

Flowers

Flowers are grown in select pockets in Maharashtra due to favorable weather conditions. It grown mainly for aesthetic purpose, while some varieties are sold for festivals, temples, household consumption, oil extraction, etc.

Maharashtra primarily cultivates cut flowers which are grown in polyhouses and are marketed for its aesthetic appeal. Major cut flowers cultivated are rose, gerbera and carnation. Loose flowers, which are cultivated in open-field, is also grown in Maharashtra. Indian rose varieties, marigold, geranium, lily, etc., are open-field varieties and are used for festivals, daily religious usage, oil extraction, etc.

S. No.	Business Opportunity	Brief description
1	Cut flowers – Integrated cold chain	Integrated cold chain is standard business requirement for effective marketing of cut flowers as they are critical in maintaining the shelf life and preserving the freshness of flowers
2	Essential Oil	Essential oils are aroma extracts of flowers with natural fragrance. They are used for their aroma and therapeutic purpose

Other business opportunities with flowers are dried flowers, bouquet making, petal jam, etc. These business opportunities are not elaborated in this document as they are mostly cottage industries requiring no machinery or have limited market potential.

1 Cut flowers – Integrated cold chain

Cut flowers have significant market potential, with good demand for exports also. Major cut flowers grown in Maharashtra are rose, gerbera and carnation. An integrated cold chain is essential in cut flowers to preserve the freshness of the flowers and to enable transporting of the flowers to long distances (e.g., Delhi, Chennai, UAE, Netherlands, etc.)

Technology	Type	Eligible for Matching Grant
Plastic buckets	Implement	No
Packhouse with refrigeration	Civil Infrastructure + Equipment	Yes
Pre-cooling chamber	Equipment	Yes
Container Cold Storage	Equipment	Yes

Technology	Type	Eligible for Matching Grant
Sorting and Grading: Stainless steel table	Implement	Yes
Stem cleaning machine with rubber tooth	Equipment	Yes
3/5 layered corrugated paper for primary packaging	Consumable	No
Corrugated Fibre Board boxes for secondary packaging	Consumable	No
Reefer trucks	Vehicle + Equipment	Yes

Process:

- Harvested flowers are immediately placed in a bucket containing water solution. 200-400 ppm of Silver Nitrate or Sodium Hypochlorite is added to water to maintain freshness of the flowers
- Harvested flowers should be kept in water solution within 2-3 minutes from harvesting. The stem is dipped in the water solution, while flowers are outside it. 15 liter of water is filled in a 50 liter bucket
- Flowers are suggested to remain in water solution during pre-cooling, sorting, cold storage, and transportation to preserve freshness
- Harvested flowers are pre-cooled in pre-cooling chambers at 10-12°C for 1-2 hours
- If required, flowers can be stored for longer duration in container cold storages at 2-3°C. The storage period depends on the type of flower stored. Rose can be stored for up to a month, while Gerbera and Carnation can be stored up to 15 days
- Post pre-cooling, sorting, and grading of the flowers is done on stainless steel table. The sorting and grading area is also recommended to be maintained at 10-15°C to maintain the freshness of the flowers
- Sorting of Rose and Carnation is done by length, while for Gerbera it is done by disc size
- For flowers with thorns and leaves in the stem (e.g., Rose), thorns and leaves are removed using a stem cleaner
- To minimize damage in some flowers like Gerbera, plastic sleeves can also be used to cover the flower
- Flowers are then bunched as per required count and are wrapped in corrugated paper. For domestic market, 3-layered corrugated paper is used, while for export market, 5-layered corrugated paper is used
- Reefer trucks may be used to transport flowers as they help in maintaining the freshness of flowers. For smaller quantities, ice battery packs can also be used
- If required, secondary packaging can be done in CFB boxes

Advantages:

- Integrated cold chains is critical to sell flowers in distant markets. Cut flowers require mandatory temperature control environment for longer shelf life

Disadvantages / Challenges:

- Significant investment required for setting up of integrated cold chain. Sufficient quantity of flowers is required for breakeven and profitability

Usage of infrastructure for Loose flowers:

- Integrated cold chains may be used for loose flowers such as Marigold and Tuberose for higher shelf life. But, setting up of complete integrated cold chains for loose flowers may not be feasible due to lower returns in comparison to cut flowers

2 Essential Oil

Essential oils are fragrant oils extracted from flowers, leaves, seeds, wood, etc. Essential oils are used for their aroma and therapeutic purposes. Flowers that possess natural fragrance are suitable for essential oil extraction. Indian rose varieties and Geranium may be suitable for essential oil extraction of the major type of flowers grown in Maharashtra.

Technology	Type	Eligible for Matching Grant
Steam distillation unit	Equipment	Yes
Manual packaging in glass bottles	Consumables	No

Distillation units contain multiple components but are usually sold as a single unit. Critical components are boiler for steam generation, condenser, and collection tanks.

Process:

- Harvested flowers are kept in a tank and steam is passed through the flowers
- Resultant vapor contains aromatic compounds along with water. The vapor is condensed by passing it through a condenser
- Condensed liquid is collected in tank. Due to difference densities between water and the extracted oil, both settle as different layers in the tank
- Essential oil is removed from the tank and are bottled manually in glass bottles
- Labelling and secondary cardboard packaging can be done for increasing the marketability of the product

Advantages:

- Essential oils fetch premium price with minimal operating cost and investment. It can result in high margins for FPOs

Disadvantages / Challenges:

- Fragrance of the flower is critical for marketability of the essential oil. Only specific varieties of flowers that have good fragrance are suitable for essential oil preparation
- Direct to consumer marketing can be challenge due to competition from existing brands on ecommerce websites
- Since it is a premium product, market is limited and concentrated in urban areas

Alternate Processes:

- Essential oil extraction can be done through numerous methods. Steam distillation described above is a common and cost-effective method. Solvent extraction is an alternate process for essential oil extraction, where oil is extracted through a solvent such as hexane and ethanol
- Maceration is a process of using carrier oils for extraction. This process provides infused oil as output and retains the properties of the flower better than above processes
- There are traditional processes also available for essential oil extraction, which are generally variations of steam/water based distillations