

Red Chilli

Red chilli is important spice crop in India. Red chilli is predominantly consumed as either dried chillies or as powder. Processed products such as red chilli paste and red chilli sauce are also used in culinary preparations.

S. No.	Business Opportunity	Brief description
1	Dry red chilli – Direct to market	Red chilli can be dried using different techniques and sold as dry chilli. Dry chilli is the common form of consumption of red chilli
2	Dry red chilli – Store and sell	Dried red chilli can be stored in ambient temperature for short-term and in cold storage for long-term
3	Red chilli powder	Chilli powder is a commonly used spice powder that is processed from dried red chillies
4	Red chilli paste	Red chilli can be processed to paste that can be sold B2B to hotels, restaurants or for further processing
5	Red chilli pickle	Red chilli can be processed into pickle that can be marketed in the surrounding geography either B2C or B2B

Other business opportunities include ready to red chilli sauce, red chilli color extract and red chilli oil. These business opportunities are not detailed in this document as they may not be suitable for FPOs due to high investment costs, significant volume of red chilli required around the year for business viability, difficulties in marketing due to competition and limited market potential.

Fresh red chilli can also be sold by FPOs. Since, red chilli is generally consumed post drying, FPOs lose significant value selling them as fresh chillies instead of processing them into dry chillies, which require minimal investment and operational costs.

Specific varieties of chilli are suitable to be grown and harvested of red chilli, instead of harvesting them as green chilli. Harvesting of green chilli varieties as red chillies may not yield desirable results in the final product in terms of physical appearance (good red color) or chemical properties (capsaicin levels for taste / flavor / smell).

1 Dry Red Chilli – Direct to market

Red chilli, post-harvesting, can be dried and converted into dry chillies. Processing red chillies to dry chillies can be done in a cost-effective manner.

Technology	Type	Eligible for Matching Grant
Packhouse	Civil construction	Yes

Technology	Type	Eligible for Matching Grant
Drying: - Sun drying yard (or) - Solar dryer	- Civil construction (or) - Equipment	Yes
Air blower cleaning	Equipment	Yes
Grading and Sorting - Conveyor line (or) - Stainless Steel table	Equipment	Yes
Gunny bags or low-density polyethylene bags	Consumable	No
Plastic crates	Implement	Yes

Process:

- Harvested red chilli should be kept away from sunlight for 48 hours to develop color
- Drying can either be done through sun-drying or solar dryers. The humidity level of the fruit should be brought down to 10%
- Both are cost effective drying process as they involve negligible operating costs. Solar drying is a quicker method for drying and also avoids the accumulation of foreign matter that is common with sun drying
- Dried chillies are then air blown to remove impurities
- If sorting is required, they can be sorted on conveyor lines or SS tables. Grading and sorting is done manually
- Dried chillies are usually packed in clean dry gunny bags and sold in the market
- They can also be packed in small polyethylene packs for retail sales

Advantages:

- Manufacturing cost of dry chillies is minimal and it can provide FPOs with high margin

Disadvantages / Challenges:

- During prolonged subdued prices for dry chillies, having no storage facilities can become a drawback leading to losses for FPOs

2 Dry Red Chilli – Store and sell

Dry chillies can be stored for as long as 8-12 months in appropriate storage conditions. Avoiding moisture build up and low weight loss are critical factors when storing dry chillies. For short-term storage (up to 2

months), dry storage (at ambient temperature) is suitable, while for long-term storage (up to 8-10 months) cold storage is recommended.

Technology	Type	Eligible for Matching Grant
Packhouse	Civil construction	Yes
Drying: - Sun drying yard (or) - Solar dryers	- Civil construction (or) - Equipment	Yes
Air blower cleaning	Equipment	Yes
Grading and Sorting: - Conveyor line (or) - Stainless Steel table	Equipment	Yes
Packaging: - Manual packaging in gunny bags (or) - Vacuum packaging in low-density polyethylene bags	Manual process (or) Equipment and Consumable	Equipment – Yes
Dry Storage	Civil construction	Yes
Cold Storage: - Container Cool Rooms (or) - Cold storages	- Equipment (or) - Civil Construction	Yes
Plastic crates	Implement	Yes

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- Both are cost effective drying process as they involve negligible operating costs. Solar drying is a quicker method for drying and also avoids the accumulation of foreign matter that is common with sun drying
- Dried chillies are then air blown to remove impurities
- If sorting is required, they can be sorted on conveyor lines or SS tables. Grading and sorting is done manually
- Dried chillies are then manually packed in gunny bags or vacuum packed in low-density polyethylene bags. Vacuum packing retains the properties of chillies better
- For short-term storage, chillies can be stored at ambient temperature. Vacuum packed chillies can be stored in ambient temperature for 6-8 months
- For long-term storage of 8-10 months, chillies should be stored in cold storage at 5-10°C. Vacuum packed chillies can be stored in cold storages for more than a year.

- During storage, care should be taken to ensure chillies moisture stays around 10% relative humidity. Higher humidity levels lead to mould formation and pest attacks.

Advantages:

- Ability of FPOs to store the dried chillies can help it overcome prolonged subdued market prices
- It also assist in case FPOs are processing the dried chillies to chilli powder for continuous supply post harvesting season
- FPO can rent the cold storage / dry storage facilities to farmers on subscription or usage charge basis for additional income during low utilization

Disadvantages / Challenges:

- Price risk – the market price of dried chilli may go further down forcing the FPOs to sell at lower prices in spite of incurring storage costs
- The cost of establishment and operating the cold storage facilities are high. FPOs should ensure high utilization for break-even and profitability

3 Red Chilli Powder

Red chilli powder is a common spice in Indian households and a widely used ingredient in different cuisines across the world.

Technology	Type	Eligible for Matching Grant
Shed for unit	Civil Construction	Yes
Pulverizer	Equipment	Yes
Vibratory sieve	Equipment	Yes
Form fill seal packaging machine	Equipment	Yes

Red chilli powder unit should be combined with the equipment suggested for Dry Chilli – Direct to market business opportunity. The raw material for powder manufacturing is dry chilli.

Process:

- Cleaned dry chillies are powdered through a pulverizer
- To get fine powder, the powder is passed through a vibratory sieve
- Chilli is packed through a form fill seal packaging machine as per set quantities of each packet
- The packaging material along with labelling can be bought from manufacturers
- Secondary packaging of carton box, with branding work, can also be made to increase appeal of the product

Advantages:

- Manufacturing of chilli powder does not require significant investment and can be manufacturer in small quantities

- It can be marketed directly to consumers, leading to higher margins for FPOs. Brand can be built for a localized geography by providing consistent quality and right pricing
- It can also target B2B segment of hotels and restaurants or can supply as third-party manufacturers of established players (job-work basis). This would require less investment in terms of brand building and establishing trade supply chain

Disadvantages / Challenges:

- Chilli powder market is dominated by established players. Consistent effort and investments for building trade supply chain (distributors, retailers) is required
- FPOs must be able to supply chilli powder year round in case of supplying to consumers directly (B2C brand)

Additional process:

- Dried chillies, post destemming, can be roasted to further reduce the moisture content
- Before pulverizing, the dry chillies can be passed through a chilli cutter. Cut chilli pieces when passed through pulverized can give better powder

Advanced process:

- Cryogenic grinding can be used to make chilli powder. Cryogenic grinding is state-of-art technology in manufacturing of spice powders as it helps in retaining the flavor, aroma, and taste in the product. Cryogenic grinding requires significant investments and in turn will require higher quantities (utilization) of chilli for business viability

4 Red Chilli Paste

Red chilli in paste form is a convenient form of using chilli in cooking for restaurants and hotels.

Technology	Type	Eligible for Matching Grant
Shed for unit	Civil Construction	Yes
Bubble washer	Equipment	Yes
De-stemmer	Equipment	Yes
Chilli cutter	Equipment	Yes
Wet Grinder	Equipment	Yes
Blending tank	Equipment	Yes
Bottle washer	Equipment	Yes
Bottle filling machine	Equipment	Yes

Technology	Type	Eligible for Matching Grant
Manual induction sealer	Equipment	Yes

Red chilli paste unit should be combined with the equipment suggested in any first two business activities. Chillies of lower grades can be utilized for processing to paste, as higher grade chillies fetch better prices when sold fresh.

Process:

- Fresh red chillies are washed and destemmed. They can further be cut into smaller pieces through a chilli or vegetable cutter
- Cut chilli is then grind into a paste using an industrial wet grinder
- Paste-like chilli is then added to a blending tank where necessary ingredients are added and blended
- Chilli paste can be packed in bottles either manually or through a paste filling machine. Bottle washer can be used to wash the bottles or alternatively they can be washed manually
- As air tight measure and to preserve shelf life, hand-held induction heater are used to seal the bottle before capping

Advantages:

- FPOs can earn higher margins through red chilli paste than through the above mentioned business opportunities

Disadvantages / Challenges:

- Among processed red chilli products, its sauce is more widely consumed / used than paste
- Selling paste to businesses such as hotels and restaurants provides lesser margin in comparison to selling to consumers

Additional processes:

- Red chilli paste can be further processed by pasteurizing the paste and aseptic packaging. This will require additional investments and higher utilization of machinery (more quantity of chilli supplied round the year) require supply of red chilli for processing for majority of the year to have maximum utilization
- Shrink tunnel can be used for wrapping brand label around the paste bottles
- **Red chilli sauce:** Red chilli paste can be further processed to red chilli sauce. Manufacturing red chilli sauce will require additional investments for equipment and will also require higher supply of chilli round the year for increasing the utilization and thus making the business profitable. Red chilli sauce market is also dominated by established brands, and hence competing both in terms of brand recognition and pricing will be difficult. Brief process for manufacturing red sauce from paste is as follows:
 - The red chilli pulp is fed to a steam jacketed kettle, where additional ingredients are added and the mixture is heated
 - Mixture is then fed to a continuous evaporator to remove excess water in the pulp

- It is then pasteurized, through table pasteurizer or other suitable pasteurizing methods, to eliminate pathogens
- Final sauce is to be filled in bottle through aseptic bottling machine

5 Red Chilli Pickle

Red chilli pickle is a common dish consumed in India. Chilli is also an important ingredient in making different types of pickle. While there are many established and national / regional brands in pickles, pickle manufacturing is also a common cottage industry.

Technology	Type	Eligible for Matching Grant
Shed for unit	Civil Construction	Yes
De-stemmer	Equipment	Yes
Chilli cutter	Equipment	Yes
Fermentation tank	Equipment	Yes
Blending tank	Equipment	Yes

Red chilli pickle unit should be combined with the equipment suggested in any one of the first two suggested business activities. Chillies of lower grades can be utilized for processing to pickle, as higher grade chillies fetch better prices when sold fresh.

Red chilli pickle can be manufactured without much equipment. The critical factor in producing chilli pickles is on the ingredients that suit the market the FPO intends to sell the pickles in. Either fresh red chillies or dried chillies can be used to prepare pickles, depending on the product produced.

Process:

- Chillies' stem is cut followed by cutting the chilli into smaller pieces
- Chilli is fermented using different ingredients such as salt, oil, and vinegar
- Fermented chilli is then blended with other required ingredient in the blending tank
- Chilli pickle is then hand packed, either in bottles
- Labels, done through third-party, is wrapped around the bottles

Advantages:

- Pickle is widely consumed, and it is possible to build a strong local brand through consistent quality and market-suited product
- Multiple types of pickles can be manufactured with red chilli as the base ingredient
- Red chilli pickle can be supplied B2B to hotels and restaurants. It can be customized as per customer requirement

Disadvantages / Challenges:

- Investments required in building a brand in terms of establishing trade supply chains
- Year-round supply to market is required if the FPO wants to build a B2C brand

Additional Process:

- Bottle washer can be used for washing of the packaging bottles. Shrink tunned can be used to wrap labelling around the bottle.