIs have faced high default rates in such financing mechanisms.
- **Warehouse Receipt Financing by Informal Lenders or Formal Financial Institutions:** Herein, the lenders finance the producers in lieu of the commodities stored and certified by independent warehouses. It is a post-harvest financing mechanism wherein the producers benefit from price rise after a significant amount of time has passed since the harvesting. However, there are concerns around acceptability of warehouse receipt as a security. Further, warehouses require large capital investments and running expenses without guarantee of utilization of warehouse. Also, this kind of financing arrangement is difficult to access by small-scale producers due to high costs of warehouses and high minimum volume for storage. This kind of arrangement can be implemented through formation of cooperatives or FPO / FPO and enabling smallholder

farmer cooperatives to produce high value crops as well as promoting financial institutions in designing complex financial transactions such as loans based on warehouse receipts.

- **Term Loans by Banks & Financial Institutions:** Land tenure and property rights constrain access to finance by producers under this mode of financing. Lack of accurate credit history forces banks and financial institutions to rely on collateral-based lending to producers/producer organizations. In this context, however, some NBFCs have taken lead and designed products where they offer loans to FPOs on collateral free basis. However, the interest rates are often high which discourage many FPOs from borrowing from such FIs. In order to address this problem, credit guarantee schemes are being offered by some institutions like SFAC. However, in this context too, many FPOs are unable to leverage such schemes as the eligibility criteria allow only farmer producer companies (FPOs) which have a minimum shareholder base of 500 to apply under the scheme. Notably, some banks have also been providing loans for horticulture crops. For instance, Karur Vaishya Bank Limited provides Horticulture Loans to facilitate farmers purchase machinery, poly houses, drip irrigation installation, etc. The loans have convenient repayment options with repayment period of up to 7 years for term loans.
- **Overdraft Facility by Banks and working capital finance:** Overdraft and working capital credit supports short-term working capital requirements of FPOs, aggregators, processors, wholesalers and other value chain operators.
- **Equipment, Assets and Vehicle Finance by Banks & Financial Institutions (FIs):** FIs base the decision to finance the assets on the credit worthiness of the borrower and hence such a financing arrangement is suitable only to the upstream actors of the value chain such as FPOs, aggregators, processors etc.

4. Major Central and State Schemes and Initiatives

To promote FPOs an enabling environment, the Department of Agriculture and Co-operation, Govt of India had brought out a national policy and process guidelines for farmer producer organizations together with the role of Central and State Govt institutions in supporting FPOs in 2013.

- I. Two initiatives were also announced in the Union Budget 2013-14 to support Farmer Producer Companies (FPOs), viz., support to equity base of FPOs by providing matching equity grants and Credit Guarantee support for facilitating collateral free lending to FPOs. These two schemes have been implemented by Small Farmers Agri-business Consortium (SFAC), a Society promoted by the Department of Agriculture, Cooperation & Farmers Welfare, MoA&FW, and Govt. of India.
 - a) The Equity Grant Fund Scheme (EGFS) extends support in the form of matching equity up to ₹1.5 million to eligible FPOs having minimum shareholder membership of 50 farmers to enhance the viability, sustainability and credit worthiness of the FPOs
 - b) The Credit Guarantee Fund Scheme (CGFS) provides a credit guarantee cover to Eligible Lending Institutions (ELI) in respect of loans not exceeding ₹10 million to FPOs defined in Section IXA of the Indian Companies Act, 1956 and having minimum 500 individual shareholders. The objective is to enable these FPOs avail collateral free credit and minimize their lending risk.
- II. Further initiatives were announced in the Union Budget 2018-19 to promote FPOs, viz.,

- a) Launching of “Operation Greens” for onions, potato and tomato crops on the lines of “Operation Flood” with an allocation of ₹5 billion to address price fluctuation in vegetables. This is envisaged to promote FPOs, agri-logistics and processing facilities.
 - b) To facilitate an enabling environment for aggregation of farmers into FPOs and take advantage of economies of scale, 100 percent tax exemption for FPOs with annual turnover of up to ₹1 billion for 5 years.
- III. The Producers’ Organization Development and Upliftment Corpus (PRODUCE) fund has been set up by the Govt. in NABARD during 2014-15 to promote and nurture FPOs in the initial stage with grant assistance up to ₹40,000/- towards registration and other administration overheads.

The important schemes of the GoI for SMEs operating in agriculture/horticulture value chain include that of the MoFPI which include the Mega Food Park, Cold Chain and Kisan Sampada schemes. Mega Food Park Scheme aims at providing a mechanism to link agricultural production to the market by bringing together farmers, processors and retailers so as to ensure maximizing value addition, minimizing wastage and increasing farmers’ income. Cold Chain, Value Addition and Preservation Infrastructure is to provide integrated cold chain and preservation infrastructure facilities without any break from the farm gate to the consumer. The Kisan Sampada Backward and Forward Linkages scheme provides effective and seamless backward and forward integration for processed food industry by plugging the gaps in the supply chain in terms of availability of raw material and linkages with the market. The main objective of the scheme for creation /expansion of Food Processing and Preservation Capacities is modernization/ expansion of existing food processing units with a view of increasing the level of processing, value addition leading to reduction of wastage. The Scheme for Agro-processing Cluster aims at development of modern infrastructure and common facilities to encourage group of entrepreneurs to set up food processing units based on a cluster approach.

The other important schemes of the GoI include Prime Minister’s Employment Generation Programme, Credit Guarantee Fund Scheme for Micro and Small Enterprises, Mudra Loan Scheme, Agri-Clinics and Agri-Business Centres Scheme, Scheme of Fund for Regeneration of Traditional Industries, Micro and Small Enterprises - Cluster Development Programme, Development of Commercial Horticulture through Production and Post-Harvest Management of Horticulture Crops, Capital Investment subsidy scheme for construction/ expansion/ modernization of cold storage and storages for Horticulture Products and other schemes of NHB, Venture Capital Assistance Scheme for Agribusiness Development, Equity Grant and Guarantee Fund Scheme (by SFAC).

The state government of Maharashtra too provides support to agriculture/horticulture value chain operators through schemes such as Gat-Sheti Scheme, Mukhyamantri Krishi va Anna Prakriya Yojana, Krishi Gurukul Yojana, Chief Minister Employment Generation Program, Pundit Deen Dayal Upadhyay Unnat Krishi Shiksha Yojana, Anna Saheb Patil, Arthik Vikas Mahamandal Manyadit and the Chhatrapati Rajaram maharaj Entrepreneurship and Skill Development Campaign, also various schemes of NHM.

While both Central and State Government have actively undertaken several initiatives, more than often FPOs and micro/small scale entrepreneurs are unable to leverage grant/other assistance under such schemes. The primary reasons behind this remain either non-compliance to eligibility criteria and/or lack of access to finance (in case of schemes mandating term loan). Lack of experience in food processing or cold storage operations and poor financial history or nascent establishment (lack of audited financial balance sheets) too reduce chances of FPOs/relatively smaller scale operators to gain from such schemes.

Output 2: Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened

An estimated over 300 FPOs in Maharashtra have sizeable production of targeted crops (i.e. pomegranate, banana, etc.) in their catchment zones. Many of these FPOs have been incubated and supported through promoting institutions like SFAC, NABARD, MACP, Agriculture Department, CSR Foundations, etc. After the incubation process, the major challenge that these FPOs face is in leveraging finance from FIs to meet their aspirations in terms of catering to remunerative markets. Several reasons like need for collateral, high cost of funds, etc. (which have been discussed in inception report too) hamper the process of gaining credit which in turn thwarts the growth of these FPOs. In order to meet the expectations of remunerative markets, these FPOs need finance for quality improvement in products/ services.

This invariably means either expansion of their services in terms of facilitating quality production and/or access to value addition infrastructure, agri logistics, marketing infrastructure, market access and allied services. For example, individual farmers and FPOs dealing with pomegranate require a suitable pack-house to grade, pack and market their produce to different (grade) buyers. In lack of such facilities, they are more dependent on pre-harvest contractors and other middlemen, which (dependence) in a way does not yield remunerative rates. Similarly, to process and service orders on a continuous basis and to meet other operational obligations, a sizeable corpus of working capital too is required. One of the ways these FPOs raise their capital, in lack of credit facilities, is through equity capital. However, given the limited investment capacity of the small and marginal farmers, limited contributions are made by individual farmers to raise the FPOs' equity which often cannot sustain the operations of the FPOs. In this context, equity grant through institutions like SFAC (which is availed only to FPCs) is linked to equity capital raised through each member farmer. To even gain the complete support under this scheme which is limited to INR 15 lakh, an FPC is required to have at least 1500 farmer members and raise a contribution of INR 1000 from each! Obviously, not many FPCs have been able to leverage this scheme, or at least to the extent they need to realize full potential of opportunities available to them. It is pertinent to point here that some FIs (largely NBFCs) have been actively working with FPOs to meet their credit requirements, albeit such support is limited considering own limitations of such active FIs. Also in general, as has been pointed in discussions and inception report too, the rate of interest is generally high which makes it difficult for FPOs to compete with operators who get finance at much lower cost (rather at half the rate). As such any FPO can only grow if their margins can absorb the cost of funds and still make reasonable profits, which is almost impossible with the high interest rate loans they are being extended till date.

The other value chain operators like aggregators, processors, exporters, etc. are generally found to be in better space in terms of access to credit from FIs. However, most of these operators work in isolation in terms of handling only the part of value addition process concerning them. And thus we see a large number of intermediaries playing different roles in the long value chains of our targeted horticulture crops too. It is undisputed that the changed economics of value delivery can challenge the viability of incumbents with long, complex value chains. A more coordinative relationship between these stakeholders and FPOs can practically eliminate redundant stages of the value chain, often dramatically reducing capital and infrastructure costs. It is therefore necessary that joint interventions and complementing roles are designed which will lead to creation desired quality of products and services to cater to highly quality conscious and equally remunerative markets in turn leading to better remuneration to all stakeholders. Such interventions are expected to reduce costs, increase market led quality production, spur greater growth and thus lead to a win-win situation for both FPOs and linked value chain operators.

It is pertinent to state here that to plug gaps in value chain and supply chain, integration of existing facilities and setting up new infrastructures is extremely important. For example, in order to realize full and incentivized value of a pomegranate crop, it is important that production and post-harvest handling are pursued as per prescribed best practices, the farm produce is graded to segregate qualities for different markets and for further processing, the processing grade is converted to marketable goods like beverage/arils and the by-products and waste are value added too. This is then followed by the process of right packaging and sale of the products to right markets. Setting up of such infrastructure either by FPOs or by other SMEs or even jointly requires huge capital investment as well as funds to oversee the operational costs. However, the existing banking system perhaps has not responded to such aspirations of the FPOs and other value chain operators in the manner expected. Some value chain operators (who are keen on actively working with FPOs to improve value chain) are in better stead however they are also often disincentivized investing such large capital as the gestation periods of such projects are often long and thus lead to delayed achieving of break-even and poor return on investment. The role of debt at reasonable cost and grants to reduce the gestation period and increase the financial viability of such projects is extremely crucial.

Notably, there are several other and unique issues/challenges that FPOs and other value chain operators face in implementing their business plans. In this context, the project envisages provision of financial support, in the form of a matching grant and a financial intermediation loan (FIL).

Financing Farmer Producer Organizations (FPOs)

Basically, for any FI to lend 3 things are most important return, risk and operating cost. Obviously, the returns need to be more than the cost of funds, the risks need to be at an acceptable level or covered in some form, and the cost of managing the loan needs to be recovered.

Any lending bank will primarily want to know whether the business of the FPO is bankable; i.e. the business has the ability to access debt, use it and then make a margin adequate to service the debt and pay back the loan when it falls due.

- 1. Loan Pricing:** One of the reasons FPOs back-out from taking a loan is pricing. Most NBFCs that lend to FPOs, charge at least 15%, and up to 22% per annum. Unless the concerned FPO can deploy the money to earn margins that are more than 15%, it makes sense to borrow. For any new market entrant (like FPO) such margins may be tough to achieve especially when such entity will be facing the well-established businesses in the sector. It is imperative that FPOs are able to leverage credit at lower interest rate so their business can compete with other value chain operators who are able to avail credit at substantially lower rates of even 8.5% to 9%.
- 2. Bankable business plan:** It is critical to understand as to how much business can be done by the FPO with a loan. The ability of the FPO to rotate the funds while also generating healthy margins is the key when the bank extends finances operational expenses. Market linkage is another key factor. If there are market linkages in place that could be with buyers having a track record it reduces risk and gives comfort to the lender. Holding of stocks by an FPO expecting an upside is a serious uncovered risk and could also lead to severe losses. Indicators like IRR, DSCR, etc. are equally important in understanding the financial viability of the capital investment.
- 3. Covering operating costs:** If a lender has to do small loans, sending an officer for due diligence and loan monitoring, managing the account from origination to closure costs money. It is therefore critical that lending FI can reach out to a sizable number of FPOs in a cluster region. In this context, the rural branches of the

SCBs or regional rural banks could play crucial role. Notable, NBFCs like Nabkisan Finance Limited, Samunnati Financial Intermediation & Services Pvt. Ltd., Ananya Finance, etc have been successful in extending loans to FPOs and other value chain operators in the interior parts of the State.

There are a few generally accepted principles of good conduct of a business enterprise that any FPO also needs to comply with; these include:

- A reasonable period of existence with some business traction
- A governance structure and a system of oversight
- A business plan detailing what the enterprise wants to do
- Compliance to the regulations & laws of the land
- Transacting on the books, preferably through a bank account

Additionally (specifically for FPOs),

- A member base with participating members
- Equity Capital
- A demonstration of the ability to do business
- An understanding of the commodity & the market
- Market linkages to buyers
- Presence & support of a promoting institution helps and adds to the comfort

Any guarantee or mechanism in case of loss/inability of FPO to repay the loan when it falls due.

B. Financial Intermediary Loan (FIL)

In line with the objective to address the challenges faced by FPOs and other operators in accessing credit, the FIL component is proposed in the project. It is envisaged that the proposed FIL will be extended to member financial institutions to further on-lend to targeted and eligible sub-projects. It is also envisaged that since such FIL to member FIs shall be extended at a considerably lower rate, these FIs shall be able to on-lend at competitive rate to sub-projects. Two types of loans, namely Term Loan and Working Capital Loan, shall be extended to eligible sub-projects from FIs. It is envisaged that term loan at competitive rates will lead to incentivizing FPOs and other value chain operators in infusing their equity and the obtained debt to set up suitable projects eligible under MAGNET. Similarly, working capital assistance shall enable the sub-projects to optimally utilize their capacities and shall assist in meeting their operational obligations more efficiently. In order to thoroughly understand the activities and areas warranting debt support (through appropriate products) for the sub-projects, TRTA consultants undertook detailed discussions with some potential FIs, FPOs, value chain operators, experts. In this context, further details with reference to qualifying criteria and term loan and working capital loan product contours are outlined below and detailed out under project implementation arrangement.

Table 1: Recommended (and in-principally agreed by PFIs) term loan and working capital loan product features:

Product Features	Term Loan		Working Capital Loan	
	Criteria For FPOs and Anchor Organizations	Criteria For Other Value Chain Operators (also large anchor FPOs)	Criteria For FPOs and Anchor Organizations	Criteria For Other Value Chain Operators (also large anchor FPOs)
Pricing of sub loan	FIs to on-lend as per Median MCLR of SCBs of the month (in which loan is sought), plus max spread of up to 100 basis points (based on merit of the case)			
Free Limit of the Sub-Loan	Free limit be set at INR 1 Crore	Free limit be set at INR 5 Crore	Maximum Limit of INR 1 Crore	Maximum Limit of INR 5 Crore
Tenure	Up to 7 years Longer Tenure of up to 10 years may be offered at FIs own discretion for highly capital intensive Cold Chains or other Critical Infrastructure.		Flexible loan repayment tenures that can be short term or long term based on customers' business requirements. Hence repayment can be fixed based on business revenues and cash flows. CC/OD or other WCL products may also be offered. These may include Invoice Discounting, Purchase Order Funding/ Packing Credit, Warehouse Receipt Finance, Domestic LC, etc. Also, relaxation in submission of Stock Statements and Debtor Statements and other compliances may be offered.	
Moratorium Period	Not less than 12 months for relatively small infra projects like Primary Processing Infrastructure etc. Not less than 24 months for relatively large size and capital intensive projects	Not less than 9 months for relatively small infra like Primary Processing Infrastructure, etc. Not less than 18 months for relatively large size and capital intensive projects	Repayment to be flexible based on business revenues and cash flows.	
Repayment of loan	Post Moratorium, Repayment (clause) w.r.t. to initial 6 months to 1 year to be flexible (staggered repayment) to allow Quarterly, Bi-Annual or Annual Repayments.	Post Moratorium, Repayment (clause) w.r.t. to initial 6 months to 1 year to be flexible (staggered repayment) to allow Quarterly, Bi-Annual or Annual Repayments.	Repayment to be flexible based on business revenues and cash flows.	
MCLR Reset and Protection Clause	Not less than 1 Year. i.e. if Median SCB MCLR increases during the year interest rate remains unchanged, however if MCLR decreases benefit need be passed to beneficiaries			
Credit Guarantee Cover	Member FIs will have to necessarily accept and process meritorious applications , wherein promoters may not be able to offer sufficient collateral. FIs can however demand collateral to extent of amount not covered under Max Cover of applicable CG scheme; Also Hypothecation of	FIs can use their discretion in this case. However, in case of large integrated projects (meritorious application) being jointly constructed by FPO and Industry Entrepreneur, leading to multiple infrastructures/ common facilities at farm level and/or market, may be considered.	Member FIs will have to necessarily accept and process meritorious applications , wherein promoters may not be able to offer sufficient collateral. FIs can however demand collateral to extent of amount not covered under Max Cover of applicable CG scheme	FIs can use their discretion in this case.

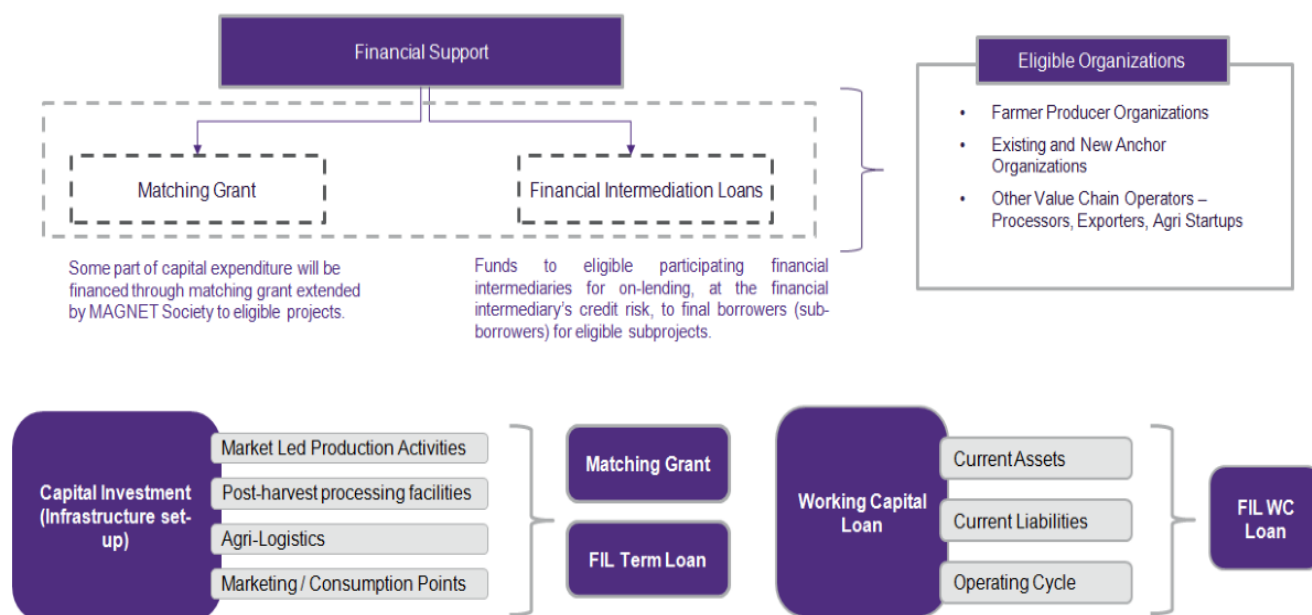
	assets created out of loan can be done.			
Processing Fee	Loan Processing fee should not exceed 0.5% FIs can also explore sharing of processing fee between FI and Ag-tech/ Fin-tech/other targeted beneficiaries - not exceeding 0.5% total			
Promoter Contribution	Minimum 10% (Working Capital Margin as per project cost calculation to be additionally infused by promoter)	Minimum 20% (Working Capital Margin as per project cost calculation to be additionally infused by promoter)	Minimum 15% (Promoter's Working Capital Margin of at least 15%)	Minimum 25% (Promoter's Working Capital Margin of at least 25%)

C. Matching Grant

It is envisaged that some part of capital expenditure incurred towards enabling market led production, setting up of processing and preservation infrastructure, agri-logistics and marketing infrastructure, proposed by FPOs and other SMEs or jointly as a FPO-SME partnership model or PPP model (for setting up of common facilities), will be financed through matching grant up to the extent of 60% of such investment with a maximum cap of INR 4 crore grant. It is also envisaged that such grant will:

- Assist in creating modern processing infrastructure closer to production areas.
- Enable linking groups of producers to processors and market through a well-equipped supply chain and cold chain, thereby ensuring remunerative prices to farmers and year-round availability of food products to consumers.
- Assist projects that ensure plugging of critical gaps in supply-chain (and lead to considerable increase in producer's remuneration).
- Assist FPOs to invest in farm equipment's/ other capital investment that support advanced techniques in production (such as High Density Plantation, Integrated Pest Management, etc.).
- Assist FPOs in the targeted value chains to develop suitable infrastructure at farm level which will help in increasing the level of processing/ value addition/ preservation capacities and thereby lead to reduction of wastage and enhancement of other associated benefits.
- Assist other value chain operators in setting up relevant projects that are of pioneering nature by way of new product / new process.
- Assist projects in achieving greater financial viability which otherwise have high gestation period sans grant (hence delayed break even and low ROI).

In order to thoroughly understand the activities and areas warranting grant support for the sub-projects, TRTA consultants undertook detailed discussions with some FPOs, value chain operators and experts. In this context, further details with reference to eligible organizations, qualifying criteria, selection criteria, list of eligible and ineligible components, pattern of assistance and project selection criteria are outlined under project implementation arrangement. The final schematic design of the financial support is presented as under:



D. Demand Assessment

As per the NCCD cold chain assessment report there is a need of 9,245 pack-houses, 34,200 MT of cold storage bulk, 1,23,509 MT of cold storage hub and around 12,045 MT of ripening chamber to meet the state processing demand³⁴. The government drafted an Agri Export Policy (AEP) for the state with an aim to transform Maharashtra into an Agri Export Hub of the country. The AEP has set out its export projections for major horticulture commodities along with outlining infrastructure requirements among other strategic recommendations³⁵. The Mapping study on agribusiness industry & value chain players was also conducted across Maharashtra to analyse the gap across the value chain. The study proposes to enhance the current infrastructure capacities by 5 to 10% by setting up 146 integrated pack houses at farmers/aggregator level and 32 specialized facilities for value addition at SMEs level for the targeted value chains. Additionally, ADB conducted a post-harvest study to assess the post-harvest losses and infrastructure gaps across the targeted value chain. The study estimated an overall average losses of 25% across the value chain and 4500 crore worth of loss in value. Basis these findings and multiple stakeholder consultations (presented in annexure) the TRTA consultants have done a detailed demand assessment across the value chain for the 10 horticulture commodities to determine the infrastructure requirement in the state for the FPOs and value chain operators. These infrastructure projects have been classified into two categories for each value chain as explained below:

- Small category projects:** This includes, export oriented pack-house facility with sorting-grading, conveyor line, cold storage and packaging infrastructure with the average annual capacity of 6000 MT with average project cost varying between 70-200 lakhs INR.
- Large category projects:** This includes, export oriented integrated pack house facility with sorting, grading, conveyor line, pre-cooling, cold storage, reefer vans, ripening unit and packaging infrastructure with average annual capacity of 6000 MT and average project cost varying between 600 – 1400 lakhs INR. It

³⁴ All India Cold-chain Infrastructure Capacity Assessment of Status & Gap, NCCD, 2015
https://www.nccd.gov.in/PDF/CCSG_Final%20Report_Web.pdf

³⁵ Agri Export Policy of Maharashtra State, MSAMB, 2019

may also include additional processing infrastructure such as pulping unit, IQF, blast freezing etc. for value addition of respective commodities.

A total of 200 potential FPOs and 105 value chain operators' will be supported towards infrastructure development in the focused production clusters of the targeted value chains under various State and Central government projects/schemes like SMART, Gat Sheti, MOFPI (Cold Chain) etc. Several such applicants will be target sub-projects and are expected to also be supported by MAGNET (through either Matching Grant or FIL Term Loan or FIL Working Capital Loan or even combination of the Matching Grant and FIL products), and various relevant aspects. In this context, a detailed financial analysis has been conducted for each crop small and large model infrastructure projects. The tables below give a snapshot of demand assessment for both categories of model projects:

Table 2: Demand Assessment - Small Category Projects

Sr. no.	Crop	Project Cost	Promoter Contribution	Grant From Magnet/ Other Schemes	Term Loan	Working Capital Loan (Avg. 5 years)*	No. of Projects envisaged under MAGNET	No. of Projects supported with grant under MAGNET	Grant Support under MAGNET (Amount)	FIL Term Loan Support (Total for all small category Projects)	FIL Working Capital Loan Support (Total for all small category Projects)	Total Fund Requirement under Output 2 (Total for all small category Projects)
1	Banana	80	16	30	34	36	46	20	600	1554	1666	3820
2	Pomegranate	195	41	71	84	153	96	40	2832	8045	14730	25607
3	Orange	177	36	65	77	132	57	24	1555	4378	7498	13431
4	Custard apple	93	23	30	40	76	7	3	90	280	530	900
5	Chilli	129	26	55	48	40	17	7	385	821	678	1884
6	Strawberry	150	30	62	58	46	3	1	62	173	139	374
7	Sweet lime	178	36	65	77	124	19	10	648	1459	2360	4467
8	Guava	181	41	64	76	150	3	1	64	228	449	741
9	Okra	129	26	55	48	40	5	3	165	242	199	606
10	Sapota	157	31	64	61	65	6	3	192	369	390	951
	Total						259	112	6,593	17,547	28,639	52,781

* Figures in Rs. Lakh

** Working Capital Loan Amount is considered on 5 yrs average basis, as requirement for same is low during initial years but increases considerably with increase in scale of operations.

***At least 40% of the total number of projects or minimum 1 project for each commodity, whichever is higher under small category will be supported by grant assistance under MAGNET

Table 3: Demand Assessment - Large Category Projects

Sr. no.	Crop	Project Cost	Promoter Contribution	Grant From Magnet/ Other Schemes	Term Loan	Working Capital Loan (Avg. 5 years)*	No. of Projects envisaged under MAGNET	No. of Projects supported with grant under MAGNET	Grant Support under MAGNET (Amount)	FIL Term Loan Support (Total for all Large category Projects)	FIL Working Capital Loan Support (Total for all Large category Projects)	Total Fund Requirement under Output 2 (Total for all Large category Projects)
1	Banana	819	164	349	307	91	8	5	1,743	2,453	731	4,927
2	Pomegranate	930	186	391	354	150	17	9	3,515	6,011	2,554	12,080
3	Orange	1,307	262	567	479	216	10	5	2,837	4,786	2,164	9,787
4	Custard apple	665	133	268	264	80	1	1	268	264	80	612
5	Chilli	657	131	262	264	160	3	1	262	791	480	1,533
6	Strawberry	717	143	267	307	222	1	1	267	307	222	796
7	Sweet lime	1,276	255	567	453	104	3	1	567	1,359	313	2,239
8	Guava	664	133	268	263	100	1	1	268	263	100	631
9	Okra	657	131	262	264	160	1	1	262	264	160	686
10	Sapota	659	132	268	259	76	1	1	268	259	76	603
	Total						46	26	10,257	16,757	6,882	33,894

* Figures in Rs. Lakh

** Working Capital Loan Amount is considered on 5 yrs average basis, as requirement for same is low during initial years but increases considerably with increase in scale of operations.

***At least 40% of the total number of projects or minimum 1 project for each commodity, whichever is higher under large category will be supported by grant assistance under MAGNET

The table below thus presents a summary of total fund requirement:

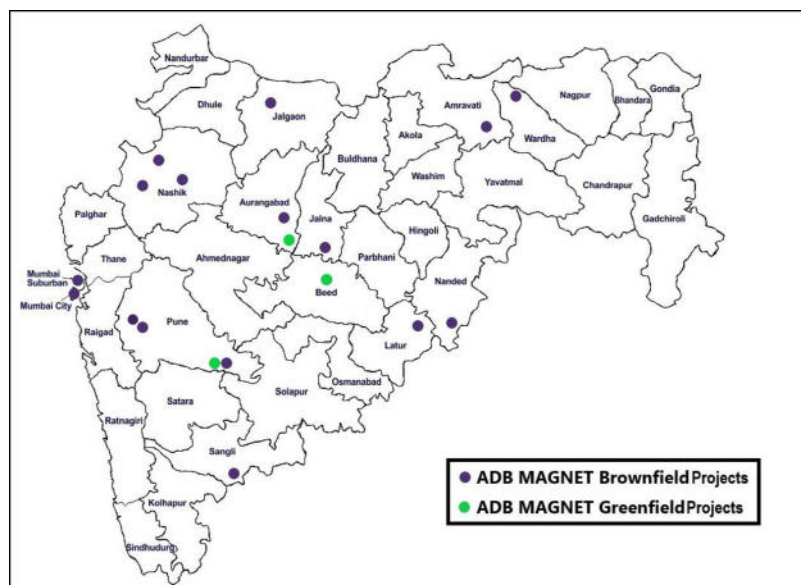
Sr. No.	Crop	Grant Support under MAGNET (Amount in Rs. Lakh)	FIL Term Loan Support (Amount in Rs. Lakh)	FIL Working Capital Loan Support (Amount in Rs. Lakh)	Total Fund Requirement under Output 2 (Amount in Rs. Lakh)	Total Fund Requirement under Output 2 Amount in MIn USD (@Rs 73.78/USD)
1	Banana	2,343	4,007	2,396	8,747	12
2	Pomegranate	6,347	14,056	17,285	37,687	51
3	Orange	4,392	9,163	9,663	23,218	31
4	Custard apple	358	544	610	1,512	2
5	Chilli	647	1,612	1,158	3,417	5
6	Strawberry	329	480	362	1,170	2
7	Sweet lime	1,215	2,819	2,674	6,706	9
8	Guava	332	491	549	1,372	2
9	Okra	427	505	359	1,292	2
10	Sapota	460	627	466	1,554	2
	Total	16,850	34,304	35,521	84,115	117

5. Output 3 – Agriculture value chain infrastructure improved and operational.

A. Detailed assessment of all MSAMB facilities

MAGNET is aimed to support the development of horticulture sector and agribusiness through promoting value addition in post-harvest segments of targeted horticulture value chains, facilitate agribusiness investment, stimulate FPOs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation. The project has identified 10 key crops namely, Pomegranate, Banana, Guava, Orange, Sweet lime, Sapota, Custard Apple, Strawberry, Okra, Green and Red Chilies and floriculture and a number of post-harvest facilities that shall be upgraded to promote value addition and exports of select value chains.

The output 3 focuses on improving post-harvest infrastructure by developing 3 new Greenfield facilities and modernization of 16 existing select facilities of MSAMB located across 7 districts.



MSAMB has 44 such facilities in various regions of the state considering the climate and production of fruits and vegetables in the region. This includes 21 export facility centers (out of which only 16 are being modernized), 20 fruit and vegetable modern market facility center and 3 Flower export facility. With these facilities the state has established 1919 Mts Cold Storage, 225 MT of Pre-cooling and 200 MT of Ripening chamber capacity has been developed in the state by MSAMB. About 60,000 Mts plus agro commodities have been handled through facilities for export and

domestic market purpose.

Under this project, 16 export facility centers shall be upgraded with the total investment of INR 198.30 crores leading to increased capacity for cold storage, ripening chambers and pre-cooling while other modifications and repairs are also proposed for select locations along with addition of required utilities such as pallets, crates, dock levelers, conveyor system and etc. Furthermore 3 Greenfield facilities are proposed with a total investment of INR 77.49 crores. With the proposed upgradation the total increase in post-harvest capacities of Maharashtra is:



1,925 MT
Cold Storage



85 MT
Ripening Chamber



23 MT
Pre-Cooling/Holding Room

1. Mohadi Export Facility Centre, Nashik

Mohadi Export Facility center was established in 2014 on a plot size of 8,000 Sq. Mtr. with current utilized area of 1571. Sq. Mtr. The proposed expansion/modernization includes setting up of 250 MT of cold storage, Holding Room of 20 MT, Pre-cooling chamber of 5 MT Plastic Pallets, Electric Hydraulic Pallet and other utility items. The facility has been leased to Nature One Fresh Produce Pvt. Ltd. For a period of 10 years since 2014 to 2024. The facility is mainly used for primary processing of Grapes. The grapes season extends from December to May depending upon the time of grafting operation. This export facility is used for mainly for grapes while other fruits and vegetables such as pomegranate, chilies and okra are also packed and for exports. The total proposed investment for the modernization of the facility in INR 490.12 Lakhs.

2. Kalvan Export Facility Centre, Nashik

Kalvan Export Facility center was established in 2012 on a plot size of 17,500 Sq. Mtr. with current utilized area of 2042. Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Pre-cooling chamber of 10 MT Plastic Pallets, Electric Hydraulic Pallet and other utility items. The facility has been leased to M/s Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including grapes onion, tomato, chilly and okra from September to February. The total proposed investment for the modernization of the facility in INR 489.19 Lakhs.

3. Chandwad Export Facility Centre, Nashik

Chandwad Export Facility center was established in 2015 on a plot size of 8000 Sq. Mtr. with current utilized area of 1512 Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, conveyor belt a shed of 700 Sq. The facility is nonoperational from some years. The facility is mainly used for primary processing of variety of horticulture crops including grapes onion, tomato, chilly and okra from September to February. The total proposed investment for the modernization of the facility in INR 204.87 Lakhs.

4. Savda export facility center, Jalgaon

Savda Export Facility center was established in 2009 on a plot size of 8000 Sq. Mtr. with current utilized area of 1403. Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 25 MT of cold storage, Pre-cooling chamber of 10 MT, a shed, Plastic Pallets, Electric Hydraulic Pallet and a training hall with the required items for training. The facility has been leased to M/s Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including Banana and Maize from October to May. The total proposed investment for the modernization of the facility in INR 695.11 Lakhs.

5. Vegetable processing center, Vashi

Vegetable processing center, Vashi was established in 2016 on the 1st floor of MSAMB complex in Navi Mumbai with on a 1418.39 Sq. M. area. The proposed expansion/modernization includes setting up of CCTV cameras for better flow of goods and to enhance security, a spiral staircase and a goods lift. The facility is owned and operated by MSAMB itself. The facility is mainly used for primary processing of variety of vegetables such as Okra, various types of gourds, Tomatoes and leafy vegetables. The facility can be used all year long. The total proposed investment for the modernization of the facility in INR 100.91 Lakhs.

6. Vapor heat treatment, Vashi

Vapor heat treatment center, Vashi was established in 2016. It is based on the 2nd floor of the MSMAB complex in an area of 3779 Sq. Mtr. The proposed expansion/modernization includes setting up of 125 MT of cold storage, quarantine lab equipment, conveyor belt, automatic doors, plastic pallets, electric hydraulic pallet truck. The facility owned and operated by MSMAB. The facility is mainly used for vapor heat treatment of Mangoes, Custard apples and Guavas from March to May and July to September. The total proposed investment for the modernization of the facility in INR 145.95 Lakhs.

7. Irradiation facility center, Vashi

Kalvan Export Facility center was established in 2016 on a plot size of 4000 Sq. Mtr. with current utilized area of 2946. Sq. Mtr. The proposed expansion/modernization includes enhancement of source capacity, installation of temperature control system, addition idler conveyor system, installation of person and product scanning system, atomized material handling and storage racks, atomized doors at the loading and unloading area, auto dock levelers, packhouse to irradiation facility, plastic pallets, electric hydraulic trucks and conveyor belts. The facility is owned and operated by MSAMB. The facility is mainly used for irradiation of Mangoes, Onions, spices, ready to eat food items, etc. The perishable food items that are to be exported to Australia and USA are irradiated. The total proposed investment for the modernization of the facility in INR 92.52 Lakhs.

8. Latur export facility center, Latur

Latur Export Facility center was established in 2010 on a plot size of 10,370 Sq. Mtr. with current utilized area of 2320. Sq. Mtr. The proposed expansion/modernization includes modification to ripening chamber, humidity, CO2 controller, Ethylene controller, plastic pallets, Electric hydraulic Pallet truck, Upgradation of compressors of cold storage, dock levelers, dock seal and training hall. The facility has been leased to RJS FPC for a period of 2 years since 2017 to 2020. The facility is mainly used for primary processing of variety of horticulture crops including Banana, Citrus fruits and repacking of apples from August to February. The total proposed investment for the modernization of the facility in INR 389.94 Lakhs.

9. Ardhapur export facility center, Nanded

Ardhapur Export Facility center was established in 2014 on a plot size of 4000 Sq. Mtr. with current utilized area of 492. Sq. Mtr. The proposed expansion/modernization includes setting up of Humidity, CO2 and Ethylene control, plastic pallets, electric hydraulic pallet truck. The facility has been leased to Sheya irrigation Ltd. For a period of 3 years since 2017 to 2020. The facility is mainly used for primary processing of variety of horticulture crops including Bananas from June to December. The total proposed investment for the modernization of the facility in INR 60.42 Lakhs.

10. Karmad export facility center, Aurangabad

Karmad Export Facility center was established in 2017 on a plot size of 4,000 Sq. Mtr. with current utilized area of 492. Sq. Mtr. The proposed expansion/modernization includes setting up training hall, provision of plastic pallets and electric hydraulic pallet truck. The facility has been leased to Karmad farmer producer company. For a period of 10 years since 2018 to 2028. The facility is mainly used for primary processing of variety of horticulture crops including Green chili, Pomegranate, Tomato, Mosambi from February to November. The total proposed investment for the modernization of the facility in INR 140.94 Lakhs.

11. Jalna export facility center, Jalna

Jalna Export Facility center was established in 2004 on a plot size of 14163 Sq. Mtr. with current utilized area of 1212. Sq. Mtr. The proposed expansion/modernization includes setting partitions for unflow of goods and materials, holding room, pre – treatment inspection room, material storage room, post treatment inspection room, NPPO office, inspection kits, dock levelers, dock seal, dock door, plastic pallets and electric hydraulic pallet truck. The facility has been leased to AMPC Jalna. For a period of 3 years since 2017 to 2020. The facility is mainly used for primary processing of variety of horticulture crops including Kesar Mangoes and vegetables. Mangoes are processed from March to May. Vegetables are available for the entire year the total proposed investment for the modernization of the facility in INR 117.18 Lakhs.

12. Atpadi export facility center, Sangli

Atpadi Export Facility center was established in 2017 on a plot size of 8000 Sq. Mtr. with current utilized area of 682.6 Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 25 MT of cold storage, plastic pallets, Electric Hydraulic Pallet truck, plastic crates, conveyor belts and other utility items. The facility has been leased to Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including Grapes and Pomegranates. Grapes are available from November, December, January. Pomegranates are available all year round. The total proposed investment for the modernization of the facility in INR 297.51 Lakhs.

13. Talegaon Dabhade export facility center, Pune

Talegaon Dabhade Export Facility center was established in 2009 on a plot size of 4000 Sq. Mtr. with current utilized area of 578 Sq. Mtr. The proposed expansion/modernization includes setting up of automatic sorting and grading line for Pomegranates, Plastic pallets, Electric hydraulic pallet truck, Ripening chambers for Banana 4 x 20. The facility has been leased to Nisarg Fresh Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including Grapes, Pomegranates, Mango, Onion and vegetables in their respective seasons. Vegetable are available all year round. The total proposed investment for the modernization of the facility in INR 452.32 Lakhs.

14. Baramati export facility center, Pune

Baramati Export Facility center was established in 2007 on a plot size of 6350 Sq. Mtr. with current utilized area of 1003.33 Sq. Mtr. The proposed expansion/modernization includes setting up of 4 x 20 MT of ripening chamber, Training hall, Plastic Pallets, Electric Hydraulic Pallet and other utility items. The facility has been leased to APMC Baramati. For a period of 10 years since 2014 to 2024. The facility is mainly used for primary processing of variety of horticulture crops including Grapes, Pomegranates and Mangoes. The facility is operational all year round except a few months during monsoon season. The total proposed investment for the modernization of the facility in INR 381.53 Lakhs.

15. Chandur Railway export facility center, Amravati

Chandur Export Facility center was established in 2012 on a plot size of 17,500 Sq. Mtr. with current utilized area of 2042. Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Pre-cooling chamber of 10 MT Plastic Pallets, Electric Hydraulic Pallet, dock leveler and other utility items including electrification, internal road network and provisioning for environment planning. The facility has been leased to Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of

horticulture crops including grapes onion, tomato, chilly and okra from September to February. The total proposed investment for the modernization of the facility in INR 280.98 Lakhs.

16. Karanja Ghadge export facility center, Wardha

Karanja Ghadge Export Facility center was established in 2014 on a plot size of 4000 Sq. Mtr. with current utilized area of 492.Sq. Mtr. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Plastic Pallets, grading unit with waxing unit, Construction of Training hall along with LCD Projector, Sound system, Tables, Chairs with air conditioners, holding room, Pre-treatment inspection room, material storage room, post-treatment inspection room, dock leveler. The facility is mainly used for primary processing of variety of horticulture crops such as Oranges. The total proposed investment for the modernization of the facility in INR 624.21 Lakhs.

Greenfield facilities

1. Pachod export facility center, Aurangabad

Pachod Export Facility center be established in the FY 2020 - 2021. The land for the project is being leased from APMC Pachod. The proposed facility will include setting up of 4 x 25 MT of cold storage, Pre-cooling chamber of 6 MT, Pack house, Grading lines and other utility items. The facility will be leased to the most eligible value chain player who will be selected via a competitive bidding process. The facility is being constructed for the post-harvest handling and processing of Sweet lime. The total proposed investment for the modernization of the facility in INR 1813 Lakhs

2. Beed export facility center, Beed

Beed Export Facility center be established in the FY 2020 - 2021. The land for the project is being leased from APMC Beed. The proposed facility will include setting up of 2 x 250 MT of cold storage, pack house, two blast freezes of 2.5T/ batch capacity, pulping unit of 500kg/hr, packing and sealing line, trolley and crates and other utility items. The facility will be leased to the most eligible value chain player who will be selected via a competitive bidding process. The facility is being constructed for the post-harvest handling and processing of Custard apples. The total proposed investment for the modernization of the facility in INR 685 Lakhs.

3. Baramati export facility center, Pune

Baramati Export Facility center be established in the FY 2020 - 2021. The land for the project is being leased from APMC Baramati. This facility will be adjoining an existing facility at the same location. The proposed facility will include setting up of 7 x 100 MT of cold storage, precooling, pack house, blast freezes of 5MT/ batch capacity, Aril packaging area, dry storage area, frozen storage area and other utility items. The facility will be leased to the most eligible value chain player who will be selected via a competitive bidding process. The facility is being constructed for the post-harvest handling and processing of Pomegranates. The total proposed investment for the modernization of the facility in INR 5,251 Lakhs.

6. Cost Estimates and Financial & Economic Analysis

A. Detailed Cost Estimates

Detailed cost estimated are presented in the table below:

Category	Unit	Total no of units	MAGNET Financial Assistance (In Lakhs INR)	Total Cost (In lakh INR)	In million USD
Output 1 - Institutional capacities of agribusiness institutions and farmer producer organizations strengthened				7,013.50	9.51
A. Enhancing market-led production and improving productivity				2,437.50	
1. Nursery Development in focussed crops (4 ha)	No.	15	40	600.00	
2. Tissue culture unit	No.	4	100	400.00	
3. Introduction of new varieties	Lumpsum		200	200.00	
4. Capacity building on Good Agricultural Practices					
a. Training on GAP (government contribution--arrangement and logistics)	No. of farmers	30000	0.01	300.00	
b. Certification cost on GAP	Acre	1500	0.13	187.50	
c. MRL testing	No.	1500	0.05	75.00	
d. Support for fruit care activities	No. of farmers	1500	0.25	375.00	
5. Demonstrations on High density Plantation (HDP)	Acres	400	0.75	300.00	
B. Post-harvest management				782.50	
1. Capacity building on post-harvest management					
a. Trainer training on post-harvest technology under MAGNET focus crops (5 days)	No.	250	0.25	62.50	
b. Training of FPOs (400) and VCOs (200) on post-harvest management for MAGNET focus crops (3 days)	No.	4800	0.15	720.00	
C. Innovation in new product				975.00	
1. Research & Development					

a. R&D for new product development in focussed value chain	Lumpsum	-	200	200.00	
b. Innovation in packaging in all 10 commodities	Lumpsum	10	20	200.00	
c. Bio-waste to wealth	Lumpsum	-	75	75.00	
2. Support for commercialization of new technology	No.	20	25	500.00	
D. Lead firm SME linkages	Lumpsum	-		120.00	
1. Capacity building	No. of person	300	0.025	7.50	
2. Production Plant Certification compliance cost (GMP, HACCP, etc.)	No. of SMEs	30	1.50	45.00	
3. Market development assistance	No. of SMEs	30	1.00	30.00	
4. Other certification cost for sustainable sourcing of raw material (Fairtrade, RFA, Organic etc.)	No. of SMEs	30	1.25	37.50	
E. Market Development and Promotion				1,450.00	
1. Development of e-commerce portal for B2B and B2C	Lumpsum		100	100.00	
2. Traceability systems through Blockchain	Lumpsum		200	200.00	
3. Buyer seller meets	No.	50	2	100.00	
4. Trade fair and Exhibitions					
a. Participation in Trade Fair & Exhibition (International)	No.	10	30	300.00	
b. Participation in Trade fair & Exhibition (Domestic)	No.	15	10	150.00	
5. Development of export protocols and support for trials for MAGNET focussed crops and targeted countries	Lumpsum		300	300.00	
6. Branding and promotion	Lumpsum per year	6	50	300.00	
F. Building institutional capabilities of FPOs				588.50	
1. Capacity building and training of BoD of FPOs	No.	500	0.10	50.00	
2. Export training to women led FPOs & enterprises	No.	300	0.20	60.00	
3. Study Tours, Exposure visits					
a. Within state (3 day trip, 2 farmer per FPO)	No.	400	0.06	24.00	
b. Outside state (7 day trip, 2 farmer per FPO)	No.	400	0.21	84.00	
c. International (30 farmers per crop)	No.	300	1.00	300.00	
d. Study tour for MAGNET staff (outside state)	No.	50	0.21	10.50	
e. Study tour for MAGNET staff (international)	No.	30	2.00	60.00	

G. Capacity building and Training workshops on project compliances (Gender, Social, Environment, Finance, M&E)					160.00	
1. Training workshop for IAs, PIU, FPOs, Value chain operators, and other stakeholders	Lumpsum as per MSAMB cost estimates	80		2.00	160.00	
H. Support to innovative technologies	Lumpsum			500.00	500.00	
Output 2 - Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened					65,317.80	88.53
A. Matching Grant for Sub-projects					16,861.10	22.85
B. Financial Intermediation Loan					48,456.70	65.68
Output 3 - Agriculture value chain infrastructure improved and operational					14,732.73	19.97
1. Export Facility Centre, Mohadi, Nashik	No.	1		359.61	359.61	
2. Export Facility Centre, Kalvan, Nashik	No.	1		358.93	358.93	
3. Export Facility Centre, Chandwad, Nashik	No.	1		150.32	150.32	
4. Export Facility Centre, Savda, Jalgaon	No.	1		510.02	510.02	
5. Export Facility Centre, Jalna	No.	1		85.98	85.98	
6. Fruits & Vegetable Modern Marketing Centre, Karmad, Aurangabad	No.	1		103.41	103.41	
7. Fruits & Vegetable Modern Marketing Centre, Ardhapur, Nanded	No.	1		44.33	44.33	
8. Export Facility Centre, Latur	No.	1		286.11	286.11	
9. VHT Facility, Vashi, Navi Mumbai	No.	1		107.08	107.08	
10. Vegetable Processing Facility (VPF), Vashi, Navi Mumbai	No.	1		74.04	74.04	
11. Irradiation Facility Centre (IFC), Vashi, Navi Mumbai	No.	1		67.89	67.89	
12. Fruits & Vegetable Modern Marketing Facility Centre, Chandur Railway, Amravati.	No.	1		206.16	206.16	
13. Orange Export Facility Centre, Karanja Ghadge, Wardha	No.	1		458.00	458.00	
14. Grapes & Pomegranate Export Facility Centre, Baramati, Pune	No.	1		331.88	331.88	

15. Export Facility Centre, NIPHT Premises, Talegaon Dabhade, Pune	No.	1	279.94	279.94	
16. Pomegranate Export Facility Centre, Atpadi, Sangli	No.	1	218.29	218.29	
17. Additional Facility centre for custard apple at Beed, Beed	No.	1	502.65	502.65	
18. Fruits and Vegetable Handling Facility Centre, Pachod, Auranagabad	No.	1	1,330.05	1,330.05	
19. Fruits and Vegetable Handling Facility Centre, Baramati, Pune	No.	1	3,853.09	3,853.09	
20. Strengthening of National Institute of Post-Harvest Technology, Talegaon (Dhabhade), Dist. Pune	No.	1	1,127.18	68.49	
21. APEDA Accreditation of two facilities Beed and Warud	No.	1	68.49	300.00	
22. Provision for Cobalt source for Irradiation Facility Vashi (Rs. 3.00 cr.)	No.	1	300.00	502.65	
Taxes, duties, contingencies etc.			3909.26	3,909.26	
Project management and administration				18,364.56	24.89
A. Staff salary	No. of Man months			9,666.00	
B. Office rent, vehicle hire and establishments	Lumpsum			1,088.00	
C. Office expenses	Lumpsum			667.93	
D. VCAC Consultancy service cost	Lumpsum			1,992.06	2.70
E. PISC Consultancy service cost	Lumpsum			2,560.10	3.61
F. Contingencies, Taxes, duties etc.	Lumpsum			2,390.47	3.37
Grand Total				1,05,429.59	142.90

1USD = 73.78 INR

B. Key Assumptions

Output 1:

- The cost for setting up tissue culture lab, High-tech nursery development, importing of planting material and high density plantation are considered as per NHB MIDH cost norms.
- A total of 40% subsidy will be provided for the development of nursery unit and tissue culture lab to the women-led FPOs and value chain player respectively. For GAP certification, fruit care equipment and high density plantation a 50% subsidy will be given on the total cost. Only 5% farmers per FPO will be eligible to seek support for the listed interventions.
- The cost for capacity building on GAP, post-harvest management, export compliance etc. are taken from MSAMB capacity building and training cell.
- The cost for lead firm SME linkage program is calculated based on primary research and expert consultation.
- The cost for innovation, R&D, market development and promotional activities is calculated based on primary research and expert consultation.

Output 2:

- Technical Civil works and cost of plant machinery, pack house and reefer vans as per the case may be are as per the estimates provided by PHT team in stage 3 report
- The PHT team did not recommended any small projects in Banana, Custard apple, Chill and okra in such case the cost of technical civil works and core plant and machinery is assumed at Rs. 50 lakhs based on project proposals submitted under SMART or other schemes.
- For small projects, the non-technical civil works are assumed at Rs. 5 lakh (absolute value) per project. For large projects same is considered at Rs. 50 lakh (absolute value)
- For small projects, where the estimates for the technical civil work and planting machinery by the PHT team, the pre-harvest equipment (custom hiring equipment) cost are considered at 20% of the cost of technical civil works and planting machinery.
- For small projects where PHT team has not given capital outlay, the cost of pre-harvest is considered at Rs 10 lakh (absolute value).
- For preliminary and pre-operative expenses, it is ensured that it primarily covers interest during construction and also with some cushion for other P&P expenses.
- For miscellaneous fixed assets under small projects Rs 1 lakh per (absolute value) project has been considered. In case of large projects same is considered at Rs 10 lakh (absolute value) per project.
- For contingencies, under small projects are considered at Rs. 1 lakh (absolute value) per project. In case of large projects it is considered at Rs. 10 Lakhs (absolute value) per project.
- Working capital margin are considered at 35% of the total working capital requirement as per the project analysis

- The total project cost comprises of all the above items.
- Means of finance: Grant is assumed from MAGNET or other schemes of assistance at the rate of 50% on technical civil works, plant and machinery. Under small projects, same is considered at 50% for technical civil works, plant and machinery and pre-harvest equipment's.
- At least 20% or amount equivalent to working capital margin (whichever is higher) is assumed as promoter's contribution. The balance is considered as term loan from bank.
- The processing plant is assumed to be operating at 50% job work services model and 50% on captive model under small projects. For large projects, the project is considered to be operating on captive model.

Output 3:

- All the cost under output 3 are taken from detailed cost estimate prepared by MSAMB engineering department and their consultants.

Project management and administration:

- The PMU and PIU cost are taken as per MSAMB's norms. Staff Salaries cost for deputation is assumed as per MSAMB and GoM rules and regulation, while cost for contractual personnel is provided by the MSAMB.
- Rent and office expenses are considered as per MSAMB existing practices.

C. Financial and Economic Analysis

The project, through Output 2, will provide financial support needed for implementation of business plans of FPOs and value chain operators, including post-harvest and processing facilities, working capital, and other financial needs. The financial support will be provided through a financial intermediation loan (FIL) and a matching grant.

Under the Output 2, the project will support 259 small (category) projects and 46 large (category) projects, by way of matching grant or FIL Term loan or FIL Working Capital Loan or (in some cases) both matching grant and FIL support. It is envisaged that of the above total, about 103 small projects and 21 large projects could be supported by way of matching grant. In this context, it is pertinent to explicitly state what kind of projects form 'small' or 'large' category projects.

Broadly, small projects are farm level (on-farm) collection centers cum post-harvest processing infrastructures proposed either by FPOs or even value chain operators. Such facilities shall include minimum basic technology required for primary processing of the produce of farmers of the cluster. Large projects shall include of high end export oriented infrastructure that shall facilitate primary or even secondary/tertiary processing and cold storage, in order to gain higher remuneration for stakeholders. Such projects may deploy technology and processes which comply with requirements of APEDA or even other export/quality related certifications.

To understand the economic benefit through the proposed facility, the throughput of the sub-projects (small and large) were estimated for each of the commodities and the saving in loss arising out of the infrastructure developed was calculated. According to the post-harvest study conducted under MAGNET the average post-harvest losses is estimated to be around 22% across the 10 targeted horticulture crops. The detail estimated losses in terms of volume of each horticulture commodity is listed in the table³⁶.

³⁶ Stage 3 report, Post-harvest study, MAGNET project, 2020

Table 4: Estimated losses across different commodities for the year 2019-20.

Crop	Average Post-harvest Losses %	Total Post-harvest losses	Harvesting, aggregation and preparation	Transportation	Handling at destination market place	At Retail point	Total Production (MT) (2019-20)	Total losses (MT)
Banana	25.4	22.89-27.76 %	4-5%	3-4%	8-10%	10-12%	4,124,732	1,045,620
Pomegranate	27.2	21.96-32.30%	7-8%	4-8%	5-7%	8-14%	1,844,269	502,194
Mandarin Orange	23.3	20.38- 26.14 %	4-7%	5-6%	3-4%	10-12%	909,260	211,494
Custard Apple	26.8	22.00-31.50%	3-6%	8-10%	5-8%	8-12%	111,888	29,930
Chillies	15.3	12.8-17.7%	2-3%	3.5-5%	2-3%	6-8%	310,135	47,296
Strawberry	27.6	23.6 -31.5%	4-5%	5-9%	8-10%	9-12%	10,278	2,832
Sweet Orange	18.2	15.14 -22.03%	2-3%	7-9%	2-4%	5-8%	673,641	122,367
Guava	17.1	14.7-19.5%	3-4%	3.5-5%	2-3%	7-9%	119,925	20,507
Okra	11.1	8.75-13.36%	1-2%	2-3%	1-2%	5-7%	108,021	11,942
Sapota	26.5	22.87 -30.12%	5-7%	3-4%	7-9%	10-14%	127,552	33,795
Total	21.8						8,339,702	2,027,976

Source: Draft Final Report, Post-harvest study, MAGNET 2020

The methodology to assess post-harvest losses for each of the target commodities along the value chain was a consultative discussion process with various value chain participants by the Consultants engaged by ADB project for studying postharvest practices. The study also provided the estimated reduction in post-harvest losses across each of the value chain through setting up of the requisite post-harvest infrastructure in the stage 3 of the report. TRTA consultant also held discussions with various players (including FPOs, processors, exporters, NRCs, and subject matter experts) in each of the value chains and expert organisations, among various aspects discussed, post-harvest losses and reduction that can be achieved was also discussed. The figures adopted in the EA calculations of present losses and the potential reduction based on proposed interventions are an estimate derived from the consultations done and validated with the experts.

The percentage reduction of losses under each commodity through establishment of small and large processing facility is show in Table 2 below. The average reduction in post-harvest losses was divided into 4 stages i.e. handling at harvesting, aggregation and preparation; Transportation (from farm to packhouse); Handling and transportation at distant market; and Handling at retail point respectively, which may be seen in Table 2 for each of the commodities. According to the post-harvest study report it is assumed that there will be 50% reduction in losses at the first 2 stage i.e. a) Harvesting, aggregation and preparation, and b) Transportation from farm to packhouse through the establishment of infrastructure. An additional reduction of 30% reduction in stage 'c' and additional 20% in stage 'd' are assumed through the use of Reefer vans over the total losses saved through infrastructure development

It was found that the percentage reduction in Banana through a small sub-project which (integrated packhouse) is 8.9% whereas with the large sub-project (integrated packhouse and reefer vans) this reduction increase to 13.8% (Table 2). The Table 2 below gives such data for individual commodities.

Table 5: Percentage reduction in post-harvest losses at different stages for Small and large sub-projects

Products	Harvesting, aggregation and preparation	Transportation (from farm to Packhouse)	Handling at destination market place (Truck/Reefer)	At Retail point		
% Reduction in losses in various stages as a result of infrastructure created					Effective % Reduction in PH Loss on throughput of Facilities set up	
Thru Integrated Packhouse	50	50	30	20		
Thru Reefer & Packhouse	50	50	60	40		
	% of Post-harvest Losses at various stages				Packhouse	Packhouse + Reefer
Banana	4.5	3.5	9.0	11.0	8.9	13.8
Pomegranate	7.5	6.0	6.0	11.0	10.8	14.8
Mandarin Orange	5.5	5.5	3.5	11.0	8.8	12.0
Custard Apple	4.0	9.0	6.5	10.0	10.5	14.4
Chillies	2.5	4.2	2.5	7.0	5.5	7.7
Strawberry	4.5	7.0	9.0	10.5	10.6	15.4
Sweet Orange	2.5	8.0	3.0	6.5	7.5	9.7
Guava	3.5	4.2	2.5	8.0	6.2	8.6
Okra	1.5	2.5	1.5	6.0	3.7	5.3
Sapota	6.0	3.5	8.0	12.0	9.6	14.4

Source: Stage 3 report post-harvest study, MAGNET and GT analysis

*Cold storage is not considered separately because it is integrated with the packhouse and the standalone capacity is not significant

Financial and Economic Analysis Approach

The project is designed using the sector financing modality, wherein the entire scope of project financing is demand led and will be fully determined during the project implementation. Therefore, the current financial and economic analysis is conducted to evaluate the viability of four representative subprojects selected for feasibility studies rather than that of the whole project. These representative subprojects are the Pomegranate small and large subprojects and the Banana small and large subprojects, which are proposed models (suggested in PHT Team's Report for Stage 3). Detailed assumptions for estimating the streams of project costs and benefits are in the detailed financial and economic analysis attached in annexure.

Financial Analysis Summary- Pomegranate Pack-house (Small project)

A. IRR and NPV

Figures in Rs. Lakh

Particulars		Y1	Y2	Y3	Y4	Y5	Y6	Y7
Net Profit		21.47	47.42	66.39	89.26	113.86	140.39	168.59
Depreciation		7.29	7.29	7.29	7.29	7.29	7.29	7.29
Amortization		0.86	0.86	0.86	0.86	0.86	0.86	0.86
Cash Flow	(195.28)	29.62	55.56	74.53	97.41	122.01	148.53	176.73
D.F @ 10%		0.90909 0909	0.82644 6281	0.75131 4801	0.68301 3455	0.62092 1323	0.56447 393	0.51315 8118
Disc Cash Flow @ 10% DF		26.93	45.92	56.00	66.53	75.76	83.84	90.69
Total P.V of Inflows @ 10% DF		445.67						
Total P.V of Outflows		195.28						
NPV (@10% DF)		250.39						
IRR		33.24%						

B. BEP Analysis

Figures in Rs. Lakh

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Revenue	617.35	835.29	968.13	1,109.49	1,262.06	1,425.57	1,601.81
Variable Costs	38.08	48.62	54.60	60.53	67.46	74.41	81.90
RM Purchases	425.00	557.99	644.37	737.99	839.36	949.45	1,068.00
Contribution	154.27	228.68	269.16	310.98	355.24	401.71	451.91
Fixed Cost							
Fixed Expenses	144.13	151.33	158.90	166.84	175.19	183.95	193.14
TL Interest	6.97	5.71	4.45	3.19	1.94	0.68	-
WC Interest	10.98	12.67	13.87	15.11	16.41	17.84	19.40
Depreciation	7.29	7.29	7.29	7.29	7.29	7.29	7.29
P&P exp	0.86	0.86	0.86	0.86	0.86	0.86	0.86
BEP	110%	78%	69%	62%	57%	52%	49%
Avg BEP	68.17%						

C. DSCR

Figures in Rs. Lakh

DSCR	Y1	Y2	Y3	Y4	Y5	Y6	Y7
PROFIT	21.47	47.42	66.39	89.26	113.86	140.39	168.59
Depreciation	7.29	7.29	7.29	7.29	7.29	7.29	7.29
INTEREST on TL	6.97	5.71	4.45	3.19	1.94	0.68	0.00
P&P exp	0.86	0.86	0.86	0.86	0.86	0.86	0.86
TOTAL	36.58	61.27	78.99	100.60	123.95	149.21	176.73
Total Annual EMI	20.93	19.68	18.42	17.16	15.90	14.65	-
DSCR	1.75	3.11	4.29	5.86	7.79	10.19	-
AVG DSCR	5.50						

Economic Analysis Summary- Pomegranate Pack-house (small project)

A. ERR and ENPV

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Pomegranates							
Pomegranates processed (MT)	2400	3000	3300	3600	3900	4200	4500
Yield per acre	4.92						
Acres Influenced -	487.90	609.88	670.86	731.85	792.84	853.83	914.81
Hectares Influenced	197.53	246.91	271.60	296.30	320.99	345.68	370.37
Number of Farmers to be benefitted	198	247	272	296	321	346	370

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
(assuming 1 hectare per farmer)							
Additional Income to producer Per MT under envisaged model (in Rs.)	357.87	632.23	804.70	991.81	1,167.82	1,337.01	1,498.53
Total Additional sales realization to farmers over traditional sale (in Rs. Lakh)	8.59	18.97	26.56	35.71	45.54	56.15	67.43
Profit Share of FPO/VCO Per MT (in Rs.)	536.80	948.34	1,207.05	1,487.72	1,751.73	2,005.51	2,247.80
Total Remuneratio n to FPO/VCO (in Rs. Lakh)	12.88	28.45	39.83	53.56	68.32	84.23	101.15
Total Benefit to Producers+ FPO/VCO (in. Rs. Lakh)	21.47	47.42	66.39	89.26	113.86	140.39	168.59
D.F @ 9%	0.91743119 3	0.8416799 9	0.7721834 8	0.7084252 1	0.6499313 9	0.5962673 3	0.5470342 4

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Disc Cash Flow @ 9% DF	19.70	39.91	51.26	63.24	74.00	83.71	92.22
PV of Total Benefit	424.04						
Project PV of Outflows	195.28						
ENPV (in Rs. Lakh)	228.76						
Economic Rate of Return	29.58%						

Financial Analysis Summary- Pomegranate Pack-house (Large project)

A. IRR and NPV

Figures in Rs. Lakh

Particulars		Y1	Y2	Y3	Y4	Y5	Y6	Y7
Net Profit		201.02	266.19	324.40	393.78	471.91	558.13	652.13
Depreciation		44.22	44.22	44.22	44.22	44.22	44.22	44.22
Amortization		6.43	6.43	6.43	6.43	6.43	6.43	6.43
Cash Flow	(930.22)	251.67	316.84	375.05	444.43	522.56	608.78	702.79
D.F @ 10%		0.90909 0909	0.82644 6281	0.75131 4801	0.68301 3455	0.62092 1323	0.56447 393	0.51315 8118
Disc Cash Flow @ 10% DF		228.79	261.85	281.78	303.55	324.47	343.64	360.64
Total P.V of Inflows @ 10% DF		2,104.73						
Total P.V of Outflows		930.22						
NPV (@10% DF)		1,174.51						
IRR		35.80%						

B. BEP Analysis

Figures in Rs. Lakh

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Revenue	1,570.90	2,132.89	2,476.52	2,836.14	3,227.02	3,649.88	4,108.57
Variable Costs	278.57	350.85	387.66	424.50	461.64	499.69	538.14
RM Purchases	1,000.00	1,312.50	1,516.16	1,736.44	1,975.43	2,233.48	2,512.96
Contribution	292.33	469.54	572.70	675.21	789.95	916.71	1,057.48
Fixed Cost							
Fixed Expenses	55.16	57.92	60.82	63.86	67.05	70.40	73.92
TL Interest	31.22	26.28	20.49	14.71	8.92	3.13	-
WC Interest	9.19	11.94	13.60	15.44	17.45	19.59	21.80
Depreciation	44.22	44.22	44.22	44.22	44.22	44.22	44.22
P&P exp	6.43	6.43	6.43	6.43	6.43	6.43	6.43
BEP	50%	31%	25%	21%	18%	16%	14%
Avg BEP	25.13%						

C. DSCR

Figures in Rs. Lakh

DSCR	Y1	Y2	Y3	Y4	Y5	Y6	Y7
PROFIT	201.02	266.19	324.40	393.78	471.91	558.13	652.13
Depreciation	44.22	44.22	44.22	44.22	44.22	44.22	44.22
INTEREST on TL	31.22	26.28	20.49	14.71	8.92	3.13	0.00
P&P exp	6.43	6.43	6.43	6.43	6.43	6.43	6.43
TOTAL	282.89	343.12	395.55	459.14	531.48	611.92	702.79
Total Annual EMI	63.36	90.56	84.78	78.99	73.21	67.42	-
DSCR	4.46	3.79	4.67	5.81	7.26	9.08	-
AVG DSCR	5.84						

Economic Analysis Summary- Pomegranate Pack-house (Large project)

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Pomegranates							
Pomegranates processed (MT)	2400	3000	3300	3600	3900	4200	4500
Yield per acre	4.92						
Acres Influenced	487.90	609.88	670.86	731.85	792.84	853.83	914.81
Number of Farmers to be benefitted (assuming 1 acre per farmer influenced)	488	610	671	732	793	854	915
Additional Income to producer Per MT under envisaged model (in Rs.)	3,350.31	3,549.17	3,932.14	4,375.36	4,840.08	5,315.52	5,796.75

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Total Additional sales realization to farmers over traditional sale (in Rs. Lakh)	80.41	106.48	129.76	157.51	188.76	223.25	260.85
Profit Share of FPO/VCO Per MT (in Rs.)	5,025.46	5,323.76	5,898.22	6,563.04	7,260.12	7,973.28	8,695.12
Total Remuneration to FPO/VCO (in Rs. Lakh)	120.61	159.71	194.64	236.27	283.14	334.88	391.28
Total Benefit to Producers+ FPO/VCO (in. Rs. Lakh)	201.02	266.19	324.40	393.78	471.91	558.13	652.13
D.F @ 9%	0.917431 193	0.841679 99	0.772183 48	0.708425 21	0.649931 39	0.596267 33	0.547034 24
Disc Cash Flow @ 9% DF	184.42	224.04	250.50	278.97	306.71	332.79	356.74
PV of Total Benefit	1,934.17						
Project PV of Outflows	930.22						
ENPV (in Rs. Lakh))	1,003.95						
Economic Rate of Return	30.53%						

Financial Analysis Summary- Banana Pack-house (Small project)

A. IRR and NPV

Figures in Rs. Lakh

Particulars		Y1	Y2	Y3	Y4	Y5	Y6	Y7
Net Profit		12.24	19.65	29.35	39.52	50.89	62.85	75.56
Depreciation		3.39	3.39	3.39	3.39	3.39	3.39	3.39
Amortization		0.43	0.43	0.43	0.43	0.43	0.43	0.43
Cash Flow	(79.72)	16.06	23.47	33.17	43.33	54.70	66.67	79.38
D.F @ 10%		0.909090 909	0.826446 281	0.751314 801	0.683013 455	0.620921 323	0.564473 93	0.513158 118
Disc Cash Flow @ 10% DF		14.60	19.40	24.92	29.60	33.97	37.63	40.73
Total P.V of Inflows @ 10% DF		200.84						
Total P.V of Outflows		79.72						
NPV (@10% DF)		121.13						
IRR		36.95%						

B. BEP Analysis

Figures in Rs. Lakh

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Revenue	179.94	219.88	256.37	295.71	338.22	384.29	433.47
Variable Costs	36.95	42.17	47.29	53.49	59.77	66.80	74.49
RM Purchases	72.00	85.03	99.26	114.62	131.27	149.31	168.89
Contribution	70.99	92.67	109.83	127.60	147.17	168.18	190.08
Fixed Cost							
Fixed Expenses	56.10	58.91	61.85	64.95	68.19	71.60	75.18
TL Interest	2.81	2.30	1.79	1.29	0.78	0.27	-
WC Interest	2.62	2.94	3.24	3.56	3.92	4.29	4.69
Depreciation	3.39	3.39	3.39	3.39	3.39	3.39	3.39
P&P exp	0.43	0.43	0.43	0.43	0.43	0.43	0.43
BEP	92%	73%	64%	58%	52%	48%	44%
Avg BEP	61.60%						

C. DSCR

Figures in Rs. Lakh

DSCR	Y1	Y2	Y3	Y4	Y5	Y6	Y7
PROFIT	12.24	19.65	29.35	39.52	50.89	62.85	75.56
Depreciation	3.39	3.39	3.39	3.39	3.39	3.39	3.39
INTEREST on TL	2.81	2.30	1.79	1.29	0.78	0.27	0.00
P&P exp	0.43	0.43	0.43	0.43	0.43	0.43	0.43
TOTAL	18.87	25.77	34.96	44.62	55.48	66.94	79.38
Total Annual EMI	8.44	7.93	7.42	6.92	6.41	5.90	-
DSCR	2.24	3.25	4.71	6.45	8.66	11.34	-
AVG DSCR	6.11						

Economic Analysis Summary- Banana Pack-house (Small project)

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Banana							
Banana processed (MT)	2400	2700	3000	3300	3600	3900	4200
Yield per acre	21.07						
Acres Influenced -	113.91	128.14	142.38	156.62	170.86	185.10	199.34
Hectares Influenced	46.12	51.88	57.64	63.41	69.17	74.94	80.70
Number of Farmers to be benefitted (assuming 1 hectare per farmer)	46	52	58	63	69	75	81
Additional Income to producer Per MT under envisaged model (in Rs.)	204.08	291.17	391.33	478.99	565.41	644.64	719.62

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Total Additional sales realization to farmers over traditional sale (in Rs. Lakh)	4.90	7.86	11.74	15.81	20.35	25.14	30.22
Profit Share of FPO/VCO Per MT (in Rs.)	306.12	436.75	587.00	718.48	848.11	966.95	1,079.43
Total Remuneration to FPO/VCO (in Rs. Lakh)	7.35	11.79	17.61	23.71	30.53	37.71	45.34
Total Benefit to Producers+ FPO/VCO (in. Rs. Lakh)	12.24	19.65	29.35	39.52	50.89	62.85	75.56
D.F @ 9%	0.917431 193	0.841679 99	0.772183 48	0.708425 21	0.649931 39	0.596267 33	0.547034 24
Disc Cash Flow @ 9% DF	11.23	16.54	22.66	27.99	33.07	37.48	41.33
PV of Total Benefit	190.32						
Project PV of Outflows	79.72						
ENPV (in Rs. Lakh))	110.60						
Economic Rate of Return	32.81%						

Financial Analysis Summary- Banana Pack-house (Large project)

A. IRR and NPV

Figures in Rs. Lakh

Particulars		Y1	Y2	Y3	Y4	Y5	Y6	Y7
Net Profit		24.06	155.77	179.19	229.20	283.88	346.15	412.93
Depreciation		40.59	40.59	40.59	40.59	40.59	40.59	40.59
Amortization		5.00	5.00	5.00	5.00	5.00	5.00	5.00
Cash Flow	(819.11)	69.66	201.36	224.78	274.79	329.47	391.75	458.52
D.F @ 10%		0.90909 0909	0.82644 6281	0.75131 4801	0.68301 3455	0.62092 1323	0.56447 393	0.51315 8118
Disc Cash Flow @ 10% DF		63.32	166.42	168.88	187.69	204.58	221.13	235.30
Total P.V of Inflows @ 10% DF		1,247.31						
Total P.V of Outflows		819.11						
NPV (@10% DF)		428.21						
IRR		21.13%						

B. BEP Analysis

Figures in Rs. Lakh

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Revenue	637.03	1,200.83	1,370.65	1,536.11	1,711.53	1,901.40	2,105.32
Variable Costs	329.11	580.63	626.23	670.89	715.91	761.27	807.90
RM Purchases	180.00	330.75	372.13	416.75	464.99	516.94	573.02
Contribution	127.91	289.45	372.29	448.47	530.63	623.19	724.40
Fixed Cost							
Fixed Expenses	61.04	64.10	67.30	70.67	74.20	77.91	81.81
TL Interest	27.07	22.79	17.77	12.75	7.73	2.72	-
WC Interest	4.51	7.90	8.70	9.54	10.44	11.39	12.40
Depreciation	40.59	40.59	40.59	40.59	40.59	40.59	40.59
P&P exp	5.00	5.00	5.00	5.00	5.00	5.00	5.00
BEP	108%	48%	37%	31%	26%	22%	19%
Avg BEP	41.75%						

C. DSCR

Figures in Rs. Lakh

DSCR	Y1	Y2	Y3	Y4	Y5	Y6	Y7
PROFIT	24.06	155.77	179.19	229.20	283.88	346.15	412.93
Depreciation	40.59	40.59	40.59	40.59	40.59	40.59	40.59
INTEREST on TL	27.07	22.79	17.77	12.75	7.73	2.72	0.00
P&P exp	5.00	5.00	5.00	5.00	5.00	5.00	5.00
TOTAL	96.73	224.15	242.55	287.55	337.21	394.46	458.52
Total Annual EMI	54.94	78.53	73.51	68.50	63.48	58.46	-
DSCR	1.76	2.85	3.30	4.20	5.31	6.75	-
AVG DSCR	4.03						

Economic Analysis Summary- Banana Pack-house (Large project)

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Banana							
Banana processed (MT)	2400	4200	4500	4800	5100	5400	5700
Yield per acre	21.07						
Acres Influenced -	113.91	199.34	213.57	227.81	242.05	256.29	270.53
Number of Farmers to be benefitted (assuming 1 acre per farmer)	114	199	214	228	242	256	271
Additional Income to producer Per MT	401.06	1,483.53	1,592.78	1,910.01	2,226.50	2,564.10	2,897.76

Particulars	Y1	Y2	Y3	Y4	Y5	Y6	Y7
under envisaged model (in Rs.)							
Total Additional sales realization to farmers over traditional sale (in Rs. Lakh)	9.63	62.31	71.68	91.68	113.55	138.46	165.17
Profit Share of FPO/VCO Per MT (in Rs.)	601.59	2,225.30	2,389.17	2,865.02	3,339.76	3,846.15	4,346.64
Total Remuneration to FPO/VCO (in Rs. Lakh)	14.44	93.46	107.51	137.52	170.33	207.69	247.76
Total Benefit to Producers+ FPO/VCO (in Rs. Lakh)	24.06	155.77	179.19	229.20	283.88	346.15	412.93
D.F @ 9%	0.9174311 93	0.8416799 9	0.7721834 8	0.7084252 1	0.6499313 9	0.5962673 3	0.5470342 4
Disc Cash Flow @ 9% DF	22.08	131.11	138.37	162.37	184.50	206.40	225.89
PV of Total Benefit	1,070.71						
Project PV of Outflows	819.11						
ENPV (in Rs. Lakh)	251.61						
Economic Rate of Return	15.44%						

Subproject Costs

- **Capital cost:** The Capital Costs of the projects are as per the Capital outlay suggested in PHT Teams' Report for Stage 3. In some crops, the Stage 3 Report has not suggested any capital outlay for small projects; and for which TRTA have considered same as per recommendations of existing owners of similar facilities. The Capital Outlay of the Pomegranate Small Pack-house is Rs. 195.28 Lakh, which includes cost of Civil works, Plant and Machinery, Post-harvest equipment, P&P expenses (including interest during construction period), Misc. Fixed Assets, Contingencies, and Working Capital Margin. The Capital Outlay of the Pomegranate Large Pack-house is Rs. 930.22 Lakh, which includes cost of civil works, Plant and Machinery, Reefer Vans, P&P expenses (including interest during construction period), Misc. Fixed Assets, Contingencies, and Working Capital Margin.

Similarly, Capital outlay of Banana Small Pack-house is Rs. 79.72 Lakh and that of a Large Banana Pack-house is Rs. 819.11 Lakh.

- **Operation and Maintenance Costs:**

The subproject's annual financial incremental operating and fixed costs broadly include fixed and variable expenses like:

- a. Fixed administrative costs like (Printing & Stationery, Telephone, Internet & Broadband, Office Electricity, Accounting Charges, Legal Expenses, Admin Staff Salary, Conveyance, Travelling Expenses, Periodicals, Staff Welfare)
- b. Fixed Factory costs like Repairs, Insurance, Factory Staff Salary, Electricity
- c. Variable Expenses include labour, electricity, water, consumables, stocks of safety gear, laboratory expenses, reefer van expenses, repairs & maintenance, selling & distribution expenses, and other miscellaneous expenses.

Subproject Benefits

- **Quantified benefits:** The main sources of quantified benefit are revenues from the processing, packing, and storage of the targeted products. To illustrate with example, the financial revenue of Small Pomegranate Pack-house include Revenues from Job Work Services, Revenues from Sale, and Revenue from Custom Hiring. Aside from the sales revenues, project benefits can be generated from the sale of project assets at the end of the project life. Same is however currently not considered in financial analysis. The complete financial analysis, including revenues, of the projects is included as annexure.
- **Un-quantified benefits:** It is important to note that the above benefits represent only part of the overall benefits of the subproject from economic perspectives. One of the other significant benefits generated by the subproject is reduced post-harvest losses along the supply chain from farm to market. However, these benefits were not included in the estimation of the subproject rate of return since their exact scale is not readily quantifiable and will depend upon the actual mix and volume of fruit and vegetables handled by the subproject facilities as well as those of other value chain facilities to be financed by the project.

Besides the quantified benefits included in the analysis, there are additional, less easily quantified short- and long-term benefits associated with the subproject. Short-term indirect benefits include the increase in economic activity that will be generated during the construction and installation of the processing and cold storage facilities. Long-term indirect benefits include

- i. improvement in farm productivity because of contractual arrangements between the enterprise and affiliated farmers;

- ii. reduction in crop losses because of proper handling of produce from farms to processing and packing facilities;
- iii. increase in exports and/or import substitutes of fruit and vegetables;
- iv. efficiencies gained in the fruit and vegetable value chain, which include reduced handling costs and better and/or safer product quality; and
- v. more transparent price identification and formation and stabilization of fruit and vegetable prices throughout the year.

Financial Viability

The analysis indicates that the Pomegranate Small Category subproject is both financially and economically viable, with an FIRR of 33.24% compared to the discounting factor of 10% (which is higher than the WACC which is in the range of 4.67% to 5%), and an EIRR of 29.58% compared to the economic cost of capital of 9.0%. The subproject's financial net present value is Rs. 250.39 Lakh, while its economic net present value is Rs. 228.76 Lakh.

Similarly, Pomegranate Large Category subproject is both financially and economically viable, with an FIRR of 35.80% compared to the discounting factor of 10% (which is higher than the WACC of 6.23%), and an EIRR of 30.53% compared to the economic cost of capital of 9.0%. The subproject's financial net present value is Rs. 1174.51 Lakh, while its economic net present value is Rs. 1003.95 Lakh. All other model projects present similar financial and economic viability.

7. Project Management Arrangement

A. Project Implementation Arrangement – Roles & Responsibilities

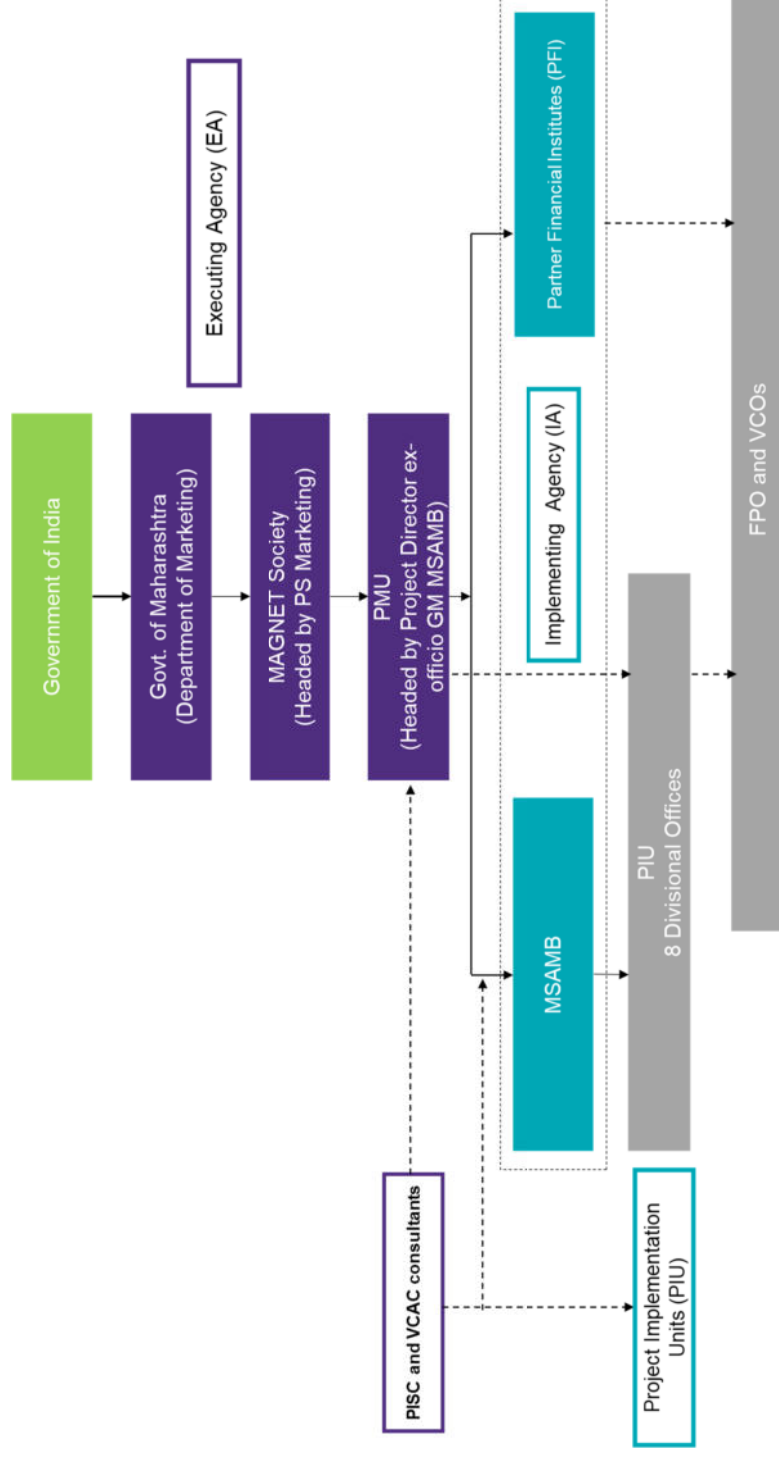
Organizations	Management Roles and Responsibilities
Executive Agency (State of Maharashtra acting through the MAGNET Society)	<p>MAGNET Society is established to function as apex autonomous body of Government of Maharashtra to implement, monitor and coordinate Maharashtra Agribusiness Network Project assisted by ADB and any other projects authorized by the State Government. It is incorporated under Society Act of 1860.</p> <p>Management of MAGNET Society consist of two-tier administrative system comprising of Governing Council and Executive Committee. Governing council is the apex policy making body, while Executive committee is executive authority of the society.</p> <p>Governing council is headed by Principal Secretary (Marketing) as Chairman. Representatives from related key departments such as Finance, Planning, Agriculture and Marketing and Agencies like MAVIM and MSAMB as members. Project Director MAGNET is member secretary.</p> <p>MAGNET Society shall act as executing agency for the project and shall be responsible for overall coordination, implementation and monitoring of the project.</p>
Implementing Agency (MSAMB and selected Partner Financial Intermediaries)	<p>The implementing agencies are MSAMB and Participating Financial Intermediaries (PFIs), initially including Bank of India, and Samunnati Financial Intermediation and Services Private Limited.</p> <p>MSAMB, reporting to the Executing Agency, will be responsible for implementation of Output 3 through its eight regional offices (project implementation units [PIUs]).</p> <p>The PFIs will be responsible for the implementation of the Financial Intermediation Loan (FIL) component under Output 2.</p>
Project Management Unit in MAGNET Society	<p>A Project Management Unit (PMU) will be established within the MAGNET Society and headed by Project Director, who is concurrently General Manager, MSAMB.</p> <p>The PMU will be responsible for implementation of Output 1 and matching grant component under Output 2.</p> <p>The PMU will be responsible for the following:</p> <ul style="list-style-type: none"> • Overall management and coordination of all the three outputs • Guiding and overseeing the work of implementing agencies and PIUs • Hiring of project staff • Overall leadership, control, monitoring and supervision of project activities and staff • Ensuring funds are available for the project activities as well as implementing agencies. • Ensuring timely submission of reports to Government of Maharashtra and ADB • Ensuring deployment of staff, service providers and other functionaries as required

	<ul style="list-style-type: none"> • Screening and due diligence of subproject proposals under Output 2 for matching grants based on eligibility criteria set out in Appendix 2 • Negotiations and grant agreement signing of subproject proposals under Output 1 and Output 2 (for matching grant). • Physical verification and financial audits of approved subproject proposals • Disbursement of matching grant to approved subproject proposals • Implementation monitoring of subproject proposals • Approving and certifying subprojects' compliance with the eligibility criteria • Procurement of goods, works and services, following ADB procedures • Preparation of annual forecast of contract awards and disbursements • Establishing and managing advance account/s, submission of withdrawal applications to ADB, retention of supporting documents • Submission of consolidated statement of expenditures to Asian ADB for reimbursement of claims • Submission of progress reports and annual audit reports and financial statements; ensuring that all required audit reports from MAGNET Society, MSAMB and the PFIs are timely submitted to ADB • Preparation of a project completion report
Project Implementation Units in each Participating Financial Intermediaries (PFIs)	<p>PIUs will be established in each PFIs and shall:</p> <ul style="list-style-type: none"> • Carry out credit origination in line with sound banking principles • Monitor and ensure compliance with eligibility criteria for sub-borrowers, subprojects, and sub loans • Select sub loans in accordance with eligibility criteria set out in Appendix 2 • Establish environmental and social management systems and ensure that sub-borrowers comply with ADB's Safeguard Policy Statement (SPS) and applicable environmental, health and safety and social laws and regulations of Government of India • Manage financial reporting, accounting, and auditing of project-related activities • Designate dedicated staff for project implementation unit • Implement GESI/AP • Submit to MAGNET Society, annual audited financial statements that include an audit management letter and an audit opinion on the use of loan proceeds, and the statement of the advance account • Submit to MAGNET Society, quarterly progress reports within 30 days from the end of each quarter, and respond to other information requests <p>Provide all the requisite information and documents as required by ADB and Government of Maharashtra</p>
Project Implementation Units (PIUs) of the PMU and MSAMB	<p>The project will set up 8 project implementation units across 8 divisions/regions in accordance with MSAMB structure.</p> <p>The PIUs will be responsible for:</p> <ul style="list-style-type: none"> • Implementation of project activities at the divisional/regional level, under the management and leadership of MAGNET Society, PMU, and MSAMB head office • Monitoring and supervising the implementation of subprojects under Output 2 and Output 3 • Assisting in implementation of activities under Output 1 with the help of service providers and PMU

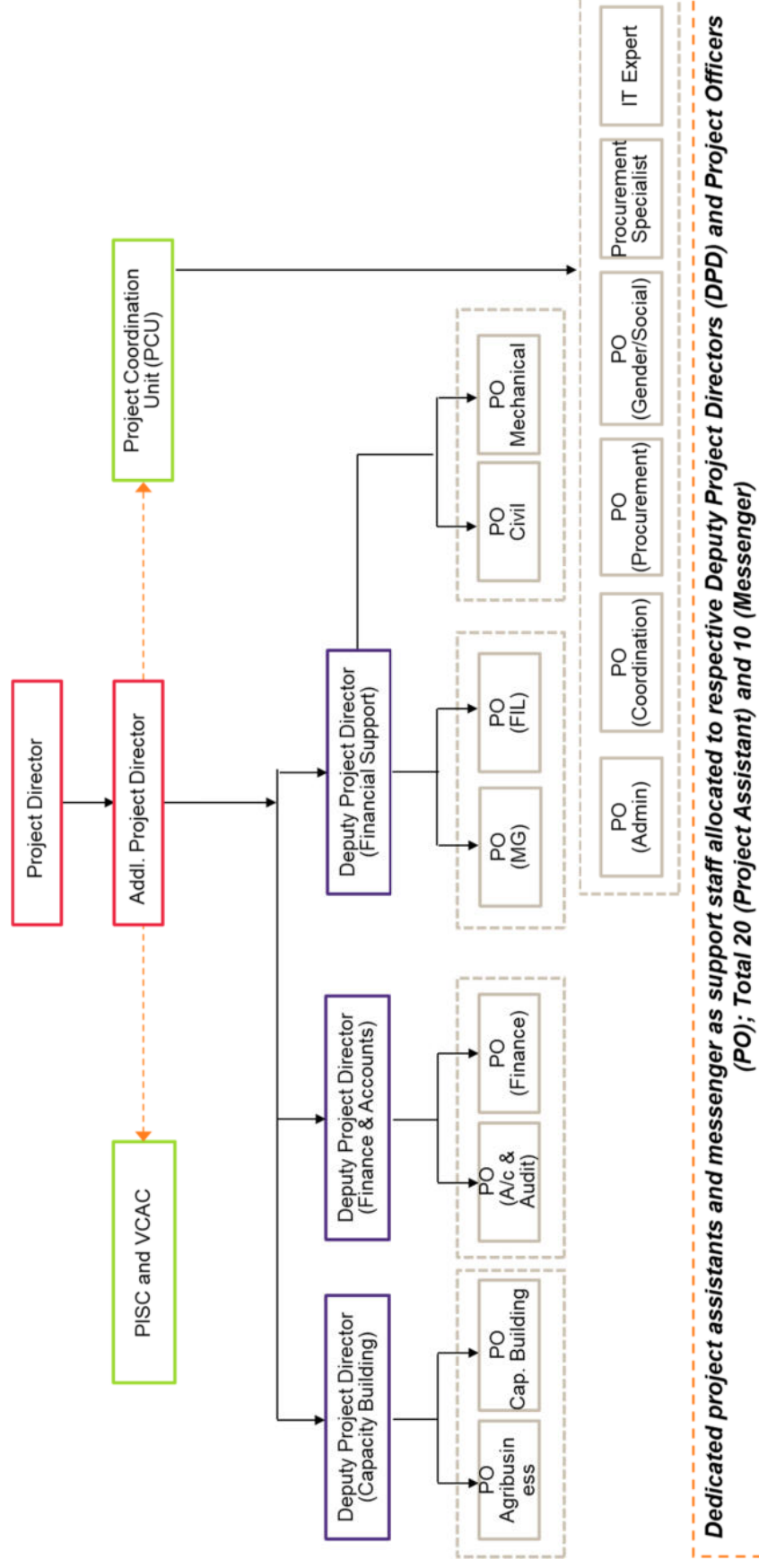
	<ul style="list-style-type: none"> Identifying and mobilizing potential farmer producer organizations and value chain operators <p>Coordinating with PFIs for the subproject proposals</p>
Consultants	<p>MAGNET will be assisted by two consultants as below :</p> <p>Project Implementation Support Consultant (PISC) :</p> <ul style="list-style-type: none"> Project Implementation Support Consultant (PISC) will provide management and technical support to MAGNET Society, PMU and implementing agencies in the project implementation. PISC will also strengthen technical and management capacities of the PIUs and FPOs, and ensure the project's compliance with ADB's environment and social safeguards policies and Financing Agreement and policies of the Government of Maharashtra <p>Value Chain Acceleration Services Consultant (VCAC) :</p> <ul style="list-style-type: none"> VCAC will build a network of anchor FPOs and support FPOs in their post-harvest needs, market linkages, finances and other services needed to maximize their productivity and income. VCAC will strategize and coordinate the project interventions with market-focused goals to handle market challenges in a consolidated scale
Asian Development Bank (ADB)	<p>ADB will:</p> <ul style="list-style-type: none"> Monitor project implementation arrangements, disbursement, procurement, consultant selection, and reporting Monitor schedules of activities, including funds flows Review compliance with agreed procurement procedures Review compliance with grant covenants Monitor effectiveness of safeguard procedures Analyze the outcome of the three Outputs Monitor conformity with ADB anti-corruption policies Undertake periodic review missions Undertake a joint mid-term review mission with the government

B. Project Organisation Structure

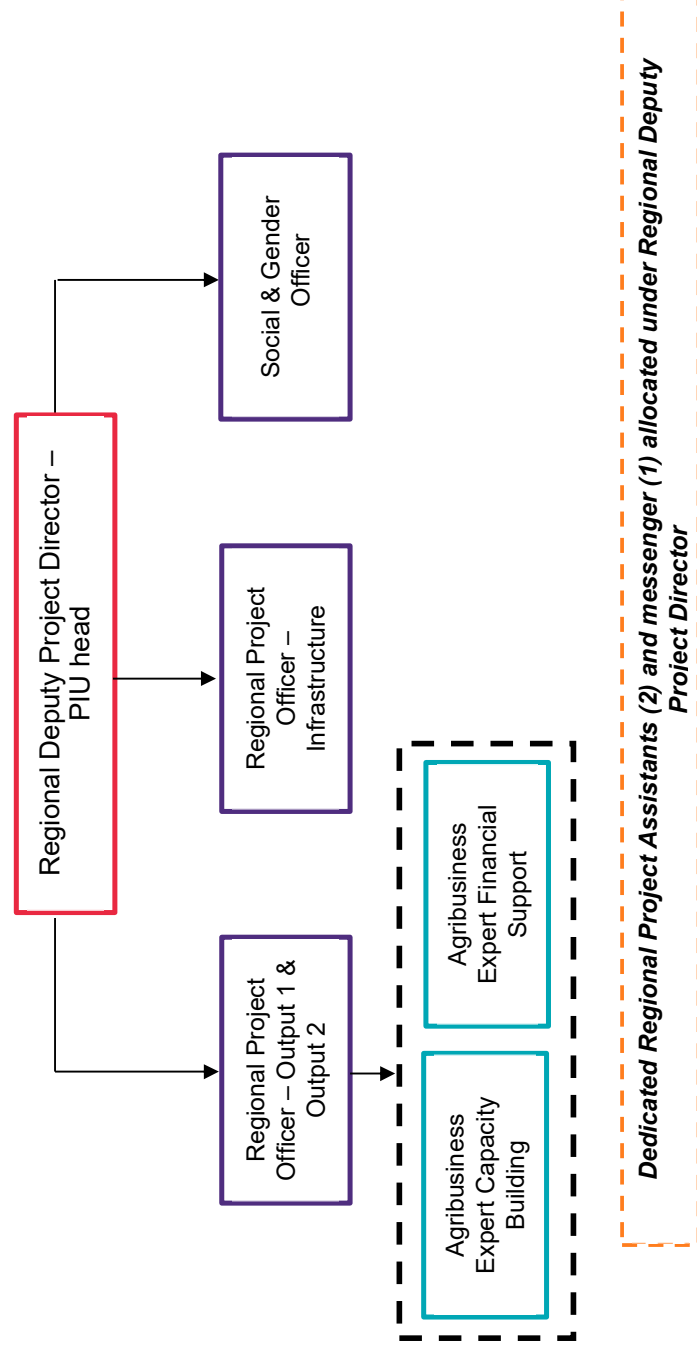
The project will follow below mentioned organization structure in such a way that; (i) executing agency will be Department of Marketing, Govt. of Maharashtra and MAGNET Society established under it. (ii) Project Management Unit (PMU) established under the MAGNET Society will co-ordinate and oversee the implementation of all the three Outputs and will be responsible for Output 1 and matching grant under Output 2, accordingly it will be provided by staff on deputation from MSAMB, NIPHT, MAVIM and requisite contractual staff will be hired by the society at PMU and PIU level. (iii) Each PFI will establish an implementation unit within itself to oversee the implementation of credit line activities.



Project Management Unit and Staffing Pattern



Project Implementation Units (PIU) at 8 divisions/regions



A. Project Staffing Structure at Project Management Unit (PMU)

S No.	Position	Appointment	Department/Organization	No. of Posts
1	Project Director	Additional Charge	MSAMB - General Manager	1
2	Additional Project Director	Deputation	Cooperation - DRCS	1
3	Deputy Project Director - Capacity Building	Deputation	MSAMB - AGM	1
4	Deputy Project Director - Finance & Accounts	Deputation	Finance - Deputy Director	1
5	Deputy Project Director - Financial Support	Deputation	MSMAB- AGM	1
6	Project Officer - Agribusiness	Deputation	MSAMB - Manager	1
7	Project Officer - Capacity Building	Deputation	MSAMB – Manager / NIPHT	1
8	Project Officer - Admin & HR (PCU)	Deputation	MSAMB - Manager	1
9	Project Officer- Civil	Deputation	MSAMB - Manager	1
10	Project Officer- Coordination PCU	Deputation	MSAMB - Manager	1
11	Project Officer - Mechanical	Contractual	Open Market	1
12	Project Officer - Matching Grant	Deputation	MSAMB- Manager	1
13	Project Officer – FIL	Contractual	Open Market	1
14	Project Officer - Accounts and Audit	Deputation	Finance - Assistant Director	1
15	Project Officer - Finance	Deputation	Finance - Assistant Director	1
16	Project Officer- Procurement	Deputation	MSAMB - Manager/ Assistant Manager	1
17	Procurement Specialist	Contractual	Open Market	1
18	IT Expert	Contractual	Open Market	1
19	Project Officer – Gender and Social	Deputation	MAVIM	1
20	Project Assistant (Support Staff)	Deputation / Contractual	MSAMB/NIPHT/Contractual	20
21	Messenger	Contractual	Open Market	10
	Total			49

Staffing Structure for Project Implementation Units (PIUs) at 8 Division/regional level

S No.	Position	Appointment	Department/Organization	No. of Posts
1	Regional - Deputy Project Director - PIU Head	Additional Charge	MSAMB - DGM	8
2	Regional Project Officer - PIU	Deputation	MSAMB - AGM / MANAGER	8
3	Project Officer - Infrastructure	Additional Charge	MSAMB-Jr. Engineer	8
4	Agribusiness - Capacity Building	Contractual	VCAC	8
5	Agribusiness- Financial Support	Contractual	PISC	8
6	Social and Gender Officer	Deputation	MAVIM	8
7	Regional Project Assistants	Contractual	MSAMB/NIPHT/ Contractual	16
8	Messenger	Contractual	Open Market	8
	Total			72

C. Eligibility Criteria for beneficiaries under Output 1 and Output 2 Sub projects under Matching Grant and FIL

1. Eligibility Criteria for beneficiaries under Output 1

List of Activities

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
	A. Enhancing market-led production and improving productivity				
1	Nursery Development in focused crops (4 ha)	Activity reserved for Anchor FPOs. Based on the eligibility and qualifying criteria they shall receive support from the project.	<p>1. Min shareholder strength of 500 farmers, with 60% Small & Marginal (S&M) farmers including women and STs, with successful management of any kind of farmer support services of annual turnover of at least Rs. 50 lakh for any past two years, with positive net worth.</p> <p>2. If entirely owned by women farmers, turnover could be reduced to 50%.</p>	<p>Women led FPOs, Anchor FPOs can select on the basis of</p> <ul style="list-style-type: none"> • Land availability • Location advantage • Catchment • Length of experience 	<p>TA grant for a) salary of two horticulture graduates with relevant experience for initial 2 years @ Rs.6 lacs p.a. per person, and b) costs of training of nurserymen at recognised local institutions @ 4 lacs, Capital subsidy – 40% on the total cost, subject to a maximum of Rs 40 lakhs per unit.</p>
2	Tissue culture unit	Activity reserved for Anchor FPOs and private entities. Based on the eligibility and qualifying criteria of Anchor	<p>1. An FPO in the business of banana marketing at least past 5 years with growth in CAGR of 10%</p>	<p>Anchor FPO / Private entity can select on the basis of</p> <ul style="list-style-type: none"> • Land availability 	<p>TA grant for a) salary of two tissue culture specialist for initial 2 years @ Rs.10 lacs p.a. per person, and b)</p>

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
		FPOs or private entity they shall receive support from the project	<p>2. 5 or more FPOs collectively working as anchor FPO can also qualify</p> <p>3. Positive networth</p> <p>4. Maintenance of bank account</p> <p>5. Audited accounts,</p> <p>6. Bank account is maintained</p> <p>2. Project appraised by any nationalized bank, with sanction for a loan based on business plan.</p> <p>3. Private entity: Lead promotor or representative of the lab must possess a min of Master's degree in plant biotechnology with experience of 3 years in commercial Tissue Culture laboratory</p>	<ul style="list-style-type: none"> • Location advantage • Catchment • Length of experience 	<p>costs of senior expert consultant @ 10 lacs anytime within two years,</p> <p>Capital subsidy – 40% on the total cost, subject to a maximum of Rs 100 lakhs per unit.</p>
3	Introduction of new varieties	Under a MoU with the respective crop specific National Research Centres for R&D	Proposals with specific objectives aligned with the value chain growth strategy, and results deliverable within 3 years	<p>Research Institutes can select on the basis of</p> <ol style="list-style-type: none"> 1. Demand of planting material amongst shareholders 2. Lead/sole promotor must have minimum experience of 5 years in cultivation 	<p>Cost of project and dedicated manpower to be considered, subject to a ceiling of Rs.50 lacs per MOU for the designated period</p>

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
				3. Adoption of Good Nursery Management practices including proper record keeping	
4	Capacity building on Good Agricultural Practices				
	a) Training on GAP	Anchor FPOs.	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET and/or have forward market linkages with the private players and export market	<p>Farmers from the FPOs can select on the basis of</p> <ol style="list-style-type: none"> 1. Selected farmer should be in the age group of 18 to 55 years. 2. He/she should be cultivating the respective horticulture crops on his own land. 3. Preference to small, marginal and women farmers and beneficiaries. 4. Member willing to share their experiences in workshops/ seminars at District and State Level as resource persons. 5. Minimum farming experience of 5 years. 6. Member having minimum educational qualification of 8th pass. 	The project will cover the complete training cost for all the selected farmers and FPO members.
	b) Certification cost on GAP c) MRL Testing	Anchor FPOs.	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET and/or have forward market linkages with the private players and export market	<p>Farmers from the Anchor FPOs can select on the basis of</p> <ol style="list-style-type: none"> 1. He/she should be cultivating the relevant horticulture crops on his own land. 	The project will also provide 50% subsidy on total certification cost to 5% of farmers from each selected FPO subject to a ceiling of Rs 10000 per farmer.

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
				2. Minimum farming experience of 5 years. 3. Preference to small, marginal and women farmers and beneficiaries. 4. Member willing to share their experiences in workshops/ seminars at District and State Level as resource persons.	
	d) Support for fruit care activities	Anchor FPOs.	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET and/or have forward market linkages with the private players and export market	Farmers from the Anchor FPOs can select on the basis of 1. He/she should be cultivating the relevant horticulture crops on his own land. 2. Minimum farming experience of 5 years.	The project will also provide 50% subsidy on total certification cost to 5% of farmers from each selected FPO subject to a ceiling of Rs 25000 per farmer.
5	Demonstrations on High density Plantation (HDP)				
	a. Integrated package with drip irrigation	Anchor FPOs.	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET or have forward market linkages with the private players and export market	Farmers from the Anchor FPOs can select on the basis of 1. He/she should be cultivating the relevant horticulture crops on his own land. 2. Minimum farming experience of 5 years.	Eligible FPOs will be given a 50% grant based subsidy on the overall cost of HDP as per the cost norms under MIDH scheme or Commercial horticulture scheme, NHB.

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
	b. Without Irrigation		FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET or have forward market linkages with the private players and export market	Farmers from the Anchor FPOs can select on the basis of 1. He/she should be cultivating the relevant horticulture crops on his own land. 2. Minimum farming experience of 5 years.	
B.	Post-harvest management				
1	Capacity building on post-harvest management				
	a. Trainer training on post-harvest technology under MAGNET focus crops (5 days)	Consulting services, NIPHT	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET or have forward market linkages with the private players and export market	MSAMB, PIU, KVK, field level staff and others can select on the basis of 1. Trainer should be in the age group of 18 to 55 years. 2. He/she should have 3 years' experience of a capacity building/training. 3. He/she having minimum educational qualification of Diploma/Degree. 4. Member willing to share their experiences in workshops/ seminars at District and State Level as resource persons. 5. Minimum farming experience of 5 years	The project will provide full sponsorship to selected individuals

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
	b. Training of FPOs (400) and VCOs (200) on post-harvest management for MAGNET focus crops (3 days)	Consulting services, MAGNET PMU	FPOs who have availed financial assistance for post-harvest infrastructure under MAGNET or have forward market linkages with the private players and export market.	<p>Members from FPOs and VCO can select on the basis of</p> <ol style="list-style-type: none"> 1. Farmer should be in the age group of 18 to 55 years. 2. He/she should be cultivating the respective horticulture crops on his own land. 3. Minimum farming experience of 5 years. 4. Preference to small, marginal and women farmers and beneficiaries. 5. Member having minimum educational qualification of 8th passes. 6. Member willing to share their experiences in workshops/ seminars at District and State Level as resource persons. 	The project will provide full sponsorship to selected individuals
C.	Innovation in new product				
1	Research & Development	MAGNET PMU			

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
	a. R&D for new product development in focused value chain		<ol style="list-style-type: none"> 1. Government of India recognized/supported (Public/private) academia, Central Govt. Institute under ICAR, CSIR, SAUs, National level Govt. agencies and other location specific Institute 2. Research foundations having research as one of the imperative mandates are eligible for funding subject to fulfilment of technical, administrative and financial guidelines 3. The institution should be eligible for receiving Government funds/grants. 	<p>Research Institutes (Govt, Private) can select on the basis of</p> <ol style="list-style-type: none"> 1. Length of experience in handling similar assignments, viable product development and value addition 2. Proven track record in conducting applied research, innovation and implementation in agriculture and allied sectors 3. Evidence of successful (technical and financial) implementation of minimum two projects funded by any Government agency 4. Technical and financial viability of proposal 5. Innovation and market driven approach, ultimately leading to commercialization of the new product <p>Selection criteria should be based on the strength of the proposal and its implications on the project.</p> <p>On case to case basis the MAGNET steering committee, it will look at the proposal and decide</p>	Cost of project and dedicated manpower to be considered, subject to a ceiling of Rs.50 lacs per MOU for the determined period
	b. Innovation in packaging in all 10 commodities		<ol style="list-style-type: none"> 1. Government of India recognized/supported (Public/private) academia, Central Govt. Institute 	Research Institutes (Govt, Private) can select on the basis of	Cost of project and dedicated manpower to be considered, subject to a ceiling of Rs.50 lacs per MOU for the determined period

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
			<p>under ICAR, CSIR, SAUs, National level Govt. agencies and other location specific Institute</p> <p>2. Research foundations having research as one of the imperative mandates are eligible for funding subject to fulfilment of technical, administrative and financial guidelines</p> <p>3. The institution should be eligible for receiving Government funds/grants.</p>	<p>1. Length of experience in handling similar assignments, viable product development and value addition, viable product development and value addition</p> <p>2. Proven track record in conducting applied research, innovation and implementation in agriculture and allied sectors</p> <p>3. Evidence of successful (technical and financial) implementation of minimum two projects funded by any Government agency</p> <p>4. Technical and financial viability of proposal</p> <p>5. Innovation and market driven approach, ultimately leading to commercialization of the new product</p>	ceiling of Rs.10 lacs per MOU for the determined period
	c. Bio-waste to wealth		<p>1. Government of India recognized/supported (Public/private) academia, Central Govt. Institute under ICAR, CSIR, SAUs, National level Govt. agencies and other location specific Institute</p> <p>2. Research foundations having research as one of the imperative mandates are eligible for funding subject to fulfilment of</p>	<p>Research Institutes (Govt, Private) can select on the basis of</p> <p>1. Length of experience in handling similar assignments, viable product development and value addition</p> <p>2. Proven track record in conducting applied research, innovation and implementation in agriculture and allied sectors</p> <p>3. Evidence of successful (technical and financial) implementation of minimum two</p>	50% grant on the capex subject to maximum support of 25 lakhs per project

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
			technical, administrative and financial guidelines 3. The institution should be eligible for receiving Government funds/grants.	projects funded by any Government agency 4. Technical and financial viability of proposal 5. Innovation and market driven approach, ultimately leading to commercialization of the new product	
2	Support for commercialization of new technology	MAGNET PMU	As per the eligibility criteria of Value chain operators mentioned below	Agri Startups, VCOs, Anchor FPOs can select on the basis of selection criteria mentioned below	50% grant on the capex for the investment specific to the new product subject to maximum support of 25 lakhs per project Plus support under market development to be provided by VCA services
D.	Lead firm SME linkages 1. Capacity building 2. Production Plant Certification compliance cost (GMP, HACCP, etc.) 3. Market development assistance 4. Other certification cost for sustainable sourcing of raw material (Fairtrade, RFA, Organic etc.)	Consulting services	Selection of technical agency/consultant will be based on experience in processing, supply chain and designing technical assistance package. Selection of VCOs is based on the eligibility criteria mentioned below or VCOs who have availed financial assistance for post-harvest infrastructure under MAGNET	1. He/she should be industry experience of 5 years. 2. Long term commercial arrangements with the lead firms and potential to improve and grow through their access to investment and working capital. 3. The SMEs should have a minimum statutory compliance on food safety and quality. 4. The SMEs should possess strong backward linkages with farmers or FPOs and sizeable procurement of the selected commodities. 5. Member willing to share their experiences in workshops/ seminars at District and State Level as resource persons	The project will provide assistance with training, sustainability compliances, certification etc. in order to meet the lead firms quality compliances and industry standards

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
E.	Market Development and Promotion				
1	Development of e-commerce portal for B2B and B2C	Consulting services		<p>1. Should have strong database for taking informed decision of markets and products and disseminating of such information to various stakeholders.</p> <p>2. Should have development of online platform/e-commerce platform to enable direct linkage among producers / processors / exporters / export markets</p>	Consulting services will establish it as part of their contract
2	Traceability systems through Block chain	Consulting services		Should have development of standards of packaging/ transport protocol (air/sea) geographical indication	Consulting services will establish it as part of their contract
3	Buyer seller meets	Consulting services	Farmers/FPO participation norms to be defined by consulting sservices	Preference would be given for first time participation	Consulting services will organize such events and provide full sponsorship to selected individuals and organizations already participating in MAGNET project. The final discretion lies with the MAGNET Society.
4	Trade fair and Exhibitions	Consulting services	Farmers/FPO participation norms to be defined by consulting services		The project will provide full sponsorship to selected individuals and

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
	a. Participation in Trade Fair & Exhibition (International)		Farmers/FPO participation norms to be defined by consulting services	Preference would be given for first time participation in particular trade fair.	organizations already participating in MAGNET project. The final discretion lies with the MAGNET Society.
	b. Participation in Trade fair & Exhibition (Domestic)		Farmers/FPO participation norms to be defined by consulting services	Preference would be given for first time participation in particular trade fair.	
5	Development of export protocols and support for trials for MAGNET focused crops and targeted countries	Consulting services	To be defined by consulting service	Should have development of standards of packaging / transport protocol (air/sea) geographical indication	The project will sponsor the study trials for the designated period as per the requirement.
6	Branding and promotion	Consulting services	To be defined by consulting services		The project will fund the branding and promotion of the selected commodities.
F.	Building institutional capabilities of FPOs				
1	Value Chain Acceleration Services	Consulting services	To be defined by MAGNET PMU	To be defined by MAGNET PMU	
2	Capacity building and training of BoD of FPOs	Consulting services	To be defined by consulting services	To be defined by consulting services	
3	Export training to women led FPOs & enterprises	MAGNET PMU	Farmers/FPO participation norms to be defined by consulting services	Preference would be given for first time participation	

Sr. No.	Category	Implementation Mechanism	Eligibility Criteria	Selection Criteria	Nature of Support
4	Study Tours, Exposure visits	MAGNET PMU	Farmers/FPO participation norms to be defined by consulting services	Farmers/FPO participation norms to be defined by VCA services	The project will provide full sponsorship to selected individuals and organizations already participating in MAGNET project. The final discretion lies with the MAGNET Society.
G.	Capacity building and Training workshops on project compliances (Gender, Social, Environment, Finance, M&E)				
1	Training workshop for IAs, PIU, FPOs, Value chain operators, and other stakeholders	Consulting services	To be defined by consulting service	To be defined by consulting service	The project will provide full sponsorship to selected individuals based on the project requirements
H.	Support to innovative technologies	MAGNET PMU	To be defined by MAGNET Society PMU	Anchor FPOs, FPOs, VCOs to be selected basis the minimum eligibility criteria	The project will provide full grant support to selected individuals and organizations. The final discretion lies with the MAGNET Society.

1. Eligible Sectors: Primary Condition for Application

Projects or interventions that facilitate productivity improvement, reduction in post-harvest losses, improving quality, value addition and marketing of one or group of the following horticulture crops:

- 1) Banana
- 2) Custard Apple
- 3) Green and Red Chili
- 4) Guava
- 5) Okra
- 6) Orange
- 7) Pomegranate
- 8) Sapota
- 9) Strawberry
- 10) Sweet Lime
- 11) Floriculture

2. Eligible Organizations

- a) Farmer Producer Organizations (also including legally constituted Cluster Level FPO Federations/Association)
- b) Value Chain Operators (Non FPO Entities) which may include aggregators/processors/exporters/mid and large size retail organizations/Ag-tech - working actively with producers and their collectives.
- c) Research Institutes and SAUs working on varietal development, innovation and value addition in the selected commodities

a) Farmer Producer Organization

i. Qualifying Criteria- Farmer Producer Organization

- Legally registered FPOs- Farmer Producer Companies, Farmer Cooperative Societies, and other Producer Organizations (legal entities) also including Cluster Level FPO Federations/Associations
- FPO should be a legally registered entity, with audited books of Accounts (audited by a Chartered Accountant).

ii. Selection Criteria - Farmer Producer Organization

- **Minimum Shareholding-** 250 producers. However, MAGNET Society/Steering Committee for approval may use its own discretion to allow FPOs with lower shareholding
- FPO should have turnover of more than Rs. 5 lakh in at least one audited financial statement in last three years.
- FPO should have a Forward Linkages MOU/Contract with Large/SME buyers. FPOs already having Trade History with large processors will be given priority.
- FPO who will be availing financial assistance to setup post-harvest infrastructure under Output 2.
- **Exception:** FPOs that primarily support farm level production for a larger project headed by an Anchor FPO, and thus proposing to operate minimal processing and/or logistics as decentralized activity –will be exempt.
- At least 60% of applicant FPO's shareholders should be involved in production of one or more of the targeted crops and collectively have considerable production within their catchment zone. This should be backed by crop-wise data in the catchment area indicating source of data.

- Priority to be given to FPOs that have shown growth in membership on a y-o-y basis for 2 years preceding the year in which proposal is submitted.
- Final selection for assistance to any entity will be based on meeting of above criteria and final discretion of MAGNET Society/Steering Committee for approval.

b) Value Chain Operators

i. Qualifying criteria – Value Chain Operators

- Eligible applicant can be Central and State PSUs / Joint Ventures / Public and Pvt. Ltd. Companies / Limited Liability Partnerships/Corporate Entity/ Proprietorship Firms/ Partnership Firms.
- Only applicants proposing projects which are of pioneering nature by way of new product / new process **OR** projects that ensure plugging of critical gaps in supply-chain (and lead to considerable increase in producer's remuneration) and having high gestation period (hence delayed break-even) will qualify for grant assistance. Established business model/s of private sector will not qualify for any grant assistance.
- Applicant should be a legally registered entity, with audited books of Accounts (audited by a Chartered Accountant).
- Only Applicants having at least 3 years of experience in Aggregation and Storage/ Processing/Marketing and/or Exports of listed crops and/or other horticulture crops will be eligible.
- Applicant should have established backward linkages with primary producers/FPOs who are involved in production and/or primary processing of listed crops.
- Applicant should not have been declared as Non-Performing Asset (NPA) by Bank/FI due to past loan default.
- Applicant should not have any significant audit observations.

ii. Selection Criteria – Value Chain Operators

- Applicant should have turnover of more than INR 50 lakh in at least one audited financial statement in last three years.
- Net worth of the Applicant should be at least 1.5 times of proposed equity in their proposed project
- Applicants with minimum previous 2 years records that establish sizeable procurement done of listed and other horticulture crops from Maharashtra State.
 - **OR**
- Applicants having considerable procurement of listed crops from other States and wanting to set up their project in Maharashtra, which will have minimum 50% of the project's capacities utilization towards listed crops sourced from the State of Maharashtra.
- Priority to be given to Applicant with Majority stake / shareholding of Women/SC/ST in the organization/firm.
- Final selection for assistance to any entity will be based on meeting of above criteria and final discretion of MAGNET Society/Steering Committee for approval.

c) Research Institutes, SAUs selected/nominated for R&D, innovation and new product development

A collaboration proposing an R&D project that meets the requirements of the overall MAGNET vision and support value addition in the selected value chain.

i. Eligibility criteria

- The participating entities/organisations from India have to be a legal entity as per Indian law. The Indian entities eligible to participate include:
 - Government of India supported or recognised (Public or Private) academia; research organisations and urban or other local bodies;
 - Government of India recognised Research foundations, having research as one of the imperative mandates are eligible for funding subject to fulfilment of technical, administrative and financial guidelines
- The research institute should have experience in viable product development and value addition in selected horticulture crops.
- The institution should have a proven track record in conducting applied research, innovation and implementation in the sector
- The institution should be eligible for receiving Government funds/grants. Evidence of successful (technical and financial) implementation of minimum two projects funded by any Government agency.
- The Research Institute or University should have requisite networking and linkages with other academic and research institutions to take advantage of existing expertise.
- Project proposal must be innovative and market-driven, leading to the proposed development of a new product, service or process, leading ultimately to commercialisation.
- Project proposal duration should be up to 36 months.

2. Sub-projects eligibility criteria for Matching Grant under Output 2

1. Eligible Sectors: Primary Condition for Application

- **Eligible Organizations**

- d) Farmer Producer Organizations (FPO is farmers organizations registered under Company Act, Co-op Society Act, Farmer Groups/ Cluster Level Federations (CLFs)/Community Managed Resources Centers (CMRCs) registered with ATMA/MSRLM/MAVIM also including Cluster Level FPO Federations/Associations)
- e) Value Chain Operators (Non FPO Entities) which may include aggregators/ processors/ exporters/mid and large size retail organizations/Ag-tech or Fin-tech organizations - working actively with producers and their collectives of any horticultural commodities.

A. Qualifying Criteria- Farmer Producer Organization

- a. Legally registered FPOs- Farmer Producer Companies, Farmer Cooperative Societies, and other Producer Organizations (legal entities) also including Cluster Level FPO Federations/ Associations. If FPO is not legal entity then at the time of application it should apply for legal registration and should be legally registered at the time of grant agreement.
- b. FPO should be a legally registered entity, with audited books of Accounts (audited by a Chartered Accountant). In case of farmer groups registered with NABARD, it should have the proofs of financial transactions.
- c. FPO should not have been declared as Non-Performing Asset (NPA) by Bank/FI due to past loan default.
- d. FPO should not have any significant adverse audit observations in its previous annual audits.
- e. Minimum Shareholding of FPO should be 250 producers. However for Associations/ Federations/Anchor FPO minimum shareholding of 10 institutional members with an aggregate shareholder base of minimum 2000 producers.

- f. At least 60% of applicant FPO's shareholders should be involved in production of one or more of the targeted crops and collectively have considerable production within their catchment zone. This should be backed by crop-wise data in the catchment area indicating source of data.

Selection Criteria for Farmer Producer Organization/Anchor FPOs or Cluster Level FPO Federations

- a. FPO should have turnover of more than Rs. 5 lakh in at least one audited financial statement in last three years.

Exception: FPOs that primarily support farm level production for a larger project headed by an Anchor FPO, and thus proposing to operate minimal processing and/or logistics as decentralized activity –will be exempt.

For legally constituted Cluster Level FPO Federations/Association/Anchor FPOs- Aggregate/Collective Turnover of minimum Rs. 25 Lakh in at least one audited financial statement in last three years.

- b. FPO should have Forward Linkages MOU/Contract with Large/SME buyers. FPOs already having Trade History with processors/aggregators/exporters/buyers/retailers etc will be given priority.
- c. Priority to be given to FPOs that have shown growth in membership on a y-o-y basis for 2 years preceding the year in which proposal is submitted.
- d. Priority to be given to the FPOs fulfilling Social and Environment Safeguards criteria of MAGNET Project.
- e. FPO should be engaged for at least one year in agricultural production, marketing, processing, trading or input supply of listed crops and/or other crops will be eligible. However preference will be given to those FPOs who have been engaged with targeted horticultural crops of the project.
- f. Priority to be given to Applicant with majority stake / shareholding of Women/SC/ST in the organization/firm.

B. Qualifying Criteria- Value Chain Operators

- a. Eligible applicant can be Public Ltd. Companies/Pvt. Ltd. Companies / Limited Liability Partnerships/Corporate Entity/ Proprietorship Firms/ Partnership Firms/Cooperatives Societies.
- b. Applicant should be a legally registered entity, with audited books of Accounts (audited by a Chartered Accountant).
- c. Only Applicants having at least 3 years of experience in Aggregation and Storage/ Processing/Marketing and/or Exports of listed crops and/or other horticulture crops will be eligible. However preference will be given to those VCOs who have been engaged with targeted horticultural crops of the project.

Exception 1: Central/State Government recognized Agri Start-ups or Ag-tech companies having demonstrated at least 1 year experience in Aggregation and Storage/ Processing/Marketing and/or Exports of any horticulture commodities may be considered.

- d. Applicant should have established backward linkages with primary producers/FPOs who are involved in production and/or primary processing of listed crops and/or other horticulture crops will be eligible. However preference will be given to those VCOs who have been engaged with targeted horticultural crops of the project.
- e. Applicant should not have been declared as Non-Performing Asset (NPA) by Bank/FI due to past loan default.
- f. Applicant should not have any significant adverse audit observations.

Selection Criteria- Value Chain Operators

- a. Applicant should have turnover of more than INR fifty lakh in at least one audited financial statement in last three years.

- b. Net worth of the Applicant should not be less than 1.5 times of grant sought in their proposed project.
- c. Applicant should have own equity of minimum 20% of the project cost.
- d. Preference will be given to the applicant who will avail the term loan from the PFIs selected in the project.
- e. Priority to be given to the applicants having minimum previous 2 years records that establishes procurement of any of the listed crops from Maharashtra State.
- f. Priority to be given to Applicant with majority stake / shareholding of Women/SC/ST in the organization/firm.

Table 6: List of Eligible Infrastructure Components

Infrastructure and Other Components eligible for Grant			
Market Led Production Activities	Post-harvest processing facilities	Agri-Logistics	Marketing / Consumption Points
A. Capital Costs for Setting up: 1. Nursery and Greenhouses 2. Protected Cultivation B. Investment in: 1. Traceability Systems 2. Farm Equipment's/ other capital investment that support Advanced Techniques in Production (such as High Density Plantation, Integrated Pest Management, etc) 3. Any other modern technology as may be approved by MAGNET Society/Steering Committee for approval	A. Setting up of main infrastructure which may include: 1. Technical Civil works (to house Core Plant & Machinery and other equipment) 2. Pack-house 3. Cold Storage Unit(s) [Associated with value addition] 4. Integrated Pack-house (with mechanized sorting & grading line/ packing line/ waxing line/ washing and drying line/ staging cold rooms, etc.) 5. Ripening Chamber(s) 6. Controlled Atmosphere (CA) storage [Associated with value addition] 7. Frozen Storage/Deep freezers [Associated with value addition] 8. IQF line, Tunnel Freezer, Spiral Freezer, Blast Freezer, Plate Freezer 9. Vacuum Freeze Drying 10. Processing Infrastructure- <ul style="list-style-type: none"> • Sorting, grading, washing, peeling, cutting, sizing; • Blanching, crushing, extraction, pulping, juicing; • Deseeding, color sorting, pulverization, extrusion, freeze drying / dehydration, frying, etc.; • Packaging facilities like canning, aseptic packaging, vacuum packaging, bottling, edible packaging, labelling, any 	Procurement of: 1. Integrated multi-mode appropriate transportation; 2. Retail refrigerated carts, temperature controlled solar powered retail carts 3. Controlled temperature/ Ventilated trucks with or without raking; 4. Crates, rakes etc; 5. Mobile pre-coolers 4. Any other modern technology as may be approved by MAGNET Society/Steering Committee for approval	Setting up of: 1. Appropriate storage facility cum Distribution Centre at market level 2. Retail outlets with facilities such as frozen storage/deep freezers/ refrigerated display cabinets/cold room/chillers, etc. 3. Creation of e-market 4. Any other modern technology as may be approved by MAGNET Society/Steering Committee for approval

Infrastructure and Other Components eligible for Grant			
Market Led Production Activities	Post-harvest processing facilities	Agri-Logistics	Marketing / Consumption Points
	<p>other specialized packaging etc.</p> <ul style="list-style-type: none"> Chemical preservation, pickling, fermentation or any other specialized facility required for preservation activities etc. <p>11. Pre Cooling Unit(s)</p> <p>12. In-house product testing laboratory</p> <p>13. Any other modern technology for temperature controlled storage, processing, value addition and preservation infrastructure as may be approved by MAGNET Society for approval</p> <p>B. Utilities, Material Handling Equipment's, Accessories and other eligible components (required as supporting infrastructure to main facility). These will not be eligible as standalone component or for upgrading of any existing facilities.</p> <p>1. Electrification</p> <p>2. Essential Power Back-up</p> <p>3. Renewable/ alternate energy technologies (solar, bio-mass, wind etc.) for the project.</p> <p>4. Material Handling equipment's and systems like fixed racking system in Cold/CA storage, forklifts, reach trucks, bins, pallets, dock levellers, etc.</p> <p>5. Supporting equipment's like ETP, Waste Disposal system, Boiler, CIP unit, Water Treatment Plant, Firefighting systems etc.</p> <p>6. Toilets, Septic tank and drainage</p> <p>7. Any other accessories/ equipments as may be approved by MAGNET Society for approval</p>		

C. List of ineligible Components

Following components are ineligible (List is only illustrative and not exhaustive):

- a. Non-technical civil work like
 - i. Administrative Office,
 - ii. Approach Road/Internal Roads
 - iii. Compound wall
 - iv. Cost of land
 - v. Site development
 - vi. Canteen
 - vii. Labour rest room
 - viii. Quarters for workers
 - ix. Security guard room
- b. Preliminary and Pre-operative exp. like Consultancy fee, etc.
- c. Margin money, working capital and contingencies
- d. Second hand/ old machineries
- e. Reconditioned and refurbished plant & machinery.
- f. AC ducting, furniture, computers and allied office items
- g. Closed Circuit TV Camera and security system related equipment
- h. Fuel, Consumables, Spares and Stores
- i. Non-Temperature Controlled Transport vehicles
- j. Operational Expenses
- k. Stationery items
- l. Taxes on plant and machinery, etc.
- m. All types of service charges, carriage and freight charges, etc.
- n. Fly catchers, hand washer, laundry etc.
- o. Any other components not explicitly mentioned under list of eligible components and as may not be approved by MAGNET Society for approval.

Notes:

- a. The eligible project cost will be calculated considering the cost of technical civil and plant & machinery. The cost of utilities, material handling equipment's, accessories and other eligible components etc. as mentioned above in the list of eligible components will be considered under eligible project cost subject to restriction of above cost being maximum 25% of the total project cost. The eligible project cost needs to be supported with estimates of civil work and quotations of plant & machineries.
- b. However, for grant calculation purpose, the cost norms as determined by MAGNET society shall be applied while calculating the eligible project cost and grants for all proposals.
- c. Applicant can avail assistance under this scheme in conjunction with other schemes being implemented by Central Ministries/Departments or State Government. However, no assistance will be provided for components/facilities for which grant-in-aid has already been approved/availed.

D. Pattern of Assistance

The maximum admissible grant for each project will be as follows:

- i. For FPOs up to 60% of the eligible project cost, subject to maximum of INR 6.00 Crore per project.
- ii. For VCOs up to 35% of the eligible project cost for storage infrastructure including pack house, cold storage, pre cooling unit, ripening chamber and transport infrastructure and 50% of the eligible project cost for value addition and processing infrastructure including frozen storage/ deep freezers associated and integral to the processing, subject to maximum of INR 6.00 Crore per project.

E. Project Proposal Selection Criteria:

- a. Only integrated value chain development projects (As determined by appraisal committee/ sanctioning committee on case to case basis.) will be eligible. Stand-alone facilities/ component will not be considered for assistance under this scheme
- b. Proposal should to be technically sound and financially viable as well as have satisfactory environmental and social safeguards.
- c. Must adhere to MAGNET'S Environmental and Social Safeguards
- d. Both Greenfield and Brownfield Projects will be eligible.
- e. Compliance to all industrial norms, ROC compliance (for FPCs and Limited Companies), FSSAI Act, etc
- f. Projects shall confirm to the national and local industrial development plans and shall not include projects that are restricted or prohibited.
- g. Projects that do not involve storage/processing/value addition/marketing of at least any one of the above listed crops – will not be eligible.
- h. Minimum 50% applicant's capacities should be utilized for processing/facilitating services for listed crops produced in project's catchment zone and/or within Maharashtra. DPR proposal of applicants should clearly state Project's Catchment Area, Production Capacity, Available raw material crop-wise in the catchment area indicating source of data.
- i. Projects proposing to set up their infrastructure outside Maharashtra will not be considered.
- j. Land title in the name of the applicant or land lease, duly registered with the competent authority for not less than the period of 15 years – will be required.
- k. Preference will be given to projects having Change in Land Use (CLU) permission from the competent authority.
- l. Submission of all documents which will include among other documents- Estimates/Quotations, Drawings and Building Plan Sanction, Consent to Establish (MPCB), NOCs from Concerned Departments/Authorities, etc.
- m. Financial Indicators Criteria:
 - i. The financial internal rate of return (FIRR) should be greater than the weighted average cost of capital (WACC) for the sub-project.
 - ii. Total debt/equity ratio of the sub-project should not be more than 70:30.
 - iii. The overall current ratio of the sub-project should be at least 1.1
 - iv. The Avg. DSCR of the sub-project should be at least 1.50

F. Some specific conditions

- a. Grant will be extended only for selected projects of eligible organizations.
- b. Final selection for assistance to any entity will be based on meeting of qualifying and selection criteria and final discretion of MAGNET Society for approval.
- c. Only Projects appraised by Technical Consultant (appointed by MAGNET Society) and approved by MAGNET Society will be given grant sanction.
- d. MAGNET Society/Steering Committee may use their sole discretion to reject any project/any specific component that is eligible under specific grant schemes of other institutions like NHB, MOFPI, RKVY, SMART, POCRA, etc. The idea here is to complement the existing schemes and not to compete with them. For e.g. Some stakeholders may be eligible for grant scheme of NHB for stand-alone cold storages.

Such SMEs shall not be considered for the same component under MAGNET, unless otherwise allowed by MAGNET Society/Steering Committee.

- e. Projects that have availed Capital Grant Assistance on same components from any other Central Govt/State Govt. Agencies/Departments will not be considered for Grant assistance.
- f. Not more than one application from the same applicant / company will be entertained. An application will be considered as second proposal if there are cross holdings of the promoter(s)/partner(s) between two applicants/entities.
- g. All equipment/ plant & machinery of the project should be new. Reconditioned/ refurbished equipment/ plant & machinery will not be eligible for grant.
- h. Expansion /upgrading of the existing facility/ies will not be entertained.
- i. The grant will be restricted only to the plant & machinery and technical civil work created after the date of issue of Expression of Interest [EoI].
- j. Eligible projects that have gained **Detailed** In-principle Term Loan Sanction from any Financial Institution will be given preference. In such case, the date of sanction of term loan should not be earlier than the date of issue of EoI.
- k. During implementation, Project promoters will not be allowed to drop/remove/reduce capacity of any item approved for grant. If circumstances may still require such action on behalf of promoter, the revised project will be considered/ rejected for grant approval only after appraisal by Technical Consultant and approval of MAGNET Society.

3. Sub-Project/Borrower/Sub-loan Eligibility Criteria for FIL

A. Qualification and Selection Criteria of Applicants/Projects

- a) Only sectors (crops) as mentioned in Eligible Sectors enlisted in the scheme qualify for **FIL assistance**.
- b) Only projects proposed by Eligible Organizations enlisted in the scheme qualify for **FIL assistance**.
- c) **While final selection for assistance to any entity will be based on meeting of lending FI's own set of criteria and its final discretion, FI must mandatorily ensure the Qualification and Priority Criteria with reference to targeted beneficiaries of FIL as under:**

B. Farmer Producer Organizations (Minimum Qualification and Priority Criteria)

- a) Legally registered FPOs- Farmer Producer Companies, Farmer Cooperative Societies, and other Producer Organizations (legal entities) also including **Cluster Level FPO Federations/Associations**.
- b) At least 60% of applicant FPO's shareholders should be involved in production of one or more of the targeted crops and collectively have considerable production within their catchment zone. This should be backed by crop-wise data in the catchment area indicating source of data.
- c) Priority to be given to FPOs that have shown growth in membership on a y-o-y basis for 2 years preceding the year in which proposal is submitted.
- d) Priority to be given to the FPOs fulfilling Social and Environment Safeguards criteria of MAGNET Project.
- e) Priority to be given to FPOs having their proposals appraised and approved for **Grant** assistance under projects/schemes:
 - **Funded by Donor Organizations** - MAGNET (ADB Funded), SMART (WB funded), PoCRA (WB funded), IFAD

- **Central Govt. Schemes** - RKVY, MOFPI
 - **State Govt. Schemes**- Gat Sheti
- f) **For Existing and New Anchor Organizations (Minimum Qualification and Priority Criteria)**
- In this category, only organizations selected and awarded **Recommendation Letter** from MAGNET Society can be offered financial assistance.
 - List of selected organizations will be circulated on regular basis by MAGNET Society to all participating FIs.

C. Other (Non FPO entities) Value Chain Operators which may include aggregators/ processors/ exporters/ mid and large size retail organizations/Ag-tech or Fin-tech organizations - working actively with producers and their collectives (Minimum Qualification and Priority Criteria)

- a) Eligible applicant can be Central and State PSUs/ Joint Ventures/ Public and Pvt. Ltd. Companies / Limited Liability Partnerships/Corporate Entity/ Proprietorship Firms/ Partnership Firms including
- b) Applicant should have established backward linkages with primary producers/FPOs who are involved in production and/or primary processing of listed crops.
- c) Applicants with minimum previous 2 years records that establish sizeable procurement done of listed and other horticulture crops from Maharashtra State.

OR

Applicants having considerable procurement of listed crops from other States and wanting to set up their project in Maharashtra which will have minimum 50% of the project's capacities utilization towards listed crops sourced from the State of Maharashtra.

- g) Priority to be given to the Value Chain Operators fulfilling Social and Environment Safeguards criteria of MAGNET Project.
- h) Priority to be given to Applicant with Majority stake / shareholding of Women/SC/ST in the organization/firm.
- i) Priority to be given to Value Chain Operators having their proposals (including joint proposals with FPOs) appraised and approved for **Grant** assistance under projects/schemes:
 - **Funded by Donor Organizations** - MAGNET (ADB Funded), SMART (WB funded), PoCRA (WB funded), IFAD
 - **Central Govt. Schemes** - MOFPI

D. Term Loan assistance to support setting up of infrastructure

- a) FIs may refer to the indicative list of Infrastructure and Other Components (including components ineligible for grant) envisaged to be supported under MAGNET project to finance projects of applicants. FIs can build their own exhaustive list with more and other relevant components in this regards.
- b) Final selection of activities/project for assistance to any entity will be based on complete discretion of lending FI.

E. Working Capital Loan assistance

- a) **List of Eligible Activities (for FIL Working Capital Assistance):** FIs can extend loan to finance working capital needs of selected projects, which may include:
 - Raw Material Procurement and Aggregation (including for Pre-harvest advance to producers)
 - Processing, Trade, including for exports (including for Purchase Order Funding)
 - Contract Farming WC requirements
 - Introduction of high yielding planting material/varieties

- To facilitate adoption of improved package of practices (like GAP, traceability, etc.)
 - Compliance with the internationally accepted norms/regulations for export of horticultural produce and for obtaining necessary certifications/ permissions.
 - Other productive and operational purposes
- a) Final selection of activities/project for assistance to any entity will be based on complete discretion of lending FI.

D. Preliminary Qualified Partner Financial Institutions

In particular, the project (through FIL) aims to enhance access to financial services for FPOs and other value chain operators operating in Maharashtra's horticulture sector (specifically in targeted value chains), to enable them to undertake the investments to strengthen their productivity and competitiveness. It will support activities including the setting up of post-harvest processing facilities i.e. facilities like appropriate storage at farm level/ collection centre (CC)/Pack house, primary processing such as sorting, grading and packaging facilities, secondary processing – any mechanised and mobile processing facilities, appropriate transportation infrastructure, setting-up of retail outlets, creation of e-market etc.; as well as support working capital requirements- aggregation, processing and trade (including for exports), other productive purposes – based on submitted investment plan (sub-project proposal).

The project will attempt to alleviate the lack of short-term and long-term financing for the horticulture sub-sector by providing funding with a 15-year maturity to the banking sector to be revolved in the PFIs. The project is expected to encourage PFIs to introduce a range of innovative structured finance products, to support development of targeted value chains. These products, such as financing of specific contracts where such contract serves as collateral, are expected to take the focus of the financial sector off the traditional forms of collateral, help subprojects borrow to deliver under signed contracts, and develop relationships between farmers, processors, wholesalers, retailers, etc.

The preliminary qualified PFIs under the project include Bank of India, Axis Bank, Nabkisan Finance Limited and Sammunati Financial Intermediation and Services Private Limited which have been shortlisted based on an Expression of Interest (EOI) published in the month of July 2020. These PFIs went through the due process of due diligence and qualification. Notably, all these PFIs identified are interested to support the development of the horticulture sector and working with such borrowers, as well as their interest to participate in the training offered by the project. The PFIs that are identified/selected as project implementation units are Bank of India and Samunnati Financial Intermediation and Services Private Limited. The due diligence of the selected PFIs was carried in the months of Sep-Oct 2020, on the basis on the recent audited data.

The credit line will be open to all FIs, which qualify through the due diligence process. Specific guidelines will set forth the eligibility criteria for PFIs, sub-borrowers and subprojects to be financed and the procedures for all parties involved in the implementation of the credit line. The executing and implementing agencies, which have prior track record in implementing donor projects, will administer the implementation of the credit line on behalf of the Govt. of Maharashtra, and ensure that the provisions of the guidelines and loan agreements are enforced. Their detailed responsibilities under the credit line will be set forth in specific project documents.

The project will attempt to alleviate the lack of short-term and long-term financing for the horticulture sub-sector by providing funding with a 15-year maturity to the banking sector to be revolved in the PFIs. The project is expected to encourage PFIs introduce a range of innovative structured finance products, to support development of targeted value chains. These products, such as financing of specific contracts where such contract serves as collateral, are expected

to take the focus of the financial sector off the traditional forms of collateral, help sub-projects borrow to deliver under signed contracts, and develop relationships between farmers, processors, wholesalers, retailers, etc.

Financial intermediaries to on-lend FIL are required to meet the following criteria:

- (i) financial soundness as evidenced by adequate capital, asset quality, liquidity, and profitability;
- (ii) adequate credit and risk management policies, operating systems, and procedures;
- (iii) compliance with prudential regulations, including exposure limits;
- (iv) acceptable corporate and financial governance and management practices including, among other things, transparent financial disclosure policies and practices;
- (v) sound business objectives and strategy and/or plan;
- (vi) autonomy in lending and pricing decisions; and
- (vii) adequate policies, systems, and procedures to assess and monitor the economic, social, and environmental impact of subprojects in accordance with parameters established by ADB for this purpose.

In addition, financial intermediaries should have or build up capacity for mobilizing domestic resources.

E. Matching Grant Sub project selection and approval process

Project Proposal Selection Criteria:

- a) Proposal should to be technically sound and financially viable as well as have satisfactory environmental and social safeguards.
- b) Both Greenfield and Brownfield Projects will be eligible.
- c) Compliance to all industrial norms, ROC compliance (for FPCs and Limited Companies), FSSAI Act, etc.
- d) Projects shall confirm to the national and local industrial development plans and shall not include projects that are restricted or prohibited.
- e) Projects that do not involve storage/processing/value addition/marketing of at least any one of the above listed crops – **will not be eligible.**
- f) Minimum 50% applicant's capacities should be utilized **for processing/facilitating services for listed crops produced in project's catchment zone and/or within Maharashtra.** DPR proposal of applicants should clearly state Project's Catchment Area, Production Capacity, Available raw material crop-wise in the catchment area indicating source of data.
- g) Projects proposing to set up their infrastructure outside Maharashtra will not be considered.
- h) Land title in the name of the applicant or land lease, duly registered with the competent authority for not less than the period of 15 years – will be required.
- i) Preference will be given to projects having Change in Land Use (CLU) permission from the competent authority.
- j) Submission of all documents which will include among other documents- Estimates/Quotations, Drawings and Building Plan Sanction, Consent to Establish (MPCB), NOCs from Concerned Departments/Authorities, etc.
- k) Financial Indicators Criteria:

- v. The financial internal rate of return (FIRR) should be greater than the weighted average cost of capital (WACC) for the sub-project.
- vi. Total debt/equity ratio of the sub-project should not be more than 70:30.
- vii. The overall current ratio of the sub-project should be at least 1.1
- viii. The Avg. DSCR of the sub-project should be at least 1.25

Some specific conditions

- a) Grant will be extended only for selected projects of eligible organizations.
- b) Only Projects appraised by Technical Consultant (appointed by MAGNET Society) and approved by Steering Committee of MAGNET Project will be given grant sanction.
- c) MAGNET Society/Steering Committee may use their sole discretion to reject any project/any specific component that is eligible under specific grant schemes of other institutions like NHB, MOFPI, RKVY, SMART, POCRA, etc. The idea here is to complement the existing schemes and not to compete with them. For e.g. some stakeholders may be eligible for grant scheme of NHB for stand-alone cold storages. Such SMEs shall not be considered for the same component under MAGNET, unless otherwise allowed by MAGNET Society/Steering Committee.
- d) Projects that have availed Capital Grant Assistance on same components from any other Central Govt. /State Govt. Agencies/Departments will not be considered for Grant assistance.
- e) Not more than one application from the same applicant / company will be entertained. An application will be considered as second proposal if there are cross holdings of the promoter(s)/partner(s) between two applicants/entities.
- f) All equipment/ plant & machinery of the project should be new. Reconditioned/refurbished equipment/ plant & machinery will not be eligible for grant.
- g) Expansion /upgrading of the existing facility/ies in the same existing premises will not be entertained.
- h) The grant will be restricted only to the plant & machinery and technical civil work created after the date of issue of Expression of Interest [EoI].
- i) Eligible projects that have gained Detailed In-principle Term Loan Sanction from any Financial Institution will be given preference. In such case, the date of sanction of term loan should not be earlier than the date of issue of EoI.
- j) During implementation, Project promoters will not be allowed to drop/remove/reduce capacity of any item approved for grant. If circumstances may still require such action on behalf of promoter, the revised project will be considered/ rejected for grant approval only after appraisal by Technical Consultant and approval of Steering Committee.

8. Safeguards

A. Introduction

Safeguards Requirement

Safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The SPS requires that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts, are developed and implemented; and (iii) affected people are informed, consulted, and compensated (if need be) during project preparation and implementation. ADB's safeguard policies require its compliance by both ADB and the Borrower.

Roles and Responsibilities

Borrowers/clients are required to undertake social and environmental assessments, carry out consultations with affected people and communities, prepare and implement safeguard plans, monitor the implementation of these plans, and prepare and submit monitoring reports. As the project is under preparation, the TRTA consultant is required to support MSAMB to carry out impact assessment studies and facilitate in drawing management plans those that will either avoid, minimize, mitigate, or compensate for the potential adverse impacts, and in a manner, that is inclusive, climate compatible and sustainable for sectoral growth. The following section discusses the approaches and methodology adopted by the Safeguard team within TRTA in assessing the impacts of the project throughout the project cycle along with the identification of mitigation management plans, including an implementation plan, monitoring and reporting framework, stakeholder consultation, public disclosure, and grievance redressal measures.

Scope and Application of ADB's SPS for MAGNET

It is envisaged that the MAGNET will support small and marginal farmers through farmer's collectives, e.g., FPOs, by improving a network of post-harvest marketing and value chains focusing on the select horticulture crops. Of the three Outputs of Project MAGNET, Output 1 mainly involves conducting capacity building exercises with the FPO's on crop-specific harvesting and post-harvesting best practices, cultivation technologies, business plans, marketing strategy. Thus, the typical requirements of Safeguard, such as assessment of adverse environmental and social impact, would not be required. However, Output 1 also provides an opportunity to build borrower's capacity to address safeguard issues and implement mitigation measures. Thus, it is proposed that for **Output 1**, from Safeguard's perspective, requirements for **training and capacity building** will be provided along with the final report. This will be additional to the capacity building plan that will be prepared by the capacity building consultant, which will be selected for MAGNET.

OUTPUT 2, deals with designing the financial intermediation loan (FIL) and a matching grant lending framework. Under this financial intermediary (FI) (mainly commercial Banks in the State) will be involved, and through them, financial intermediation projects will be appraised. Similarly, the matching grant component will be managed and disbursed by MSAMB. Since the requirements for such subprojects are not available, the Safeguard Framework approach is applicable for Output 2. Impact assessments and safeguard plans are for those subprojects that will be prepared during subprojects' preparation time in conformity with the Safeguard Framework being delineated at this stage. The **Environmental and Social Management System (ESMS) Arrangement**, discussed in sub-section 2, outlines the framework that is being designed and also describes how ADB's requirements are being met.

As part of Output 3, MAGNET will support upgradation/refurbishment of 17 MSAMB facilities and construction of 3 new facilities (Greenfield), which may lead to issues related to construction, labour management, and other infrastructure. The land for the expansion projects within 17 facilities of MSAMB is already available within the facilities, and no new land will be acquired, there will be no physical or economic displacement as part of the project loan component. However, the possibility of localized, adverse impacts arising from upgrading or construction of post-harvest facilities such as processing units, cold storage, processing units, and other infrastructure proposed for MAGNET financing can't be ignored. The upgradation will also require mitigation/management of activities related to excessive use of agrochemicals, a possible increase in energy use for processing and value addition, and water usage (negatively affecting groundwater). The project activities will also be in areas inhabited by indigenous in the Fifth Scheduled areas, such as Nandurbar, Dhule, Nashik, Jalgaon, Thane, and Amaravati. **All the three safeguard policies of the Bank are applicable for MAGNET.** The policies and its application have been addressed under the **Initial Environment Examination (IEE) Report**. IEE document also contains Labour Management Procedures to be ensured during the works and Grievance Redressal Mechanism (GRM).

For MAGNET, social safeguards assessment has been covered as part of the **Initial Poverty and Social Analysis (IPSA)** especially in the context of ADB Safeguard Policies on Involuntary Resettlement, Indigenous Peoples including **Gender Analysis**.

Further, the Safeguard section also includes **Climate Risk and Vulnerability Assessment** for the ten horticultural crop's value chains covering postharvest handling and management.

Stakeholder consultations were held with the primary stakeholders across facilities covering MSAMB staff, and workers. The team proposes to organise consultations with farmer groups (focusing on small, marginal, and women farmers) and FPOs, and agribusiness enterprises before the initiation of project activities. The consultations, however, will be organised on a continuous basis. Meetings and consultations will also be held with participating IAs.

Borrower's Institutional Capacity on Managing Safeguard Requirements

The Borrower (MSAMB) is familiar with the Asian Development Bank's safeguard policies, having implemented several Bank-funded projects. More recently, in the agriculture sector, "Improving Small Farmers' Access to Market in Bihar and Maharashtra- JAPAN FUND FOR POVERTY REDUCTION (JFPR)," was recently completed. Further, the "MACP" of the World Bank was also implemented by MSAMB. Both projects have sound environmental and social management frameworks/ strategies. There is now adequate capacity in the state to manage potential safeguard risks of projects. JFPR and MACP have been rated Satisfactory on safeguards performance. However, the focus of MAGNET on high-value horticulture, post-harvest processing, and infrastructure would mean that the existing safeguard capacity would need to be strengthened to manage the environmental and social risks of MAGNET project. Capacity-building efforts are also required to deal with the new set of challenges arising as a result of climate change impacts. Maharashtra has good institutions that can provide technical support to deal with safeguards related impacts, risks, and challenges and build on positive outcomes of resource efficiency and sustainability. The borrower has identified the need for technical human resources (environment and social) for deploying at various levels during project implementation, and accordingly, the necessary budget will be earmarked. Additionally, training related to the implementation of Safeguard measures are being assessed and will be included under delivery of Output 1.

B. Social Safeguards and Gender Development Strategy

Project-specific Gender Development Strategy (GDS) is needed to ensure social inclusion and participation of women, access to opportunities and resources, and enable them to exercise their rights and use their potential in project activities. The GDS discusses the legal policy framework, issues, and strategy for gender development.

Objective of the GDS

The objective of the GDS is to help ensure that women benefit equally from project interventions and thus contribute to enhancing development through this project. The GDS aims to promote the 5th Goal of Sustainable Development Goals (SDGs), which is to “Achieve Gender Equality and Empower all girls and women.” One of the targets of this goal is to “recognize and value unpaid care and domestic work through the provision of public services, infrastructure, and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.”

The GDS focuses on:

- Specific Gender Actions Plan under MAGNET
- Reduction of gender disparities and enhancement of women participation in the project activities by ensuring at least 30 per cent women FPOs out of total FPOs
- Ensuring at least 30 per cent female membership and 20 per cent representation of women in boards of FPOs
- Equitable access to project and program resources including skill training, technology and government services
- Establishing a set of indicators and targets to monitor progress

The FPOs selected in the project will ensure a minimum of 20% women shareholders and 20% women board of directors at the end of the subproject. FPOs, which fulfil the women’s membership and board of director criteria at the time of selection, will increase the women’s participation at both levels by 5% at the end of the sub-project.

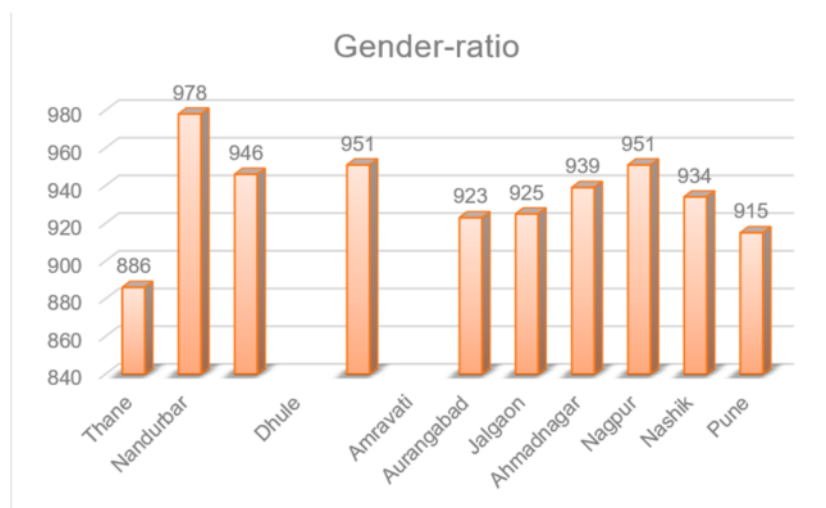
1. Status of Women in Maharashtra

The Human Development Report for Maharashtra (2012) highlights the significance of removing gender inequalities in improving overall human development achievements in the state. The report estimates that the overall human development of women, in general, is lower than that of men. According to the report, the incidence of poverty in rural areas is found to be highest for Scheduled Tribes (ST), followed by Scheduled Castes (SC) and Other Backward Classes (OBC), and others. It further brought out the poor status of rural women in terms of access to healthcare, indicating that Women belonging to the lower wealth classes in the rural areas and SC and ST groups report low BMI and haemoglobin levels. As per the report, the Gender Development Report for India was 0.677 (2006), while it was 0.590 for Maharashtra in the corresponding period. Further, during the same period, the Gender Empowerment Measure (GEM) was calculated at 0.516 (India) and 0.497 (Maharashtra).

2. Gender profile in project area³⁷

³⁷ Ten project districts have been studied: Thane, Nandurbar, Dhule, Amravati, Aurangabad, Jalgaon, Ahmednagar, Nagpur, Nashik, Pune

The analysis of gender profile in the project area was carried out based on the Census 2011 and the Agriculture Census, 2015-16. The women population accounts for 48.17% of the total population in the state. The percentage of women population in most of these districts are on par with the state women population. The gender ratio for the overall state is 929 (Census 2011). The ratio of the women is maximum in Amravati and Nagpur District (951) and is minimum in Thane District (886). The gender ratio of the project districts (ten districts) are presented in Figure below:



The literacy level among women is the highest in Nagpur District (84.51), whereas Nandurbar ranks the lowest with only 56.47% literacy rate among women. 50% of the project districts have women literacy rate lower than the state level of 75.87%. The total working population of the state is 44 percent, and the corresponding figure for women is 31.1%. The WPR among women is lower than the state level in Mumbai (urban), Mumbai, Thane, and Nagpur. The number for marginal workers is 18.1 percent, i.e., a change of (-9.8) from 2001.

3. Status of women in the agriculture and allied sector

Women's participation in agriculture and allied sector throughout the country is mostly limited to labour-intensive production activities at the lower end of value chains; women's presence and involvement in post-harvest, value addition, or agricultural / horticulture marketing activities is minimal. As per Census 2011, out of total female workers, 55 per cent were agricultural labourers and 24 per cent were cultivators. In the case of Maharashtra, it has the highest proportion of rural women employed in agriculture (88%), compared to the national average of 73.2%, and women own 17% of the operational landholdings in Maharashtra, compared to the national average of 12.8%. Defining a farmer as an individual with a title to operational land creates barriers for women to access government schemes and subsidies related to crop insurance, crop loans, agricultural assets, agricultural technology, and other inputs. Women face additional barriers in transitioning to HVA and agribusiness.

Rural women in Maharashtra work mostly on the farm, rural men have more non-farm jobs

*Figure SEQ Figure * ARABIC 7: Share of employed, 2012 (Source: World Bank)*



Issues faced by women in agriculture/ horticulture sector

Women remain confined to labour-intensive jobs such as weeding, hoeing, grass cutting, picking, separation of seeds from fibre, keeping of livestock, and its other associated activities like milking, milk processing, preparation of ghee. Additionally, because of social norms and patriarchal mind-sets, women only FPOs face additional challenges that adversely affect their participation in decision-making. Thus, women are mainly concentrated in the lower end of the chain and perform unskilled manual labour in high-value agricultural value chains. Based on the primary and secondary data, challenges faced by women of Maharashtra are presented below:

- Decision-making: Traditionally, women are not involved in the decision making of land, selection of crop, selection of inputs (seeds, fertilizers & pesticides), credit, extension, and market. Access to technology: mechanization of agriculture and allied has resulted in the confinement of women in the low paying traditional labourer role. There is little time or resource invested in making farm tools accessible to women or designing them in a way such that women farmers can operate them easily.
- Women contribute significantly to agriculture and other economic activities besides undertaking most of the housework, but their contributions in either sphere are not acknowledged.
- Women have the least access to and control of productive resources such as land (only 15 per cent in the State, most small or marginal holdings), technology, capital, and agricultural services like credit and training necessary for increasing yields and moving from subsistence to market-oriented production
- Women have limited access and lack of exposure to up gradation of technical skills, so more dependent on traditional skills due to this less contribution to commercial demand.
- Despite more work for longer hours when compared to male farmers, women farmers have much lower wage rates and, at times, remain unpaid.
- Women face many constraints in transporting their products to the markets. Since male members always dominate the decision-making bodies of the markets, women hardly get any chance to participate in marketing activities. All the wholesalers, big retailers, and aggregators are men, and only very few small vendors are women.
- Access to banking services: The number of women holding a bank account is much lesser than that among men.

- Limited skills: Women largely depend on their traditional skills, and therefore they are not able to fulfil the demand of the market as a result of which they are not able to upgrade their operations to commercially viable ventures.

Impact channels for women in Maharashtra

Substantial engagement of women has been observed in agriculture, horticulture, and the primary processing sector. Thus, the involvement of women in project activities is crucial. MAGNET will undertake specific gender actions to improve women's participation in horticulture value chains and implement a gender strategy, designed as per the World Bank's Gender Equity Model (GEM)³⁸. The actions will focus on gaining better access for women to improved horticultural practices and technology, entrepreneurship and employment opportunities in post-harvest processing segments, and markets.

As part of the gender strategy, MAGNET will take specific efforts to increase women's participation, including

Capacity Building support

- Training to raise awareness among women on market linkages, credit facilities, processing facilities, entrepreneurship.
- Training on leadership development and other soft skills, including negotiating skills support for dealing with all stakeholders (farmers, producers, facility centres, banks, government, traders, exporters, client)
- Ensuring trainings are organized at the block/ village level for maximum participation and convenience of women, as it is observed that women's participation is much lower when training is organized at the district level. Also, ensuring trainings are offered at convenient times for women to ensure attendance and offer transportation to and from facilities. Finally, childcare at training facilities during training will also be provided.
- Building their capacity on production and post-production activities for ten-value commodities and improve their participation in priority value chains
- Strengthening their capacity towards market transactions by engaging them in ag-tech demonstrations and value-chain demonstrations
- Establish mechanism to enable women to start facility centres at the cluster level (cluster of villages) by providing soft loan, necessary permits, certification, and clearance from agencies

Land entitlement of women

- Due to lack of land ownership, women do not have access to extension services, credit, technology, Government schemes, and farmer collectives. If women had the same access to productive resources as men, they could increase yields on their farms by 20–30 percent. Land entitlement is a crucial instrument to enhance women's access to productive resources. The project will encourage / sensitization male farmers, to include the names of women in land-related documents. This will be as per the resolution of Maharashtra Govt. named "Laxmimukti" that requires the consent of men to enrol the name of women as a co-owner on the land title. The awareness about this GR, sensitization of men, networking with the Revenue department will be the strategy for this activity.

³⁸ GEM is a certification process for gender equity that promotes quality standards in key areas of industrial relations, such as selection and hiring processes, training policies, professional development, work-life balance and the prevention, handling, and follow-up of cases of sexual harassment

Credit Support for Women Farmers

- Women and men, farmers, need short-term credit to buy improved seeds, fertilizers, insecticides, and herbicides and to hire farm labourers to work in the fields and help with post-harvest operations. And they need long-term credit to invest in more efficient technologies - irrigation, labour-saving tools, and implements and transport - and to set up new enterprises if conditions are favourable - women are denied full legal status that would grant them loans. This limited, and often complete lack of, access to rural financial services hampers women's efforts to improve or expand their farm activities to earn a cash income.

Extension Support for Women Farmers

- Ensure that information on new technologies, plant varieties, and cultural practices reach women farmers. Mostly, the extension and training services are directed towards men, who own land and who are willing and able to obtain credit and invest it in inputs and technological innovations. Since women often lack access to land or access to other collateral with which to obtain credit, extension services, unintentionally, bypass women.

The detailed Gender Equality and Social Inclusion Action Plan is below, that will be implemented to promote women's participation under MAGNET.

Activities	Targets / Indicators	Responsibility	Timeframe
Output 1: Institutional capacities of agribusiness institutions and farmer producer organizations strengthened			
1. Ensure participation of women and scheduled tribes (ST) members of farmer producer organisation (FPO) in trainings towards good agricultural practices and post-harvest management.	1. Of the minimum 34,000 members of FPOs and value chain operators (VCOs) reporting increased knowledge on good agriculture practices and post-harvest management, at least 6800 or 20% are women and X ^a (number) or X% are STs) (2020 baseline: 0, 0, NA). 2. At least 30 women and X ST trainers trained from the targeted 250 trainers for 10 crops. (Baseline 2020: 0 and 0).	Maharashtra State Agricultural Marketing Board (MSAMB); project management unit (PMU); Gender and Social (GESI) expert; project implementation units (PIUs)	Completed by Q1 2021 Completed by 2027 Quarterly monitoring and reporting on achieved results
2. Disseminate information and ensure the participation of women and ST owned and-led FPOs in improving business and entrepreneurial skills and establishing linkages with organized markets and complying with export requirements.	3. At least 40 women-owned or -led and X ST-owned or -led FPOs supported by value-chain acceleration and market linkage services (Baseline 2020: 0 and 0, NA).	MSAMB; GESI focals, to be assisted by GESI Expert; PMU; PIUs	
3. Facilitate GESI capacity development training and consultation with FPO and VCO members to improve horticulture value chain (HVC) participation.	4. Average percentage members in FPOs increased to at least 15% women and X% STs (Baseline 2020: 13%, X%) ^b . 5. Average board of directors' representation in assisted FPOs raised to at least 8% women, X% STs (Baseline 2020: 6%, X%).	PMU; GESI expert, PMU in consultation with PIUs	
Output 2: Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened			

Activities	Targets / Indicators	Responsibility	Timeframe
4. Facilitate women and ST - owned or -led FPOs and VCOs to avail of financial intermediary loan (FIL) and matching grant.	6. Financial support (FIL or matching grant) provided to at least 40 women and X ST -owned or -led FPOs and VCOs (FPOs with both women and STs cannot be double counted) (Baseline 2020: 0, 0). 7. At least 20% of the total financial support allocated to women-led/owned FPOs or VCOs -and sub-borrowers and X% to ST- led/owned FPOs or VCOs -and sub-borrowers (Baseline 2020: 0, 0). 8. Financial intermediaries and PMU implement GESI provisions in sourcing FPOs and VCOs e.g., GESI-sensitive outreach strategy.	Participating FIs; environmental and social management system (ESMS) coordinator to be supported by GESI expert, PMU; MAVIM	Completed by 2027 Quarterly monitoring and reporting on achieved results
5. Promote employment opportunities for women and STs in the HVC of the Maharashtra Agricultural Network Project (MAGNET) subprojects.	9. At least 2,000 jobs for women and X jobs for STs generated by the project and its outputs (Baseline 2020: 0, 0).	MSAMB; GESI focals; PFI; ESMS coordinator	
Output 3: Agriculture value chain infrastructure improved and operational			
6. Ensure that construction activities abide by core labor standards including OHS, prohibition of child labor and GESI related aspects.	10. Adequate facilities and separate women/men toilets exist in each construction site for labours. 11. Orientation sessions on labour standards/equal wages/OHS and awareness on STI (incl. HIV) prevention, human trafficking, sexual harassment, exploitation and abuse targeting 10 sessions from PMU/field office, staff/contractors. ^c	MSAMB; GESI focals; PMU; Contractor	Completed by 2027 Quarterly monitoring and reporting on achieved results
7. Ensure 19 MSAMB and 1 National Institute of Post-Harvest Technology (NIPHT) facilities rehabilitated or developed with GESI inclusive design to be climate/disaster resilient and energy efficient.	12. All 20 facilities rehabilitated or developed to be climate/disaster resilient and energy efficient with GESI-sensitive design including: accessible/friendly to women and persons with disabilities (ramps, accessible toilets); assuring a safe work environment ^f for women, including separate bathrooms ⁱⁱ e	PMU; GESI expert, in consultation with GESI focals, MSAMB; Contractor	
8. Promote and monitor jobs for women and STs working with MSAMB and NIPHT facilities in the HVC.	13. At least 30% direct incremental jobs for women and X% for STs in the HVC created by 20 facilities; (Baseline 2020: 22% of 558 workers in 16 projects of the facilities are women, X% are STs).	MSAMB, PIUs, lessees; GESI Expert, PMU; GESI focals	
B. Gender actions related to project management			
9. GESI budget and staffing established for the implementation and monitoring of GESI action plan (GESI/AP).	14. Adequate budget allocated and disbursed in a timely manner for GESI/AP successful achievement of activities and targets. 15. One (1) GESI focal point deputed as a core team member: (i) at PMU; and (ii) PFI; and Eight (8) at the PIU (one for regional level); one (1) Social Specialist and one (1) GESI expert hired at PISC.	PMU, MSAMB and project implementation units (IAs)	Completed by 2027 Quarterly monitoring and reporting on achieved results
10. Ensure GESI-sensitive project implementation, monitoring and reporting.	16. At least two (2) GESI training workshops each for PMU, PIUs,	PMU; GESI Expert, in consultation	Training 1 completed: Q1 2021; Training

Activities	Targets / Indicators	Responsibility	Timeframe
	participating FIs, IAs, and contractors conducted. 17. At least 80% of project staff participated in the workshops.	with GESI focals	2 completed: Q3 2022.
11. Ensure baselines established, and regular collection and maintenance of sex, age, ethnicity, caste, tribal, and geography -disaggregated data and results established.	18. One baseline survey conducted with established sex, age, ethnicity, caste, tribal, and geography -disaggregated data and detailed social analyses, which identify key ST inequalities and enable the team to set appropriate ST percentages and for the above targets. 19. MIS with GESI indicators established including information disaggregated by sex, age, ethnicity, caste, tribal, and geography to ensure participation by target groups and increased understanding of other vulnerable groups e.g., youth.	PMU and PISC; assistance of the GESI focals	Complete by month 1 of project launch

FPO = farmer producer organisation; GESI/AP = gender and social inclusion action plan; IA= Implementing Agency; MSAMB = Maharashtra State Agricultural Marketing Board; NIPHT= National Institute of Post-Harvest Technology; PISC= Project Implementation Support Consultant; PIU = Project Implementation Unit; PMU= Project Management Unit; ST = scheduled tribe; VCO= Value Chain Operators

^a All "X" figures and percentages will be defined upon completion of target 18.

Per the Japan Fund for Poverty Reduction (JFPR), ADB funded project's end-term report, category wise participation of FPO member: SC 0.20%, ST 0.03% and 8.7 OBC.

^b At least one orientation in PMU and one in each Site office; and minimum 2 times over the project period to verify and ensure that conditions are met. The person in charge of giving the orientations sessions will be the GESI expert or an equivalent from the PIC.

^c All the project's supported facilities will ensure provisions for a lactation room (for nursing mother), safe transportation to/from work, drinkable water, time to rest, female officers for reporting and representation.

^d Women's bathroom with menstrual hygiene management including provision of sanitary machine and incinerator, adequate water and agents and spaces for washing and bathing and private disposal facility. The ratio of male and female facilities will be adjusted based on the number male and female workers

^e Provisions for minimum wage, equal pay, occupational accident insurance, protection from sexual harassment, necessary infrastructure (like drainage, lactation room) etc.

C. Environmental Safeguards and Initial Environmental Examination

Objective

Maharashtra Agribusiness Network Project (MAGNET) is proposed for funding by the Asian Development Bank (ADB). It is aimed at extending support to Maharashtra State Agricultural Marketing Board (MSAMB) for upgradation and improvement of post-harvest processing facilities primarily focusing on the ten horticulture crops. The project will focus on FPOs, including on small and marginal farmers (FPOs), and female farmers.

In order to improve the post-harvest processes for the given ten value horticulture chains, it is proposed (Output 3) that seventeen (17) existing facilities (cold-chains) of MSAMB will either undergo expansion of capacity (such as Cold Storage, Pre-cooling facility, sheds for holding trucks, and or establish training halls) and or undergo modernization to meet the current and future demand. Besides this, 4 altogether new facilities have been proposed at Baramati (district Pune), Pachod (district Aurangabad), new Training facility at Talegaon Dabhade (district Pune). Amongst these 3 new facilities the one facility at Pachod may be termed as under Green Category while the rest may be termed as under Brown Field category in terms of environmental aspects and impacts. Thus, there shall be 20 proposed projects in total for undergoing initial environmental impact assessment.

For this purpose, experts from M/s Grant Thornton India LLP, India has been appointed by ADB to refine the project design, conduct due diligence, and assess project feasibility in various aspects including environmental and social safeguard requirements under the law of the land as well as by ADB Safeguard Policy, 2009.

The findings of the present studies enabled to make IEE, which shall be a part of the Output 3 of the ADB grant in aid.

Environmental Category

As per the guidelines provided by ADB for the categorisation of environmental impacts associated with the proposed expansion and modernization all of the proposed projects (as above) fall under category B by the virtue of the nature of reversible nature of environmental impacts in light of the proposed mitigation measures and environmental management plan (EMP) formulated considering the individual impacts. The basis of the fact is the entire work of existing building construction has been already over some time back, which shall not at all contribute, to the impact anticipated due to the proposed expansion and modernization proposed. The incremental environmental load or impact shall be minimal for the gamut of proposed activities associated.

Methodology-Baseline Survey

In order to accomplish the studies associated for conduction of environmental impacts, site visits were made by the Environment and Social Specialist along with experts from GT associated for the purpose, in the month of January and February 2020. The site visits consisted of due diligence of physical examination of every MSAMB facility split up into each and every individual unit operations being carried out at the concerned MSAMB facility. Details -such as land holding status for the particular facility, whether operated by MSAMB by in-house staff or by the concessionaire appointed by MSAMB through public auction for managing and operating the particular facility. Site details such prevalent practices of solid waste disposal, handling, sewage disposal, waste water management, electrical equipment layout, study of electrical and air conditioning ducts and their wiring associated safety, adherence to workers safety aspects such as use of personal protection equipment (PPE's -eyes, ears, hands etc.), were noted. In particular, for the irradiation facility (IFC) at Vashi (Navi Mumbai) for the irradiation using radioisotope Co60+ for treatment of vegetables, fruits, groceries etc. for export orientation was made. The prescribed nuclear radiation safety guidelines by Atomic Energy Regulation Board (AERB) and the manufacturer of equipment - Bhabha Research Industrial Technology unit (BRIT) were understood and noted. Most importantly, the MSAMB facilities operate under the guidelines of Agriculture Produce Export Development Authority (APEDA) for the processing of the fruits and vegetables handled for export orientation. The requirement and compliance to the individual guidelines and standards practised under these guidelines were studied and noted. The quality standards maintained as required for meeting export to respective destination countries was noted to know the flow sheet of process followed in each individual MSAMB facility. The guidelines of APEDA forms the basis of process undertaken in processing of fruits and vegetables from receiving at the MASMB facility until it despatch either to Port/airport for export or for inland destinations which are governing the entire quality aspects of fruits and vegetables handled.

Topography, broad land use, soil types as seen, floral and faunal assemblage of area around the site and in the neighbourhood was ascertained from the people around and the staff of MSAMB present at the site. Similarly, the sources of supply of utilities such as electricity and water, presence of green belt or tree cover was collected. The good practices of environmental management such as rainwater harvesting structures and schemes if any in operation and proposed were discussed and physically verified for confirming their efficiency. Other broad environmental parameters such as ambient air quality, noise levels within and outside the premises were judged during the visits.

The remaining details viz. secondary data pertaining to actual ambient air quality (ground level concentrations of PM10, PM2.5, NOx, SO2, and CO), ambient noise levels, water quality (surface and ground water depending upon

the source of supply), soil aspects, sewage treatment and disposal, rainfall pattern, wind activity, max-min temperature, earthquake history for intensity and potential for occurrence, proximity to sensitive areas such as forests, wild life sanctuaries and migration corridors, endangered species of both floral and faunal species as per International Union for Conservation of Nature (IUCN) and guidelines of Government of India-Ministry of Environment, Forest and Climate Change (MoEF&CC) have been covered. Based on the assessment of each associated impact on every aspect of eco-system, mitigation measures have been prescribed to be implemented and detailed EMP has been formulated considering the impacts vis-à-vis the cause.

In order to assess the impact which shall be of lesser magnitude in the light of very small or limited construction activities proposed than the entire structures themselves which have been completed earlier, the radius of influence of the proposed activities (covering earthwork, debris generation, transportation of raw materials and other materials, movement of trucks etc.) has been considered as 500 meters from the existing MSAMB facilities. Therefore, the impact zone shall be within 500 m from the proposed activities. The construction phase impacts shall be limited in intensity and temporal scale while the impacts during the operation stage shall continue with the due course of time.

The entire state of Maharashtra has prevailing tropical climate with harsh summer period. This is the root cause of all calamities. Rains are heavy in particularly western parts causing floods followed by droughts in later periods. However, the silver lining is that the entire state of Maharashtra is underlain by basaltic rocks, which are impervious for water retention but are excellent in enabling formation of fertile black cotton soil which is basic to grow so many varieties fruits and vegetables which is a unique feature of agriculture and horticulture of Maharashtra.

Findings and Interpretations

The collation of data collected during site visits and through secondary sources has resulted in drawing firm interpretations and conclusions. The proposed expansion and modernisation of the existing facilities shall cause marginal incremental changes environmental impacts as these activities are relatively very small in scale and magnitude. Also, owing to the virtue of marginal nature of activities (viz. earth work, construction, debris solid waste generation, transportation of raw materials and solid waste etc.), the overall impact on the environment shall be small as the major construction activities in raising the existing buildings and structures has been over a period ago due to which the impact associated with those activities has already been assimilated in the eco-system and only the fractional fresh impacts shall be causing the marginal incremental environmental load or impact. Also, the temporal scale involved (for building construction activity) shall be small due to which the impact occurred shall be lesser in magnitude.

In case of new proposed MSAMB facilities namely at Pachod (FPC), the impacts shall be full-fledged in the sense they shall be relatively larger as compared to the rest of existing facilities expansion and modernization. This is due to the fact that except these 2 facilities rest of the proposed activities shall be totally restricted within the existing land owned or leased out to MSAMB and as such shall not lead to change in land use or land scape or even shall not impact other sensitive aspects such as flora and fauna, ambient air quality, noise levels and water regime (either surface or ground water).

Most of the MSAMB facilities use ground water or bore well as source of water supply while the remaining get piped water supply from the local municipal sources or concerned industrial estate sources. Again, water is used in a few facilities where hot water is required to wash off the fruits or vegetables. Therefore, use of water shall be limited from process point of requirement while the main use shall be for drinking and hygiene purposes. Further mitigation and EMP measures have been adequately and appropriately formulated to take care of the quantitative aspects of use of

water. For e.g. it has been prescribed to implement rain water harvesting and artificial ground water recharge which shall take care of water withdrawals and usage. Certain features such as compliance to National Building Code of India with regards to designing of building structures incorporating relevant BIS (Bureau of Indian Standards) codes and especially such standards as to satisfy the designing structures for withstanding earthquake in the region of likely intensity as specified by NDMA (National Disaster Management Authority) and associated likely damages.

Certain other good practices such as- plantation of peripheral green belt, recycling of waste water for use in irrigation of green belts, reuse of debris generated during proposed building construction, reuse of top soil removed during earth works for spreading over landscaped surfaces using debris and solid wastes, use of water bowsers during earth working phase, composting of biodegradables such as fruit wastes, dressings, food waste etc. within a remote corner of the premises have been prescribed. Also, avoidance of use of explosives and blasting during removal of hard rock surfaces for excavating foundation shall prevent damages due to ground vibrations and excessive air blasts, which may damage rural weaker houses and structures. The development of green belt shall help to attract local bird species in adopting it as new habitats and enhance the landscaping and aesthetics of the area. Besides these advantages, the tree cover in due course of time shall serve dual purpose of suppressing dust particulates and noise levels.

The health and safety aspects are presently taken due care of operations either by the MSAMB staff or by the respective concessionaire and due adherence to prescribed guidelines especially in case of handling and administering of doses of radiations of Cobalt Co+60 isotope shall be preventing likely mishaps.

Conclusion

The proposed activities of expansion and modernization forming the major part of the proposed project shall be producing a marginal impact on the environment or eco-system more precisely being lesser in magnitude, shorter in temporal scale and more importantly having appropriately been planned with appropriate mitigation and EMP measures, what so ever impact that may be created, shall be adequately addressed and shall be reversible in nature to dynamically tune up with the nature.

Only in case of the new proposed facility at Pachod it shall of concern being altogether fresh or new in place for which the magnitude of impact shall be relatively higher than the rest of the work. However, with given mitigation and EMP measures, the impacts shall be majorly neutralized and find in harmony with the nature.

Lastly in but not the least, in order to with stand the financial requirement during the implementation of mitigation and EMP measures, adequate budgetary provisions have been made to take care of the required activities foreseeing the repetitive and temporal demands.

In nutshell, the construction phase impacts shall be relatively larger than those during the operation phase. The construction phase shall have such activities, which cause environmental impacts more than the caused during the operation stage. The operation stage shall cause certain incremental impacts such as noise and withdrawal of water (either from surface or from ground water regime) which form the core impacts to be noticeable. However due to the care being taken during the mitigation measures and in EMP in particular to minimise the impacts. Amongst the two impacts named, the development of green belt shall take care of noise suppression while the impact concerned with water shall be more due to the fact that the entire region of Maharashtra has prevailing tropical climate and due to the peculiar nature of underlying predominant rocks of basalt (which forms an almost impervious zone for ground water retention owing to its geological nature) all over the state, water has become the dwindling natural resource. Drought like situation is prevalent in most parts of the state and in the light of this the recommended rainwater harvesting

schemes shall certainly add up for water conservation and also the same schemes are so designed as to recharge the ground water regime in the maximum way it could be.

D. Climate Risk and Vulnerability Assessment (CRVA)

Maharashtra continues to embrace impacts of climate change almost every season and year on year basis at different parts of the State differently. While regions of Marathwada and Vidarbha confronts drought in every summer, the Konkan region which is the coastal belt of the State experiences flood during heavy rainfall coupled with high-tide. In past two decades the State have been recording events of heatwaves in summer in the regions of Marathwada and Vidarbha causing harm to human health.

Horticulture production including post-harvest operations are highly sensitive to climate. It is affected by the long-term shifting trends in average rainfall and temperature, interannual climate variability, climate shocks during specific phenological stages, and extreme weather events. While temperature shocks to an extent is uncontrollable during cultivation, absence of rainfall or delay in arrival can still be managed through proper irrigation system.

Impact of climate change on horticulture crop cultivation is well understood and many crop specific scientific data are also available. Climate impacts on post-harvest operations, starting from the time of harvest till the crop reaches the market, has not been vividly studied.

Climate Risk Screening

The project has been screened for climate and disaster risk using the World Banks Group's Climate and Disaster Risk Screening Project Level Tool³⁹. The Climate and Disaster Risk Screening Tool provides high-level screening to help consider short to long-term climate and disaster risks at an early stages of project design/ preparation. The tool applies an Exposure–Impact–Adaptive capacity framework to characterize risks. Potential risks have been identified by applying the tool and collecting data and information on climate and geophysical hazards from various scientific researched carried out by the State of Maharashtra (under Maharashtra State Adaptation Action Plan for Climate Change (MSAAPCC))⁴⁰ and by other independent research institutes and think-tanks. Detailed assessment report has been presented in Annexure as Climate and Disaster Risk Screening Report for Maharashtra Agribusiness Network Project (MAGNET), India.

Temporal Scale – Based on MSAAPCC - respect to the model baseline, which was the average climate during 1970-2000, and for projections future time slices of 2030s (2021-2040) and 2050s (2041-2060) have been referred. The model has used hydro-meteorological data recorded by India Meteorological Department, Government of India.

Geographical Scale - As described earlier, the 21 project sites are scattered in various districts of Maharashtra, which are characterized by physiographic and climatic variations. The state has diverse ecosystems with their inherent assortments of risks under climatic as well as non-climatic exposures and with differential vulnerability profiles. Project sites are located at the following districts of the State as shown in Figure below – Mumbai City and its suburban (GMMR). Thane, Nashik, Pune, Sangli, Jalgaon, Aurangabad, Jalna, Beed, Latur, Nanded, Amravati, and Wardah.

Maharashtra has typical monsoon climate, with hot, rainy and cold weather seasons. Tropical conditions prevail all over the state. March, April and May are the hottest months with temperature reaching as high as 47degC in some areas. Rainfall starts normally in the first week of June. July is the wettest month, while August to get substantial rain.

³⁹ <https://climatescreeningtools.worldbank.org/>

⁴⁰ <http://krishi.maharashtra.gov.in/Site/Upload/Pdf/MSAAPC.pdf>

Monsoon starts its retreat from September. Rainfall in Maharashtra differs from region to region. Thane, Raigad, Ratnagiri and Sindhudurg districts (all coastal districts), receives heavy rains of an average of 200cm annually. But the districts of Nasik, Pune, Ahmednagar, Dhule, Jalgaon, Satara, Sangli, Solapur and parts of Kolhapur get rainfall less than 50cm annually. These regions are generally characterized by extreme aridity, hot climate, and acute deficiency in water availability. Maharashtra is bordered by the Arabian Sea to the west and has a long coastline stretching nearly 720km along the Arabian. Coastal belt is generally flooded due heavy rain, poor drainage at the creeks and unprecedented slum dwelling.

According to State Disaster Management Plan of Maharashtra, the projected Hazard Vulnerability Profile suggest that the State is highly prone to drought (52% of the State is annually hit by drought), whereas the coastal districts are flood prone and faces serious concern of sea-level rise, cyclone and storm surges. District of Ratnagri, and some parts of Thane district are susceptible to earthquake and falls under earthquake zone IV.

The climate modelling results mentioned under MSAAPCC show that temperature and rainfall are projected to increase all over the state though there will regional variations. Over time, the projected rise in mean temperature is greater for the 2070s, as compared to the 2050s and then 2030s. Amravati and Aurangabad divisions may experience a greater rise in annual mean temperature than other parts of the state. The projected increase in monsoon rainfall by the 2030s and 2050s is relatively more for Amravati and Nashik divisions, though divisions like Konkan and Nagpur receive, and are projected to continue to receive, more rainfall in absolute terms. This overall increase in monsoon rainfall for the state is consistent with the findings of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Sea level rise analysis is based on Maharashtra coastline studies. Historical analysis of 100-year tide gauge data⁷ and 17-year satellite data showed a sea level rise of 0.13-2 cm per year. In the future, global mean sea level is projected to increase by 30 cm to 55 cm by the end of the 21st century for a medium range climate change scenario (RCP 4.5). Though there may be some regional variations, about 68% of the world's coastlines are projected to experience sea level rise of within $\pm 20\%$ of this range for this scenario. This corresponds to a range of about 24 cm to 66 cm for the Maharashtra coastline by end of 21st century. Moreover, global models predict that this sea level rise could be accompanied by increase in wave heights, increase in wind speeds, and greater storminess and storm surge. This accentuates the danger of coastal inundation if high precipitation event, high tides and hydro-meteorological weather events like storms etc. are concurrently observed.

Table below illustrates climate and geophysical hazards exposure matrix. The colour indicators suggest: **Yellow as – low risk**, **Orange as –moderate risk**, **Red as –high risk**, and **Green as – no/ low risk**.

Table 7: Climate and geophysical hazards exposure matrix for sub-projects in MAGNET under Output - 3

Climate And Geophysical Hazards							Geophysical Hazards
	Extreme Temperature	Extreme Precipitation and Flooding	Drought	Sea Level Rise	Storm Surge	Strong Winds	Tsunami
Current	Yellow	Orange	Red	Orange	Green	Grey	Orange
Future	Orange	Red	Red	Red	Yellow	Grey	Orange

The district-wise Hazard-Impact matrix indicates which sites are likely to experience climate change in what form.

Table 8: District-wise Hazard-Impact matrix for project sites under Output 3

Impact Hazard Matrix (for 2030s)	Increase in Temperature ⁴¹	Heat Wave ⁴²	Increase in Precipitation ⁴³	Extreme Rainfall	Dry spells	Drought	Flooding from precipitation	Sea Level Rise
MMR	✓	✓						
Thane	✓	✓						✓
Nasik	✓	✓	✓	✓		✓		
Pune	✓				✓	✓		
Sangli	✓				✓	✓		
Jalgaon	✓	✓	✓	✓		✓		
Aurangabad	✓			✓		✓		
Beed	✓			✓	✓	✓		
Latur	✓			✓	✓	✓		
Jalna	✓			✓	✓	✓		
Nanded	✓				✓	✓		
Amravati	✓					✓		
Wardha	✓	✓				✓		

Sensitivity of post-harvest operations and infrastructure to climate/ weather conditions and sea level is as follow:

- Increasing temperature impacting horticulture produce and production level in general has indirect impact on the operations of the post-harvest facilities;
- Erratic rainfall trends causing either delayed monsoon or prolonging it leading to demand-supply imbalances of horticulture produce may cause business disruptions of the facilities;
- Summer temperature extremes resulting in heatwaves has impacts on human health, thus impacting the productivity of the post-harvest facilities;
- Increased risk of drought conditions in the regions of Marathwada and Vidarbha. Units located in such regions are likely to face water-scarcity having dependent on groundwater and compete with the local community for the share of common resources;
- Increase in surface flash flood and highly intensive rain at coastal region is likely to inundate the area – only one greenfield project (Bhiwandi unit) has been proposed in such area;

Impact of Climate Change on Post-harvest Operations and Infrastructure

The proposed infrastructure development under Output 3 includes development in two (2) new facilities as green-field projects⁴⁴, two (2) new facilities as brown-field expansion⁴⁵, upgradation of sixteen (16) facilities in regard to technological upgradation and automation, and lastly expansion of training facility (both physical and equipment expansion) within the existing campus of National Institute of Post-Harvest Technology. These facilities are primary processing units, wherein only sorting, grading and packing of the fruits and vegetables takes place. In some of the pack houses ripening chambers are available, depending on the crop regions – such as in case of banana and

⁴¹ Increase in temperature by 1.2 to 1.5deg C

⁴² Heat Wave – derived based Heat Index: an index that combines air temperature and relative humidity in an attempt to determine the human perceived equivalent temperature- how hot it feels, termed as the felt air temperature

⁴³ Increase precipitation – monsoon rain

⁴⁴ No MSAMB activities has been registered before

⁴⁵ Expansions are taking place at the existing premise of MSAMB, adjacent to existing facility.

mangoes. There are only two irradiation facilities – one existing in Vashi, suburbs to the city of Mumbai (under Mumbai Metropolitan Development Region) and another proposed in Thane district. Both the facilities are export oriented. Thus, these facilities have no significant direct interaction with climatic elements as compare to its upstream activities of horticulture crop production.

Water usage in these facilities is limited to floor washing, washing of some equipment such as packing benches and usage for toilet purpose. The energy footprints of these facilities are also less as compare to secondary food processing units. Thus, exposure of these units to climate change is low and therefore at less risk. However, the new Irradiation Unit, to be located at Bhiwandi taluka of Thane district, has high exposure to coastal flooding. Detail assessment has been presented in Box 1 later in the Chapters.

These units however, due to their geographical placement in drought prone areas are likely to experience water scarcity in near future. Most of these units depends on groundwater as the source of water except for units at Pune, Sangli, Vashi and Thane. The later units are supplied with piped water by local authority. Facilities those that depending on ground water may have to invest in digging wells as water table further goes down. And, other facilities those that are dependent on pipe water supply may have to pay more for the same quantity.

Indirect Impacts leading to operational vulnerability and or business losses- The outcomes of the risk screening indicate that all project locations are vulnerable to constant rise in temperature. The energy demand of the post-harvest facilities is likely to increase with increase in temperature. Thus, translating into more operational cost. Further, in absence of reefer trucks the crop being transported in normal trucks are likely to have more exposure to high temperature and events of heat-wave. This can lead to crop losses, thus indirectly impacting post-harvest businesses, primarily the value chain operators. Increase in temperature and heat-wave may also reduce the productivity of the labourers working in the facilities. This in turn may reflect as operational delays and therefore impact the overall turnover of the businesses.

Adaptation and Mitigation to Climate Change

The project focuses on enhancing climate resilience in post-harvest facilities and operations. Post-harvest losses in the State could be reduced by improving infrastructure, increased investment in the cold chain facilities, improved regulations on extraction of natural resources such as water, and better forecasting of weather and technological innovations such as solar power reefer trucks, decentralised solar power cold-storages, and rainwater harvesting systems. A few case studies on innovative technologies relevant to the project have been presented in later chapters. Adaptation options that have been identified based on CRVA outcomes, study of the options available and after consulting with MSAMB.

Rain-water Harvesting

For the units located at drought prone region, rainwater harvesting has been proposed as an adaptation measure to climate change. Rainwater harvesting will not only support the facility's requirement but also recharge the local aquifer acting as a natural water storage facility for groundwater. In absence of pipe water connection, the communities habiting the place also depends on groundwater for their daily need. Thus, recharging the aquifers will enable the communities to some extent develop resilience to annual drought events.

Based on the calculation, it is estimated that about 32million litres of rainwater can be harvested annually across the State through the MSAMB facilities. This can serve about 162 family of four members consuming 135liter per capita per day (lpcd).

Solar Rooftop Power Generation

Post-harvest technologies require energy to run and operate. Solar rooftop power generation has been identified as a mitigation measure to be installed at new facilities being proposed under MAGNET. New facilities at Pachod and Baramati will install unit capacity of 60kW and 300kW respectively. It is estimate that the units will generate 9.75MWh and 450MWh of electricity respectively leading to replace 1% and 20% of energy demands of the sites. This will not only show a positive change in carbon-footprint of the facilities, but also allow equivalent electricity be available for the community usage and reduce grid load. Over the life time both the units' together will save 10578 tCO_{2e} of greenhouse gases.

Soft measures

Resilience can also be strengthened through non-engineering measures. Enhancing the knowledge of the FPOs/ FPCs and the value chain operators on the issues of climate change and the available means and measures to adapt to the such changes and or measures to mitigate the causes, can strengthen the overall sector capacity to combat climate change as well as alleviate poverty.

Climate Finance

The overall contribution to ADB's climate finance counting stands to be about USD 0.48 million as capital cost invested to implement the hard-core measures. Several soft measures, such as green-belt development, appropriate waste management and capacity building on climate issues and environmental conservation has also been identified and incorporated into project's Output delivery.

Measure	Capital Cost (million INR)	Capital Cost (million USD) ⁴⁶
Rainwater Harvesting	21.85	0.295
Rooftop Solar System	13.68	0.184
Total	35.53	0.479

E. Environment and Social Management System (ESMS)

Scope and Applicability

For projects involving the investment of ADB funds, to or through, financial intermediaries (FI), ADB conducts safeguard due diligence to assess the potential environmental and social impacts and risks associated with the FI's existing and future portfolio, and its commitment and capacity to manage social and environmental issues. All participating FIs will have to ensure that their investments follow applicable national laws and regulations, including prohibited investment activities (as prescribed by ADB and listed under Step 2 of ESMS framework) to subprojects financed by ADB's fund. Where the FI's investments have minimal or no adverse environmental or social risks, the FI project will be treated as a category C project and need not apply any other specific requirements. All other FIs projects will be required to implement the proposed Environmental and Social Management System (ESMS).

The ESMS will act as a guiding document, outlining procedures, and appropriate institutional arrangements for setting "commitment policy." It will assist in the identification of adverse impacts and mitigation measures to avoid, minimize, mitigate, and or compensate adverse impacts, along with monitoring, reporting, and grievance redressal modalities.

⁴⁶ Where 1USD = 74.93

The objectives of the environmental and social management system are:

- To avoid, and when avoidance is not possible, to minimize and mitigate or offset adverse impacts of subprojects on the environment and affected people; and
- To maximize opportunities for environmental and social benefits.

The partnering Banks / FIs and MSAMB are required to implement the ESMS being designed by TRTA team. MAGNET Society will provide support to the FIs in implementing the ESMS. As per the ESMS arrangement the ESMS coordinator will be responsible for its effective implementation. However, in the case of an existing ESMS, ESMS coordinator, Bank /FIs will assess its applicability to project activities and undertake modifications, if needed.

Based on the initial discussions with select Banks, it is assessed that most of the Banks / FIs will be required to develop an ESMS to manage and monitor the environment and social impacts.

In the absence of an ESMS, as a minimum, all partner Banks and MSAMB will be required to follow the following six steps:



Implementation and compliance with the ESMS will be a prerequisite for loan disbursement, and all the proposals / sub-projects will be screened by the Social Expert, within each Bank/FI in consultation with the PMU. The summary of the sub-projects will be shared with PMU and ADB for information and approval.

While the participating Banks should have an ESMS implemented before disbursement, we propose that having and implementing an action plan to gradually implement an ESMS will be a more realistic scenario. Defining and implementing an ESMS takes a few months as embedding such a system into operations takes time. Thus, ESMS adoption and implementation plan will be prepared, such that the PMU of Project MAGNET can work participating Banks in institutionalizing ESMS. The Model ESMS and ESMS for Matching Grant, Bank of India and Samunnati Financial Intermediation and Services Private Limited is annexed.

9. Design Monitoring Framework

The overall impact objective for this project, set out by ADB, is to achieve an average agriculture sector growth rate of 5 per cent in the State, promote agriculture produce export, and establish fair, competitive and accessible agriculture markets which is line with the Vision 2030. This section details out a dedicated and logical framework for the project's overall monitoring and impact measurement. Taking inspiration from the Concept Paper for MAGNET issued by ADB, as also the 'Strategy 2030 Corporate Results Framework of the Bank, we have designed an overall project design monitoring framework (DMF). We have adopted various results framework indicators from the 7 operational priorities and the 22 pillars finalized by ADB under the Strategy 2030 framework. As applicable for MAGNET, the DMF takes into account the importance of measuring various key indicators across the results chain of outcomes-outputs-key activities-inputs as defined by ADB. Following shall be the proposed DMF for the project:-

Results Chain	Performance Indicators	Data Sources and Reporting Mechanisms	Risks and Critical Assumptions
Outcome	By 2028		
Maharashtra's horticultural production value and FPOs' profits increased	a. Production of horticulture crops in Maharashtra increased by 5% (FY2020 baseline: 24.3 metric tons)	a. State of Maharashtra (annual publication of <i>Economic Survey of Maharashtra</i> , data will be taken from Horticulture Area Production Information System)	A: Relevant national and state governments' initiatives substantially implemented
	b. Nominal gross state value added by crop production in Maharashtra increased by 5% (FY2019 baseline: INR 1.335 trillion)	b. State of Maharashtra (annual publication of <i>Economic Survey of Maharashtra</i>)	
	c. Annual profits of the FPOs supported by the project increased by 10% in average (2021 baseline: to be measured)	c. MAGNET Society and consultant's quarterly report on FIL and matching grant recipients	
	d. Horticultural food losses reduced by 8% in participating FPOs (2021 baseline: to be measured)	d. Consultant's surveys to beneficiaries to be included in consultant's quarterly progress reports	
Outputs	By 2027		
1. Institutional capacities of agribusiness institutions and farmer producer organizations strengthened	1a. At least 34,000 members of FPOs and VCOs (at least 20% are women) reporting increased knowledge on good agriculture practices and post-harvest management (2020 baseline: 0, NA) (OP 2.3.1)	1a. Survey of workshop participants to be included in consultant's quarterly progress reports	A: Government counterpart funds are disbursed in a timely manner based on the project needs
	1b. At least 200 FPOs (at least 20% are women-owned or -led) supported by value-chain acceleration and market	1b. Consultant's quarterly progress reports	R: Financial intermediaries cannot provide subprojects meeting the project's eligibility criteria and

	linkage services (2020 baseline: 0, NA)		ESMS arrangements due to unexpected economic or financial situations
2. Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened	2a. At least 10,000 jobs (at least 20% for women) generated by the project including other outputs (2020 baseline: 0, NA) (OP 1.2, OP 2.1)	2a. Consultant's surveys to beneficiaries to be included in consultant's quarterly progress reports	
	2b. Financial support (FIL or matching grant) provided to at least 300 FPOs and value chain operators, of which at least 40 FPOs are women-owned or -led (2019 baseline: 0, 0) (OP 1.2.1, OP 1.3.2, OP 2.1.3)	2b. Consultant's quarterly progress reports	
3. Agriculture value chain infrastructure improved and operational	3a. Nineteen MSAMB facilities rehabilitated or developed with gender inclusive design to be climate/disaster resilient and energy efficient (2020 baseline: 0) (OP 1.3.1, OP 3.1.3, OP 3.2.5, OP 5.1.1)	3a. Consultant's quarterly progress reports	
	3b. NIPHT facility improved with women- and PWD-friendly design (2020 baseline: 0) (OP 1.3.1, OP 3.1.3, OP 3.2.5, OP 5.1.1)	3b. Consultant's quarterly progress reports	

Key Activities with Milestones

1. Institutional capacities of agribusiness institutions and farmer producer organizations strengthened

- 1.1 Prepare workshop materials (Q3 2021)
- 1.2 Conduct workshops to FPO and VOC beneficiaries (Q4 2021–2027)
- 1.3 Provide hand-holding support to MAGNET Society and other staff (Q2 2021–2027)

2. Financial and agribusiness capacities of farmer producer organizations and value chain operators strengthened

- 2.1 Approve subprojects and disburse matching grant (Q4 2021–2027)
- 2.2 Approve subprojects and disburse FIL (Q4 2021–2027)

3. Agriculture value chain infrastructure improved and operational for the target horticulture crops

- 3.1 Conduct works for MSAMB facilities (Q2 2021–2023)
- 3.2 Conduct works for NIPHT facilities (Q4 2021–2023)

Project Management Activities

Recruit and mobilize consultants (Q2 2021)

Engage and mobilize contractors for works (Q2 2021–2022)

Inputs

ADB: \$100.0 million (loan)

Government: \$43.2 million (including \$0.3 million in-kind contribution to the technical assistance)

Technical assistance (TASF-Others): \$1.0 million

Japan Fund for Poverty Reduction: \$3.0 million

A = assumption, ADB = Asian Development Bank, ESMS = environmental and social management systems, FIL = financial intermediation loan, FPO = farmer producer organization, MAGNET = Maharashtra Agribusiness Network Project, MSAMB =

Maharashtra State Agricultural Marketing Board, NIPHT = National Institute of Post-Harvest Technology, OP = operational priority, PWD = persons with disabilities, R = risk, VCO = value chain operator.

^a State Government of Maharashtra, Planning Department. 2017. *Vision 2030*. Mumbai.

Contribution to Strategy 2030 Operational Priorities

Expected values and methodological details for all OP indicators to which this operation will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President). In addition to the OP indicators tagged in the DMF, this operation will contribute results for

OP 2.1.4: Women and girls benefiting from new or improved infrastructure (number)

OP 3.1.1: Additional climate finance mobilized (\$)

OP 3.1.4: Installed renewable energy capacity (megawatts)

OP 5.1: People benefiting from increased rural investment (number)

OP 5.2: Farmers with improved market access (number)

OP 5.2.1: Wholesale markets established or improved (number)

OP 5.2.2: Storages, agri-logistics, and modern retail assets established or improved (number)

OP 5.2.3: Agribusinesses integrating farmers in efficient value chains (number)

OP 5.3.3: Commercial farming land supported (hectares)

OP 6.1: Entities with improved management functions and financial stability (number)

OP 6.1.1: Government officials with increased capacity to design, implement, monitor, and evaluate relevant measures (number)

OP 6.2.4: Citizen engagement mechanisms adopted (number)

Source: Asian Development Bank.

ⁱ All the project's supported facilities will ensure provisions for a lactation room (for nursing mother), safe transportation to/from work, drinkable water, time to rest, female officers for reporting and representation.

ⁱⁱ Provisions for minimum wage, equal pay, occupational accident insurance, protection from sexual harassment, necessary infrastructure (like drainage, lactation room) etc.