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A CEEW-VILLGRO INITIATIVE

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Can Small Horticulture Processors Enhance Rural Incomes?

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Highlights

Due to lack of adequate harvesting and post-harvesting infrastructure, an estimated 4.6–15.9 per cent of fruits and vegetables are wasted annually in India.

USD 954 million (INR 7,533 crore) is the total available market (TAM) for machines enabling decentralised processing of fruits and vegetables; this translates to more than **627,000** machines, impacting **1.3 million livelihoods**.

USD 158 million (INR 1,252 crore) is the TAM for machines enabling decentralised processing floricultural crops; which translates to more than **100,000** machines, impacting **200,000+ livelihoods**

For several fruits and vegetables, the market for processed products such as jams, candies, and juices is mature. However, entrepreneurs will have to develop and test value-added products for regional crops such as custard apple, jackfruit, and passion fruit to create a niche national and global market.

Processed food producers may explore supplier contracts with fast moving consumer goods (FMCG) companies to provide processed raw material.

They can leverage government initiatives such as the Prime Minister's Formalisation of Micro Food Processing Enterprise (PM FME) scheme and to tackle challenges such as financing, skilling, and common facilities.

Sources for datapoints are discussed on slide 12 and 16


Image: Istock

About this report

This report presents an insightful analysis of the value chain, market segmentation, and policy associated with small horticulture processors (SHPs). The report aims to boost sectoral growth by providing insights to entrepreneurs, investors, and policymakers targeting decentralised horticulture processing.

This market research is conducted as part of the Powering Livelihoods initiative

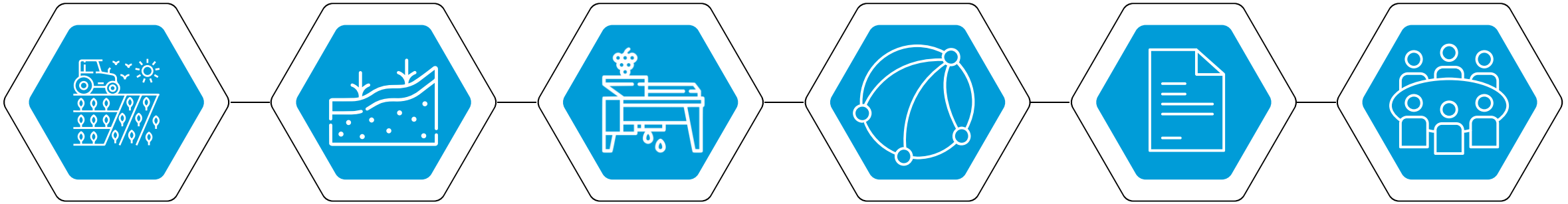
About Powering Livelihoods

Powering Livelihoods – a USD 3 million (INR 21 crore) initiative by CEEW and Villgro – is mainstreaming clean energy-based solutions in the rural economy. These solutions improve productivity, reduce drudgery and raise incomes. Examples include sub-HP solar pumps, small horticulture processors, hydroponics-based fodder grow units, cold storage units, dryers, etc.

It provides capital, technical, and sectoral growth support to help social enterprises to commercialise such solutions at scale in a gender-inclusive manner.

The research explores

Research questions



What is the current status of **horticultural crops processing** in India?

Can SHPs unlock processing at farm level?

What is the **potential market size for SHPs**?

Which major **market segments and geographies** can the SHP manufacturers target?

Which government **policies are relevant for such entrepreneurs**? Which ones are **gender-inclusive**?

What **business strategies** can SHP manufacturers adopt? Who are the **key competitors**?


Image: Wase Khalid, CEEW

Horticultural crop processing in India

- What is the current scenario of horticultural crops processing in India?
- What are the opportunities in the horticulture crop processing?
- How can small (multi-purpose) horticulture processors enable processing at the farm-level?

A solar-powered small horticulture processor, in picture used for juicing of mangoes, is an innovation the Powering Livelihoods team is taking to commercialization.

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Unlocking horticultural crops processing at the farm level

The food processing industry links two important sectors of the Indian economy—agriculture and manufacturing. Its key sub-segments include dairy, fruits and vegetables, poultry and meat processing, and marine products. In this report, we focus on the fruits, vegetables, flowers and medicinal plants.

India is the world's **second largest producer** of fruits and vegetables.[1] India produced 99.1 million metric tonnes of fruits and 184.3 million metric tonnes of vegetables in 2019–20.[2]

India produced **3 million** metric tonnes of flowers and **0.8 million** metric tonnes of aromatic and medicinal plants in 2019-20.[2]

In India, nearly 4.6–15.9 per cent[3] of fruits and vegetables are wasted due to poor harvesting and post-harvesting infrastructure.

Only 2.2 per cent[4] of fruits and vegetables in India are processed.

Currently, only about 10 per cent of the total agriculture output is processed. Indian government aims to expands it to 25 per cent by 2025.[4]

Access to small-scale food processing technology, at farm level, can help reduce farm loss and enhance rural incomes.[5]

1 Horticulture 2018; 2 Horticulture production; 3 MOFPI; 4 RBI Bulletin; 5 Authors' analysis and primary research

What are the opportunities in the horticulture produce processing value chain?[6]

Farm-to-fork value chain of horticulture produce: Key opportunities for intervention

Farming
Horticulture produce is grown by farmers for consumption, export, and processing

Primary Processing
The process involves cleaning, grading, and packaging.

Secondary Processing
The process involves making of pulp, flakes, paste, frozen products, and cutting and canning of the produce.

Tertiary Processing
The process involves producing juice, gel, soap, shampoo, extract, powder, chutney, jam, sweets, jelly, etc.

Packaging
The processed product is then packaged and stored.

Sales & Marketing
The packaged product is marketed and sold to the target customers.

Due to perishable nature of horticulture produce and lack of small-scale technology for processing them at the farm, farmers are often forced to sell their produce at lower prices when the demand is limited.

Key Intervention

Clean energy-based small horticulture processing machines can enable value addition at source and enhance additional income opportunities.

Value proposition

1. Reducing loss of horticulture produce.
2. Value addition at source.
3. Livelihood or income enhancement.

6 Authors' analysis

How do small processing machine enable decentralised processing?

Clean energy-powered small horticulture processors (SHPs) have broad applications due to their versatality to process a variety of fruits, vegetables, flowers, herbs and seeds at the farm level.

Fruits and vegetables:[8] Availability of speed control mechanism in SHPs enables the extraction of juices and pulps from a large variety of fruits and vegetables like **aloe vera, orange, guava, mango, custard apple, jamun**, among many others, without breaking their seed. The extracted pulps and juices can be either consumed directly or can be used in the making of products **like jams and chutney, soaps, facewash, hand sanitisers, powders, ice creams, etc.**

Floricultural crops:[8] Availability of temperature control and condensation mechanism in SHPs enables extraction of essence from floricultural crops like **flowers, aromatic plants, and medicinal plants** to produce essential oils. These essential oils are used in the manufacturing of personal care products such as **soap, shampoo, gel, and perfumes.** Some extracts and essential oils also possess medicinal properties; they can be therefore used for **bodily application or consumption**.

Technical specification[7]

- ✓ Volume: 12–130 litre
- ✓ Motor : 0.5–2 HP
- ✓ Juicing capacity: 50 litre/hour to 200 litre/hour
- ✓ Heater: 1.5–5 kW
- ✓ Condensation capacity: 1.5 litre/hour to 8 litre/hour
- ✓ Controller: Speed and temperature
- ✓ Price range: INR 75,000 to INR 1,90,000

Versatile
Extractions of juices, oils, and pulps from **100+** fruits, flower, and vegetables without crushing the seeds

User-friendly
Lightweight, portable, and easy to operate in smaller spaces

Customisable
Different sizing options; to meet demands of individuals, small groups, and large groups

Each machine enables income opportunities for 2–3 users[9]. Beyond operating the machine, the jobs include associated steps such as procurement of crops, primary processing (peeling, dicing), packaging, and sales.

7 Kissan Dharambir; 8 Authors' analysis; 9 Authors' analysis and primary research
SHPs: Small Horticulture Processors


Image: Istock

Market segmentation

- Who are the key target customers for SHPs
- How large is the market potential for fruit and vegetable processing machines in India?
- What is the serviceable market size for fruit and vegetable processing machines?
- Which districts are priority market for fruit and vegetable processing machines?
- What other processing opportunities can be explored?

A sweet made from guava.
Several fruits can be processed into jams and candies, using SHPs.

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Target customer segments for SHPs

Discussed below are the key customer segments that can be targeted for adopting SHPs, to process and add value to horticulture produce at the farm level.

Self-help groups (SHG)[10]

There are 7.6 million SHGs across India with over 75 million women members formed under the National Rural Livelihoods Mission (NRLM).

SHGs and encouraged to undertake various farm and non-farm livelihood activities.

SHGs can be a potential customer segment for SHPs.

Number of SHGs in states with high market potential*
Uttar Pradesh: 0.4 million
Andhra Pradesh: 0.7 million
Madhya Pradesh: 0.3 million
Bihar: 0.9 million

Farmer Producer Organisations (FPOs)[11]

The Ministry of Agriculture and Farmers' Welfare is encouraging the formation and promotion of 10,000 FPOs through Small Farmers' Agri-Business Consortium (SFAC).

Each FPO undertakes activities such as providing pre-harvest support, harvest support, post-harvest support, or marketing support for crops depending upon the local requirements.

Approximately 1,100[12] registered FPOs are engaged in harvest, post-harvest, or marketing of horticulture crops. These FPOs are potential customers for the clean energy-based processors.

Entrepreneurs and farmers[13]

Micro and small enterprises focused on food processing and personal care is another potential customer segment. Such enterprises may find the processors useful to expand their product portfolio.

Ayurvedic pharmas and religious groups manufacturing medicinal herbs and potions could be another customer segment.

Small pharmaceutical companies expanding into essential oils, village-level entrepreneurs, progressive horticulture farmers, restaurants, resorts, and juice and food joints are also potential customers for such processors.

Source: Authors' compilation

Partnerships with grassroots organisations—NGOs and other civil society organisations—that work with SHGs, FPOs, farmers, micro-enterprises, or community to promote livelihood opportunities could be a possible pathway to tap into these customer segments.

* Market potential is discussed in slide number 12,13,14,15 and 16.

10 National rural livelihood mission; 11 Small Farmer's Agri-business consortium; 12 Authors' analysis and primary research; 13 Authors' analysis and primary research

What is the potential market for SHPs to process fruits and vegetables?

APPROACH

Fruits and vegetables that have a demand in the processed form and are also suitable for value addition through SHPs, are considered for the analysis. These include—Aonla/ Amla, Apple, Bitter Gourd, Bottle Gourd, Carrot, Citrus, Cucumber, Grapes, Guava, Lime/Lemon, Litchi, Mandarin/ Kinnow, Mango, Mosambi, Orange, Papaya, Peach, Pear, Pineapple, Plum, Potato, Sapota/ Chikoo, Sweet Orange, Tomato, Watermelon.

ASSUMPTIONS

Assuming 20 days of monthly usage, each machine can process 3,200 kg* of produce per month.

For TAM

- Decentralised food processing industry can capture processing of up to 10 per cent of the horticulture produce.
- Each machine will be used to process a single commodity in a district.

For SAM

- Each machine could be used to process multiple commodities in a district across seasons.
- The processing period of a crop would largely overlaps with the harvest period of the crop.

LIMITATIONS

For TAM

Horticulture crop production data at the district level is available for different years for different states. The latest data available on the respective state horticulture departments' websites is used for the analysis.

For SAM

Harvest period data is available at the state level only for a few crops; for other crops, the same harvesting period is assumed for a limited geographical region (east, west, south, north, north-east, central).

**As per emerging trend from our forthcoming report on impact assessment of SHPs. Key trends considered: a) Machine capacity of most commonly deployed SHP for fruit and vegetable processing is 40 kg/hour; b) The daily engagement in processing activity is 6 hours— 2 hours preparatory work and 4 hours of processing through SHPs. Basis key trends and assumption of 20 days monthly usage, we have arrived at the estimated monthly processing capacity of SHPs.

A further nuanced usage trends will be shared in our forthcoming report on Impact Assessment of decentralised renewable energy powered livelihood appliances.

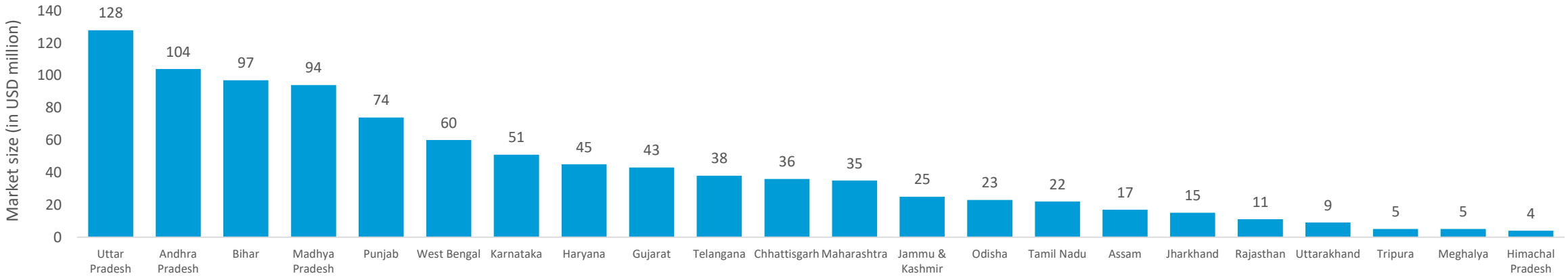
What is the potential market for SHPs to process fruits and vegetables?

TAM = Total production of fruits and vegetables, that have a demand in the processed form and are suitable for value addition* x Percentage of fruits and vegetables produce that can be processed through SHPs**

Total available market[14]
USD 954 million (INR 7,533 crore)
0.6 million SHPs

Livelihood impact[14]
1.3 million
machine users

State level distribution of TAM in USD million



Source: Authors' Analysis

Uttar Pradesh (13%), Andhra Pradesh (11%), Bihar (10%), Madhya Pradesh (10%) and Punjab (8%) represent over 50% of the total market opportunity to process fruits and vegetables through SHPs..

14 Authors' analysis; based on crop production data and interactions with manufacturers and end users; USD 1 = INR 79; Cost of SHPs: INR 120,000; TAM = Total Available Market

*References shared on slide 25; **As per the assumption on slide 11`

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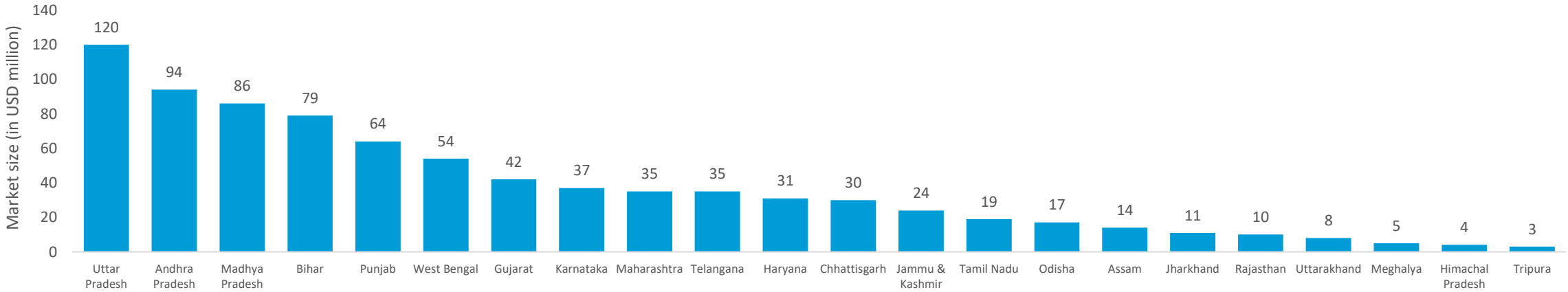
What is the potential serviceable market for SHPs to process fruits and vegetables?

TAM — Optimised use of SHPs assuming multiple commodities can be processed across seasons within a district on same machines = SAM

Serviceable available market[15]
USD 830 million (INR 6,561 crore)
0.55 million SHPs

Livelihood impact[15]
1.1 million
machine users

State level distribution of SAM in USD million



Source: Authors' Analysis

Top 12 states, as presented in the graph above, represent more than 85% of the serviceable available market opportunity to process fruits and vegetables through SHPs.

15 Authors' analysis; based on crop production data and interactions with manufacturers and end users; USD 1 = INR 79; Cost of SHPs: INR 120,000; SAM = Serviceable Available Market

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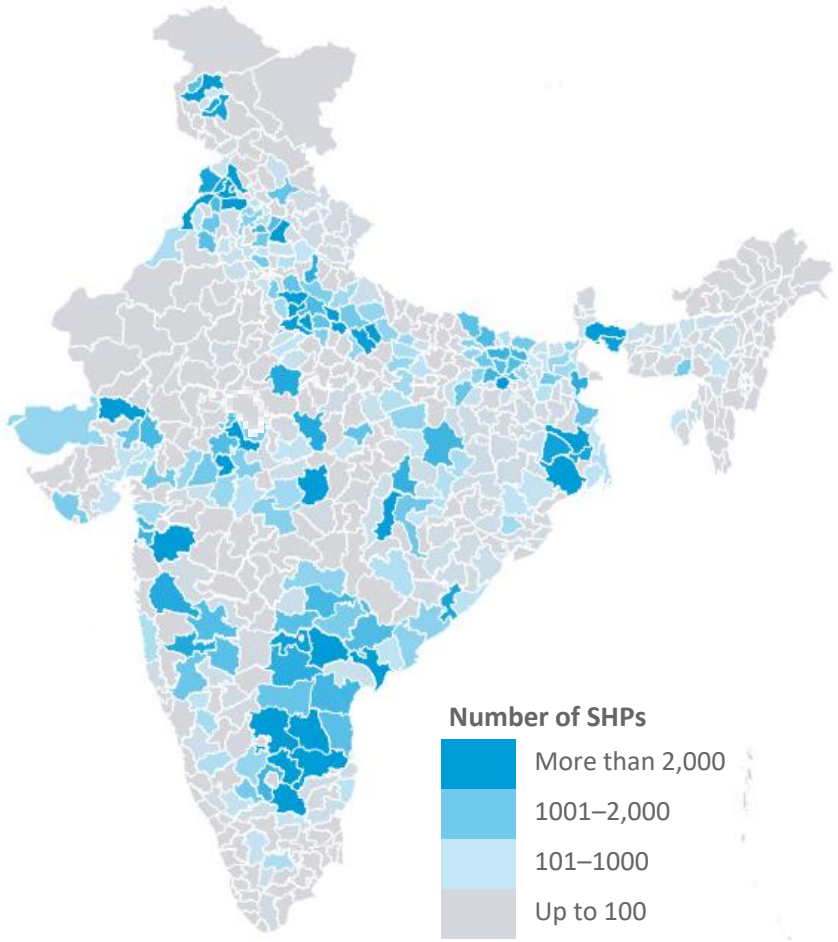
Which districts are priority market for SHPs to process fruits and vegetables?

District-wise distribution of market opportunity[16]



A complete list of disticts is available here[16].

Districts with the highest market potential

State	District	Fruits*	Vegetables*	(# machines)
Andhra Pradesh	Anantapur	Orange, Mango, Watermelon, Papaya, Grapes, Lime/ Lemon, Guava, Amla	Tomato, Bitter Gourd, Carrot, Cucumber	16,472
Andhra Pradesh	Chittoor	Mango, Watermelon, Papaya, Guava, Amla, Lime/ Lemon, Grapes	Tomato, Potato, Bitter Gourd, Bottle Gourd, Carrot, Cucumber	16,438
Madhya Pradesh	Indore	Guava, Watermelon, Mango	Potato, Carrot, Cucumber, Bottle Gourd	8,334
Maharashtra	Nashik	Grapes, Guava	Tomato, Cucumber	8,132
Punjab	Jalandhar	Watermelon, Guava, Mandarin / Kinnow, Peach, Mango, Lime/ Lemon, Plum, Orange, Grapes, Litchi	Potato, Carrot, Bottle Gourd, Tomato, Cucumber	7,992
Madhya Pradesh	Chhindwara	Citrus, Watermelon, Mango, Guava, Amla	Tomato, Potato, Bottle Gourd	7,470
West Bengal	Paschim Medinipur	Watermelon, Guava	Potato, Tomato	7,452
Andhra Pradesh	Kadapa	Orange, Mango, Papaya, Watermelon, Lime/ Lemon, Guava, Amla	Tomato, Bitter Gourd, Bottle Gourd, Cucumber, Carrot	7.054
Uttar Pradesh	Agra	Guava	Potato, Bottle Gourd, Tomato, Carrot	6,752
Gujarat	Banas Kantha	Papaya	Potato, Tomato	6,692

Top 10 districts represent 17% of the potential market. Entrepreneurs should prioritise these districts for machine sales.

16 Authors' analysis; * Fruits and vegetables are listed in decreasing order of contribution to the number of machines.

What is the total market for SHPs to process flowers and medicinal and aromatic plants ?

APPROACH

All types of flowers and "medicinal and aromatic plants" (FMAP) are considered for the analysis.

ASSUMPTIONS

Assuming 20 days of monthly usage, each machine can process 120 kg* of produce per month.

Two per cent of the flowers and herbs produce can be processed in a decentralised manner. Such a conservative estimate assumes that the processed products can be consumed even locally in rural areas, if the processors are not able to enable market linkages.

All types of FMAP can be processed and oil can be extracted using the distillation process.

LIMITATIONS

Since, for the analysis, we have used data for all FMAP at an aggregated level; few FAMPs which do not have demand in processed form may also be accounted in the total market potential

*As per emerging trend from our forthcoming report on impact assessment of SHPs. Key trends considered: a) Machine capacity of most commonly deployed SHP for FMAP processing is 1.5 kg/hour; b) The daily engagement in processing activity is 6 hours— 2 hours preparatory work and 4 hours of processing through SHPs. Basis key trends and assumption of 20 days monthly usage, we have arrived at the estimated monthly processing capacity of SHPs.

FMAP = flowers, and medicinal and aromatic plants.

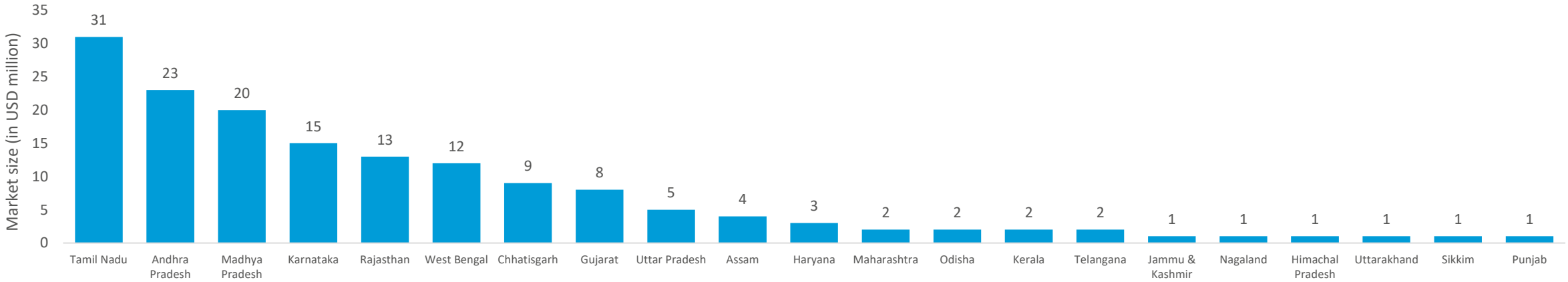
What is the total market for SHPs to process flowers and medicinal and aromatic plants ?

TAM = Total production of flowers, and medicinal and aromatic plants at state-level* x Percentage of FMAP that can be processed through SHPs**

Total available market[17]
USD 158 million (INR 1,252 crore)
0.1 million SHPs

Livelihood impact[17]
0.2 million
machine users

State level distribution of TAM in USD million



Source: Authors' Analysis

Tamil Nadu (20 per cent), Andhra Pradesh (15 per cent), Madhya Pradesh (13 per cent), Karnataka (9 per cent), Rajasthan (8 per cent), and West Bengal (8 percent) represent over 70 per cent of total market to process flower and herbs through SHPs.

17 Authors' analysis; based on crop production data and interactions with manufacturers and end users; USD 1 = INR 79; Cost of SHPs: INR 120,000; TAM = Total Available Market; FMAP = flowers, and medicinal and aromatic plants.
*References shared on slide 25; **As per the assumption on slide 15.


Image: CEEW

Policy landscape

- How can entrepreneurs leverage the ‘one district one product’ scheme?
- What are the relevant policies for entrepreneurs?
- Which are the women-focused policies?

Meeting of a SHG group in Udaipur district, Rajasthan.

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How can entrepreneurs leverage the ‘PM FME’ scheme?

Micro-enterprises, SHGs, FPOs, and producer cooperatives that have been in food processing for at least three years can upgrade their processing facilities through the Ministry of Food Processing Industries’ (MoFPI) *Prime Minister’s Formalisation of Micro Food Processing Enterprises* (PM FME) scheme (Gender-targeted scheme).

The scheme offers

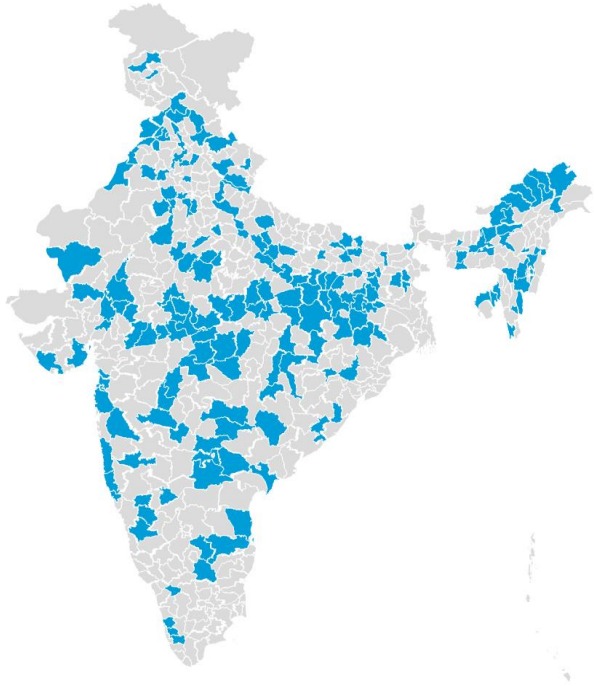
- **Access to credit**: Credit-linked capital subsidy at 35 per cent of the project cost up to INR 10 lakh (USD 14,300). Additional seed capital / grant support to SHGs at INR 40,000 per SHG member towards working capital and purchase of small tools.
- **Access to common infrastructure**: Laboratories, storage, packaging, marketing, and incubation services
- **Access to professional and technical support**: Entrepreneurship development, marketing, bookkeeping, registration, FSSAI standards, Udyog Aadhar, GST Registration, general hygiene, operating machines, hygiene issues, packaging, storage, procurement, new product development, etc. It is provided through the state government-nominated technical institutions
- **Branding and marketing support** to units with an annual turnover of USD 0.7 million (INR 5 crore) or more through empanelment of expert institutions at the national level

Outlay and coverage

- The scheme envisages an outlay of USD 1.3 billion (INR 10,000 crore) over a period of five years from 2020–21 to 2024–25
- 2,00,000 existing micro-food processing units will be directly assisted with credit-linked subsidy over 5 years

Under the PM FME scheme, through *the One District One Product (ODOP) initiative*, 210 districts are focusing on the building the ecosystem for processing of horticulture crops.

Districts focusing on processing of horticulture crops[18, 19]



A complete list of disticts and focused crop is available here.

18 Authors' analysis; 19 MoFPI

Gender-targeted: Policies which either have a women-focused clause or whose major beneficiaries are women; Gender-agnostic: No special focus on women.

What are the relevant policies for entrepreneurs?

Holistic development schemes	Target beneficiaries	Objective	How to Avail	Benefit
Horticulture Mission for North-Eastern Region and Himalayan States (HMNEH) under the Mission for Integrated Development of Horticulture (MIDH) scheme by State Horticulture Missions (SHM) in the North-Eastern States and Himalayan States[20]	Farmers, SHGs, FPOs, machine manufacturers **(Gender-agnostic)**	To address the entire spectrum of horticulture from production to consumption through backward and forward linkages. The scheme focuses on technological development, production of quality planting material, organic farming, efficient water management, post-harvest management, and marketing.	Beneficiaries should contact the Horticulture Officer of the district.	Assistance up to 50 per cent of the eligible project cost with a ceiling of USD 0.6 million (INR 4 crore).
Producers' Organisation Development Fund (PODF) by National Bank for Agriculture and Rural Development (NABARD)[21]	Producer companies, producers' cooperatives, registered farmer federations, macs (mutually aided cooperative society), industrial cooperative societies, other registered federations **(Gender-agnostic)**	Support to producers' organisations at three levels—credit support, capacity building, and market linkage support The objective of the fund is to meet end-to-end requirements of producers' organisations (POs) as well as to ensure their sustainability and economic viability.	POs can directly avail credit facility from the lending institutions without the support of any promoting agency.	Initial corpus of USD 6.9 million (INR 50 crore). The grant amount is capped at 20 per cent of the loan amount.
Post-Harvest Technology and Management by Ministry of Micro, Small and Medium Enterprises[22]	SHGs, cooperatives, farmers, user groups **(Gender-targeted)**	To provide assistance in setting up units using post-harvest technology and management, and value addition technologies for by-product management, compost, and others.	Through the Joint Secretary (M&T), Department of Agriculture and Cooperation.	Nature of assistance is a 100 per cent grant-in-aid for purchase of machinery and contingency expenditure.

20 https://midh.gov.in/tmnehs/default.aspx ; 21 https://www.nabard.org/content1.aspx?id=684&catid=23&mid=530; 22 https://msme.gov.in/sites/default/files/MSME_Schemes_English_0.pdf;
Gender-targeted: Policies which either have a women-focused clause or whose major beneficiaries are women; Gender-agnostic: No special focus on women.

What are the relevant policies for entrepreneurs?

Infrastructural support schemes	Target beneficiaries	Objective	How to Avail	Benefit
Creation/ Expansion of Food Processing/ Preservation Capacities (Unit Scheme) by the Ministry of Food Processing Industries (MoFPI)[23]	FPOs, NGOs, cooperatives, SHGs, private limited companies, individual proprietorship firms, joint ventures **(Gender-targeted)**	Increase the level of processing, value addition, and reduction of wastage through, • Creation of processing and preservation capacities. • Modernisation or expansion of existing food processing units.	Proposals for seeking assistance under the scheme are invited through an Expression of Interest from time to time and can apply through the Sampada Portal (MoFPI).	Grants-in-aid at 35 per cent of the eligible project cost in general areas and at 50 per cent of the eligible project cost in the North-Eastern and Himalayan States, State-notified Integrated Tribal Development Projects (ITDP) areas, and Islands subject to maximum of USD 0.7 million (INR 5 crore) per project.

Raw material schemes	Target beneficiaries	Objective	How to Avail	Benefit
Creation of Backward and Forward Linkages under the Pradhan Mantri Kisan SAMPADA Yojana by the Ministry of Food Processing Industries[24]	Farmers, SHGs, FPOs, machine manufacturers **(Gender-targeted)**	To provide effective and seamless backward and forward integration for the processed food industry by plugging the gaps in the supply chain in terms of availability of raw material and linkages with the market.	Proposals for seeking assistance under the scheme are invited through an Expression of Interest from time to time through the SAMPADA Portal (MOFPI).	The maximum grant extended per project is USD 0.7 million (INR 5 crore).

23 https://mofpi.nic.in/Schemes/creation-expansion-food-processing-preservation-capacities-unit-scheme; 24 http://pmkvyofficial.org/

Gender-targeted: Policies which either have a women-focused clause or whose major beneficiaries are women; Gender-agnostic: No special focus on women.

What are the relevant policies for entrepreneurs?

Financial support schemes	Target beneficiaries	Objective	How to Avail	Benefit
Credit Guarantee Scheme (CGTMSE) by the Ministry of Micro, Small & Medium Enterprises, and Small Industries Development Bank of India (SIDBI)[25]	SHGs, FPOs, micro and small enterprises (MSEs) **(Gender-targeted)**	Collateral-free credit assistance extended by lending institutions to new and existing MSEs.	Banks and financial institutions can apply to CGTMSE for credit facilities to MSEs and the beneficiaries can avail it from these banks and financial institutions.	Loans up to USD 0.3 million (INR 2 crore) without collateral/ third-party guarantees.
Venture Capital Assistance, Small Farmer Agri-Business Consortium (SFAC) by Department of Agriculture and Cooperation, Government of India[26]	Farmers, SHGs, FPOs, machine manufacturers, agripreneurs **(Gender-agnostic)**	• To catalyse private investment in setting up agribusiness undertakings that will enhance rural incomes and generate both farm and off-farm employment. • To strengthen backward linkages of agribusiness undertakings with primary producers. • Training and exposure visits of agri-preneurs interested in setting up identified agribusiness projects.	The promoters directly or with the support of any SFAC's empanelled consultant may submit application form through eligible lending institution to the SFAC along with the documents as per the checklist immediately after the bank or financial institution has sanctioned the term loan.	Support of 26 per cent (40 per cent in North Eastern and Himalayan States) of promotor's equity or USD 0.1 million (INR 0.5 crore).

25 https://www.cgtmse.in/; 26 http://sfacindia.com/VCA_Scheme.aspx
Gender-targeted: Policies which either have a women-focused clause or whose major beneficiaries are women; Gender-agnostic: No special focus on women.

Key business strategies

- What business models can help scale the adoption of SHPs?
- Who are the major competitors and what is the way forward for entrepreneurs?

Image: Wase Khalid, CEEW

A jar of Jamun candy, manufactured through processing of Jamun in SHPs.

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What business models can help scale the adoption of SHPs? [27]

Model	Description	Benefits	Challenges	Research insights
 **Direct sales** *sales to rural food micro-enterprises (RFME)*	Individual/bulk sales by equipment manufacturers (EM)	Direct interaction of EM with RFME helps EM to understand the customer needs better to customise and improve the product. Economically, the most lucrative approach for both the EM and RMFE, as there is pricing and cost control, respectively. Scope to cater to a diverse set of RMFEs.	High capital cost could make adoption difficult for a small RFMEs who lack access to finance. Providing after-sales service at a remote location may be a concern for EMs. RFME may lack knowledge of recipes, branding, and marketing of processed products, quality standards, and safety certifications required.	Equipment financing partnerships; local training and after-sales service networks are required to scale up direct sales. EM can potentially train and leverage local talent as sales and service agents. Or partnership with distributors and Go-To-Market (GTM) partners for after-sales services could be a way forward. RFMEs can promote and sell end-products through online channels (e-commerce and social networks). RFMEs affiliated with an SHG or FPO can leverage their support for product–market linkage.
 **Employment model** *sales to **Large Enterprises and Community Orgs (LECOs)***	Primarily bulk sales to LECOs, who employ community members for processing	Opportunity of repeat purchase if LECOs expand their operations. Further, future training can also be streamlined through approaches like ‘train the trainer’. Easier for LECOs to take care of the market linkages for the processed products. Promotes ‘Make in India’ and opportunity of export for processed products.	In regions with only one season of crop processing, ensuring year-round employment for community members associated with LECOs will be difficult. LECOs need invest in regular monitoring of the processing activity to ensure high quality, and compliance with standards and certifications.	In regions with year round availability of multiple horticulture produces, LECOs can potentially enable decentralised production, which allows processing of different crops and creating a bouquet of offerings for customers. High-margin end products such as essential oils for personal care may be lucrative for LECOs to break even.

Source: Authors’ compilation

For several fruits and vegetables, the market for processed products such as jams, candies, and juices is mature. However, entrepreneurs will have to develop and test value-added products for regional crops such as custard apple, jackfruit, and passion fruit to create a niche national and global market.

 27 Authors' Analysis

Who are the major competitors and what is the way forward for entrepreneurs?

EM and RFME/LECO face competition from three types of ecosystem players, as discussed below.[28]

Major competitors for EM

Mega food parks

Food parks in various states, supported by the Ministry of Food Processing Industries.

Strengths

- Common facilities like testing laboratory, packing facilities, specialised storage facilities.
- Focus on backward and forward linkages.[29]

Weakness/limitation

- Limited to 39 agri/horticulture zones in the country.

EM may explore an opportunity to set up a larger food processing unit utilising multiple machines as modular units at the proposed mega food parks.

EM should prioritise sales in horticulture regions that are not part of the planned mega food parks.

Food processor manufacturers

Manufacturers of small scale commercial juice extractors, cutter, grinders, paste makers, oil extractors.

Strength

- Established sales channels.

Weakness/limitation

- Single purpose.

EM should focus on offering a versatile product so that it can cater to demand of various customer segments—e.g., clean energy-powered multi-purpose processor which be used for multiple functions of cutting, juicing and pulping, even in regions with unreliable electricity.

Major competitor for RFME/LECOs

FMCG/Food companies

Corporate players that manufacture processed food products*

Strengths

- Processed food products are of high quality.
- Established brand presence.
- Can venture into new product segments.
- Huge marketing budgets.

RFME/LECO may explore pre-processed raw material supplier contracts with these players to meet their production demands.

RFME/LECO should focus on improving the quality of end products so as ensure they can compete with them in the market.

Source: Authors' compilation

Manufacturers can venture into the value chain and explore supplier contracts with FMCG players to provide secondary processed food products leveraging government initiatives such as the PM FME scheme and mega food parks to tackle value-chain challenges such as skilling, quality assurance, and common facilities.

*Dabur, ITC, PepsiCo, Coca-Cola, Hector Beverages, Patanjali, Kissan, Nestle, Heinz.

28 Authors' Analysis and India Mart; 29 https://mofpi.nic.in/Schemes/scheme-creation-backward-and-forward-linkages#:~:text=and%20Forward%20Linkages-,Scheme%20for%20Creation%20of%20Backward%20and%20Forward%20Linkages,and%20linkages%20with%20the%20market.

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Cover images

CEEW (front and back)

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