

RAJASTHAN AGRICULTURAL COMPETITIVENESS PROJECT



Detailed Project Report on Kinnow Waxing and Grading



Prepared by:



AGRI BUSINESS PROMOTION FACILITY

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Chapter 1- Scenario in India

1.1. Introduction to Kinnow

Kinnow, a high yield mandarin citrus fruit, is a hybrid between Sweet Orange and Willow Leaf Mandarin and was developed at the California Research Centre, Riverside by H.B. Frost in 1915. It is a seedless fruit released in 1935 in the world and was introduced by Punjab Agriculture College and Research Institute, Lyallpur (Pakistan) in 1940. The fruit was brought to India by J.C Bakshi in 1954 at the Punjab Agriculture University.

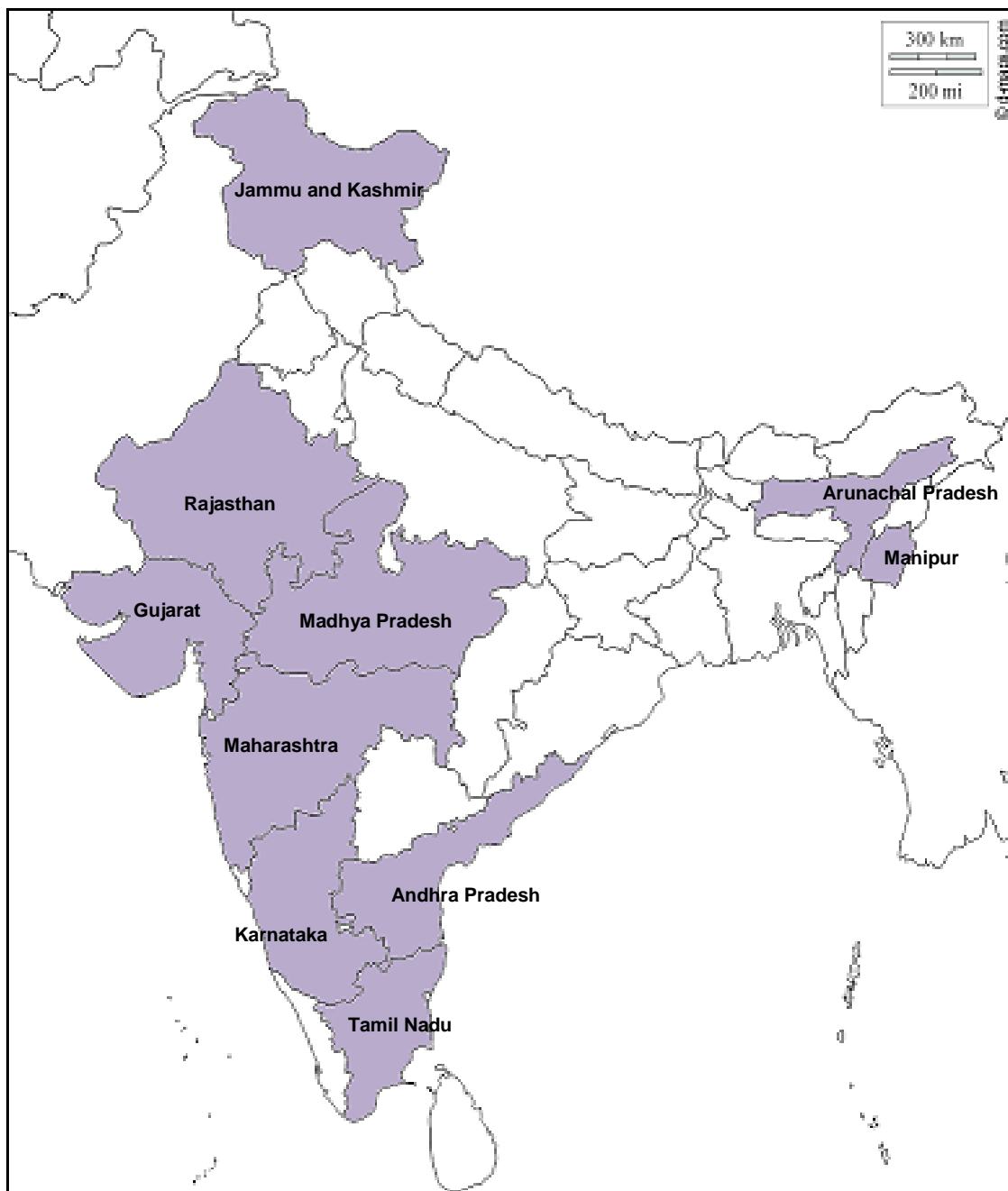
The fruit is utilised for direct consumption by the end user. This end consumption is categorised in Exports and Domestic Consumption. The indirect consumption involves the cycle of processing & utilising Kinnow in Concentrates, Juices, Schnapps, Jams, Candies etc.

The plantation of Kinnow has to be done on the onset of the monsoon season i. e. starting of July and going up to September and harvesting of this fruit is done in January or February. Due to the hot and cold climate conditions this fruit is developed more rapidly in weight, circumference and volume. High temperature and high intensity of solar radiation are the two environmental factors which are causing injury to fruit and tree. Wind induces abrasion injury on susceptible fruit (when small) due to rubbing of leaf against fruit causing lesions.

1.2. Production Trends of Kinnow

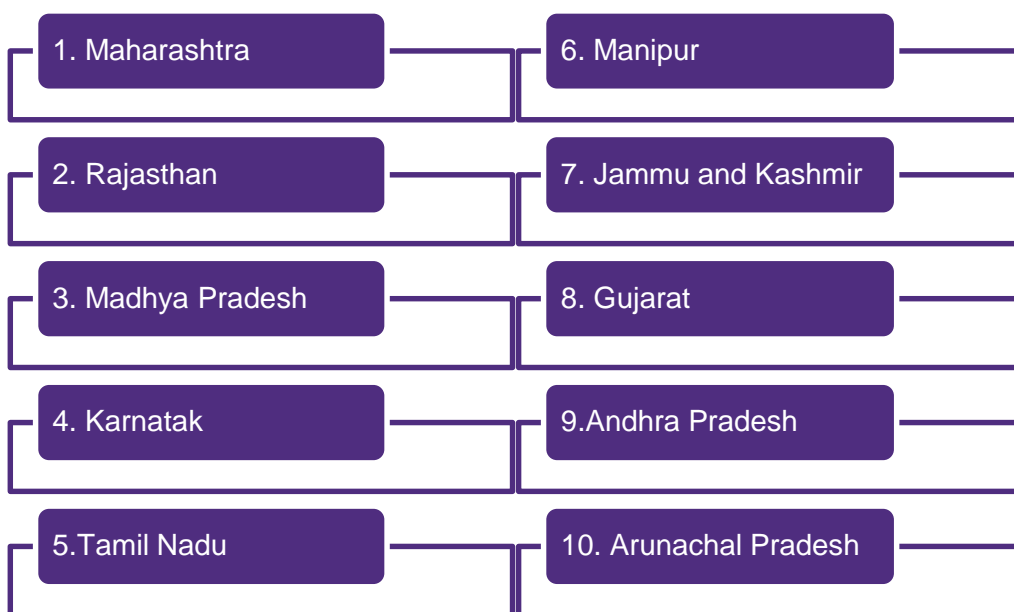
The genus that comprises of Lemon, Lime, Orange, Grapefruit, Kinnow, Ber etc. is defined as Citrus. The states of India that comprise Citrus fruits are highlighted in the diagram given below and the same are mentioned in decreasing order of production in the following diagram.

Figure 1: States of India producing citrus



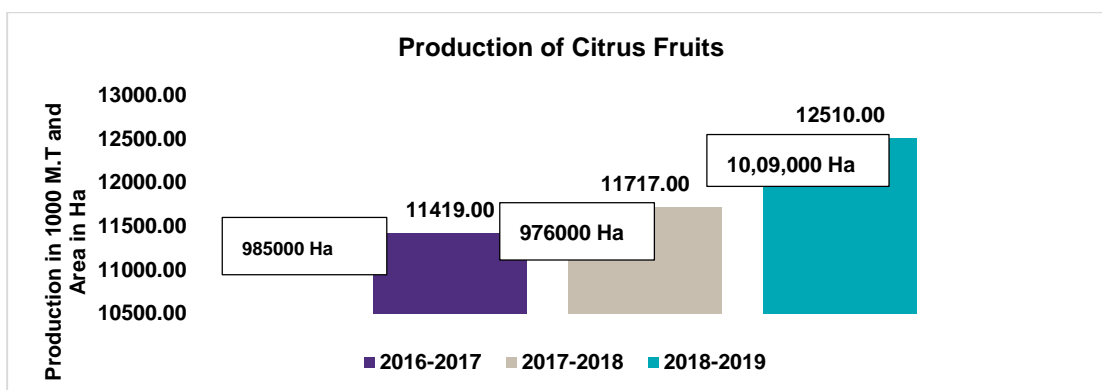
The figure below highlights the states in decreasing order of production.

Figure 2: Citrus producing states in decreasing order of Production



The production for citrus fruits in India has increased over the period and this expected increase is also captured in the figure given below. The figure for the year 2017-2018 and for the year 2018- 2019 is estimated in the figure. The observed growth in three years will be 9.5% while the growth in area under citrus production grew at 2.4%. The yield has grown from 1.5 MT per hectare to 12.3%MT per hectare in the same period for Citrus Fruits.

Figure 3: Production and Area for citrus fruits in India

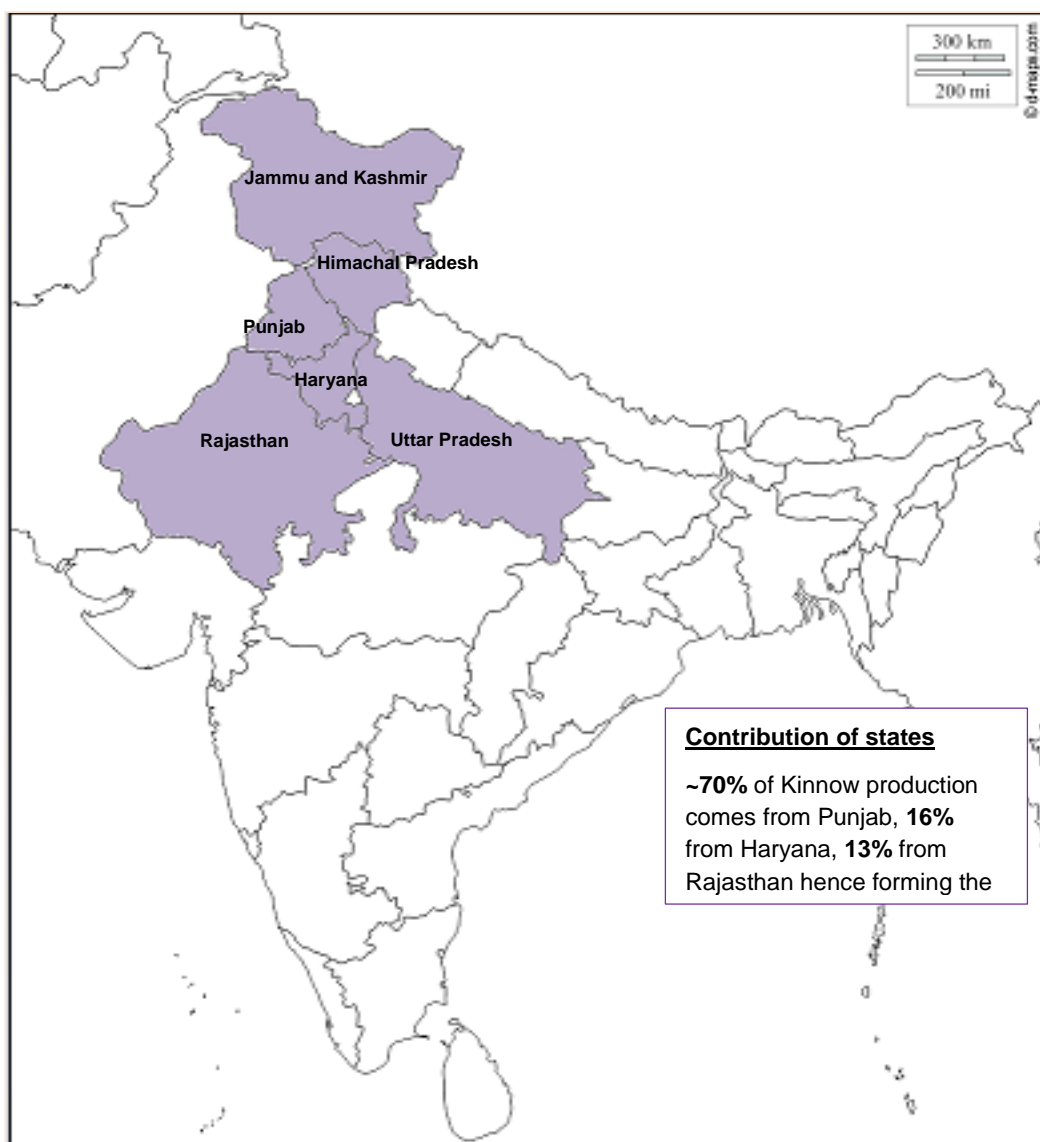


Source- NHB and GT Analysis

In 2013-2014, India produced more than 14,30,000 i.e. 1.43 Mn MT of Kinnow and it is expected to cross the figure of 1.7 Mn MT this financial year at the CAGR of 5%.

While the production increase while the resource of land remains constant, the current variety of crop will be replaced to bring in Kinnow. The map below highlights the Kinnow producing regions in India.

Figure 4: Kinnow producing regions in India



Source- GT Analysis

As per the data of 2013-2014, the state of Punjab dominates the production of Kinnow in India with highest productivity of 21.47 tonnes/hectare. The state of Punjab contributes an output of 9,88,000 tonnes on 46,000 ha of area. The production in Punjab is expected to reach 12,00,920 tonnes at the CAGR of 5%. While Punjab tops the production charts, the production in Rajasthan with a production of 1,82,000

tonnes utilising the area of 14,616 hectares' attributes to approximately 12% of total production in India for Kinnow and is expected to reach 2,21,222 tonnes.

Table: Production and Area Analysis of Kinnow Producing States

State	Output (in tonnes)	Area (Hectares)	Productivity(Output/Area)
Punjab	9,88,000	46,000	21.47 Tonne/Ha
Haryana	2,31,000	19,402	11.90 Tonne/Ha
Rajasthan	1,82,000	14,616	12.45 Tonne/Ha
Himachal Pradesh	29,000	22,000	1.31 Tonne/Ha

Source- Directorates of horticulture, Punjab and Haryana and National Horticulture Mission (2013-2014)

1.3. Demand for Kinnow

Demand for Kinnow as highlighted in the previous section comes from either direct or indirect consumption and is found at both the levels domestic and global level. Kinnow's demand has witnessed a positive growth trajectory due to its health benefits that come along with the consumption of citrus fruits and the enhanced quality and juice recovery further adds to the demand of the product.

There are three categories that have now been identified and the same are Grade A, Grade B, Grade C. Kinnow of Category A is considered to be the premium crop that is generally sent to modern trade and exported to other countries. It also supports demand in certain areas of Indian market. This fetches a better and higher price than other categories of Kinnow. Grade B Category Kinnow are sold in the local markets and consumption centers nationwide. The price of Category B Kinnow varies with the quantity of crop in a particular season. This category of Kinnow is picked and transported to the appropriate fresh local markets in bulk followed by aggregation of Kinnow in cartons takes place here for dispatch for sale to the consumer or to the Retailer that takes it to the final consumer. Retailers can operate either through Mandi's, through retail outlets or through door to door sales on carts to facilitate movement to the point of consumption. Grade C of Kinnow includes damaged and sub-standard Kinnow that are not suitable for direct consumption. Hence, this category of Kinnow is usually used for processing in order to maximize its value realization.

The table below highlights the categories of the product elaborating further on the juice content, size and end markets for Kinnow.

Table 1: Grading of Kinnow

	Grades	Juice Content	Sizes	End Markets
In India's rank as a global producer of Kinnow is -.	Grade A	High	Large	Export Market: Bangladesh (Grade A Small Size), Sri Lanka, Dubai, Russia etc.
India is the third country to come up with Seedless Kinnow				Domestic Market: Chennai, Bengaluru, Hyderabad, and other parts of South India
Punjab, the largest producer, exported 10k tonnes to Dubai Russia and Bangladesh	Grade B and C	Medium to Low	Medium to Small	Domestic Market: Mumbai, Delhi, Kolkata, UP, Bihar, Vadodara, J&K, Other parts of India

While Grade A largely caters to global markets, the trend for the demand for this category has been witnessing optimistic trajectory for Southern India.

Hence, a large volume of 'Grade A' Kinnow is being supplied to Bangalore, Hyderabad, Chennai and other parts of South India. Grade C is largely consumed for processing purposes and due to no presence of processors in Rajasthan, a large share of Grade B & C Kinnow is being supplied to other states in India including UP, Bihar, West Bengal, Kolkata and many others.

Chapter 2- State of Rajasthan:

Kinnow Production

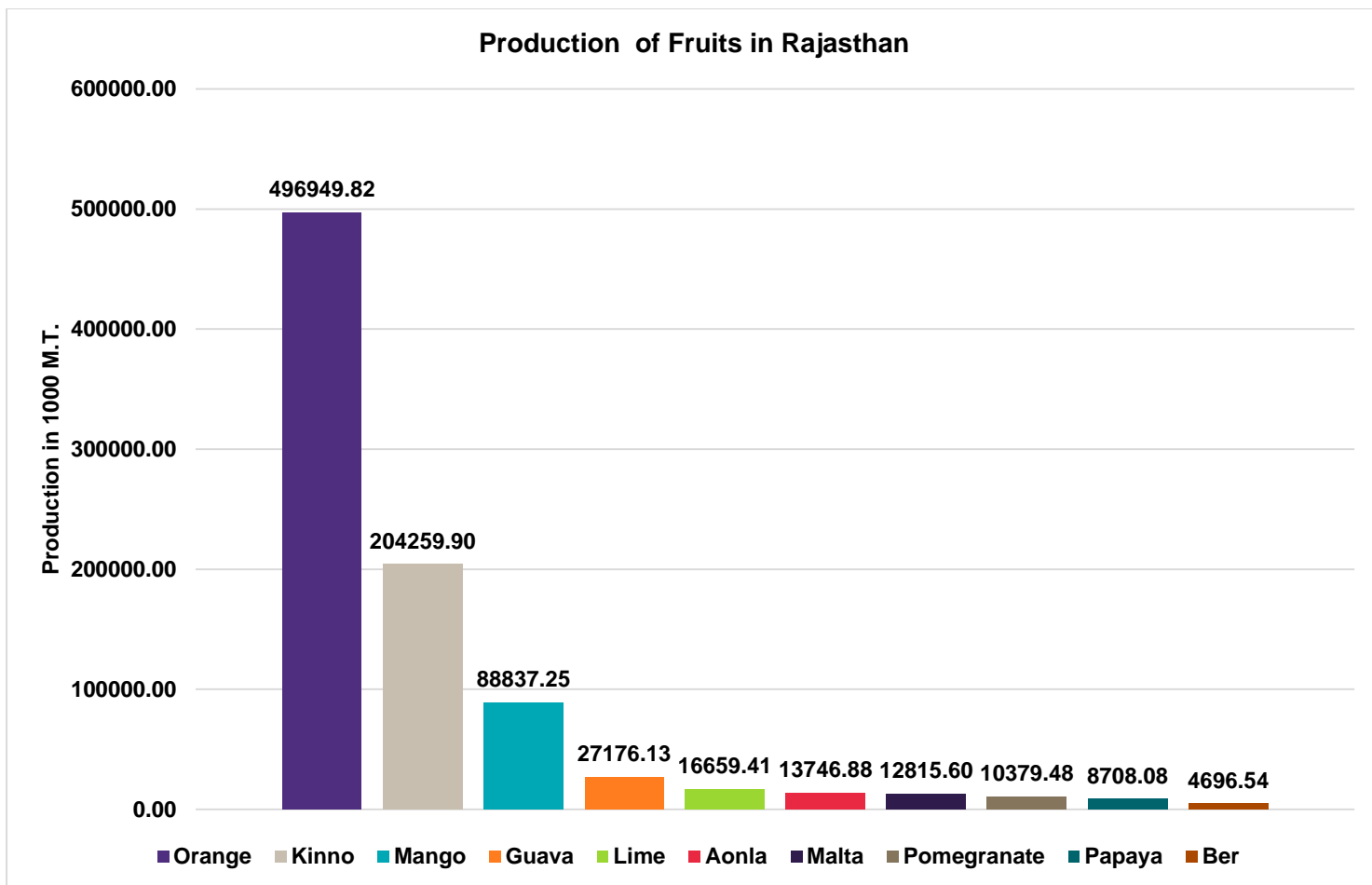
2.1 Scenario in Rajasthan

The diagram below captures the production diversity for fruits of the state of Rajasthan and culminates into the conclusion that Orange and Kinnow, the fruits that belong to the genus of Citrus, top the production figures for Rajasthan and

Table 2: Production profile of Fruits in Rajasthan

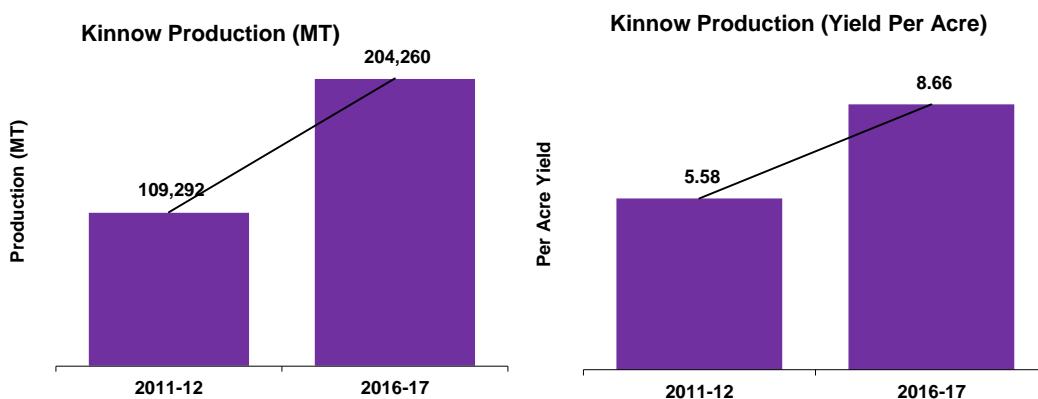
DISTRICT	Production (MT)	Area(ha)	Yield(MT/Ha)
Orange	496,950.82	23,349.60	21.28
Kinnow	204,260.90	9,547.79	21.39
Mango	88,837.25	5,164.66	17.20
Guava	27,176.13	4,171.82	6.51
Lime	16,659.41	2,947.01	5.65
Aonla	13,747.88	2,857.75	4.81
Malta	12,816.60	1,603.33	7.99
Pomegranate	10,379.48	743.98	13.97
Papaya	8,708.08	695.19	12.52
Ber	4,697.54	546.07	8.60
Total			

Figure 5: Fruit Production in Rajasthan



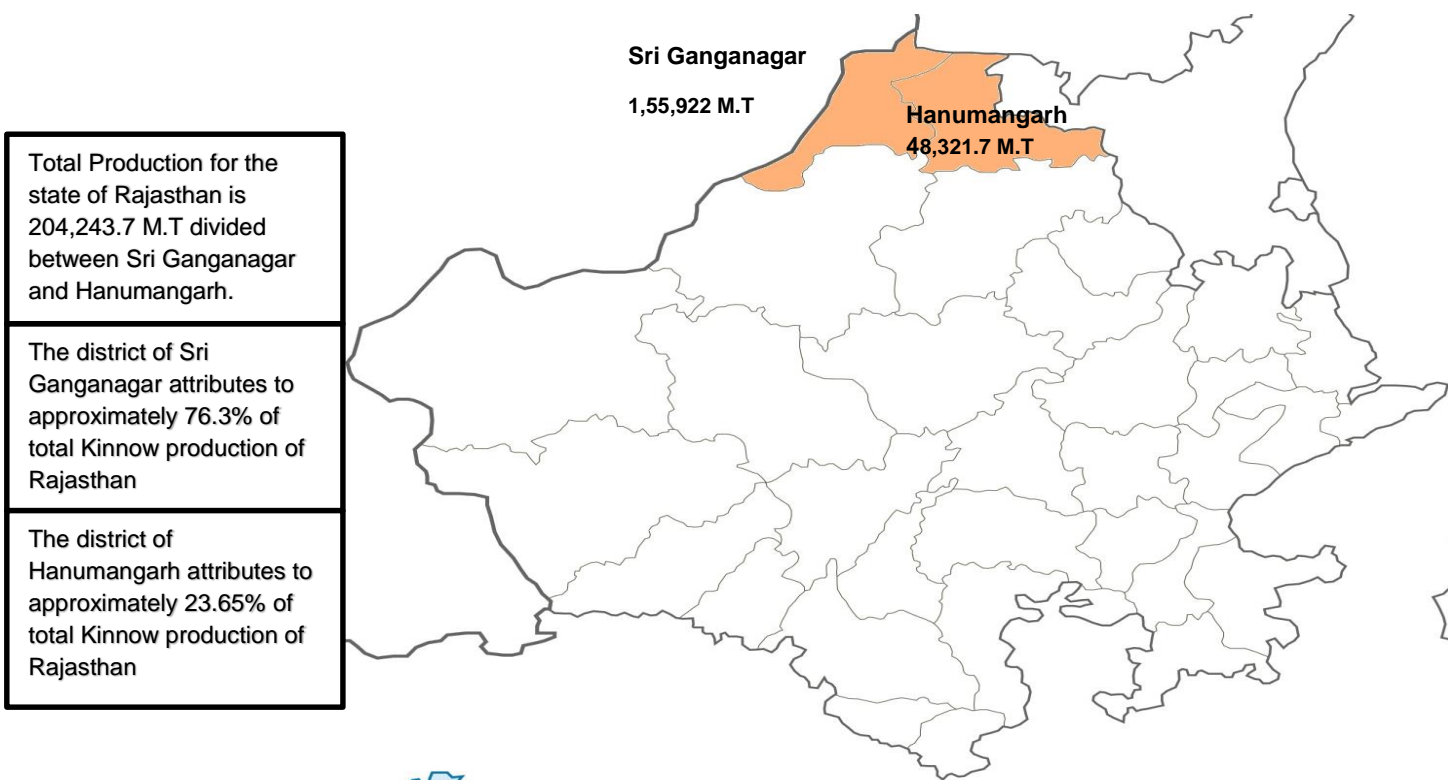
The fruit production of profile attributes for 8,84,229.06 MT of fruits in the state of Rajasthan. The state has a diverse profile for fruit production with fruits such as Orange, Kinnow, Mango, Guava, Lime, Aonla, Malta, Pomegranate, Papaya, Ber with 82.1% of the entire production being classified as Citrus Fruits. Kinnow, Mango, Malta and Ber are the fruits that comprise of the citrus segment with Kinnow being the second major crop attributing to 22.8% of the total production of citrus fruits in Rajasthan.

Figure 6: Yield and Production of Kinnow



The diagram above captures the trend in Kinnow production for the state of Rajasthan and the production while highlighting an optimistic growth has a growth rate of approximately 86% and a growth rate of yield of approximately 55%.

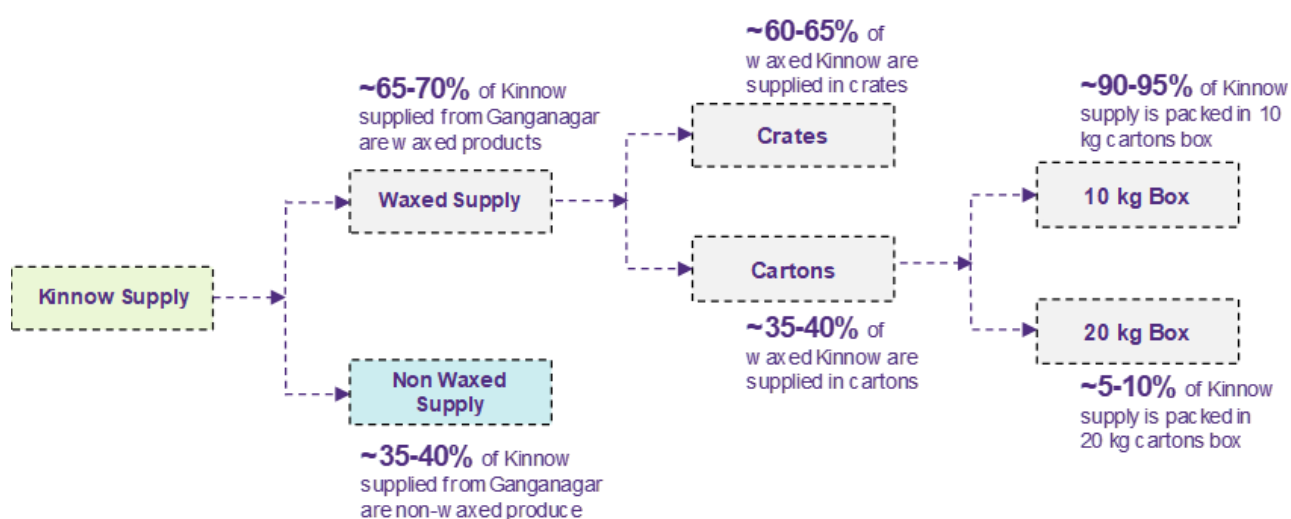
Figure 7: Kinnow producing districts of Rajasthan



Source: Rajasthan Horticulture Board, GT Analysis

These key districts of Sriganganagar and Hanumangarh contribute to 1,55,922 MT. and 48,321.7 M.T. of production respectively utilising the area of 8,080 Ha and 1,410 Ha for supporting the production.

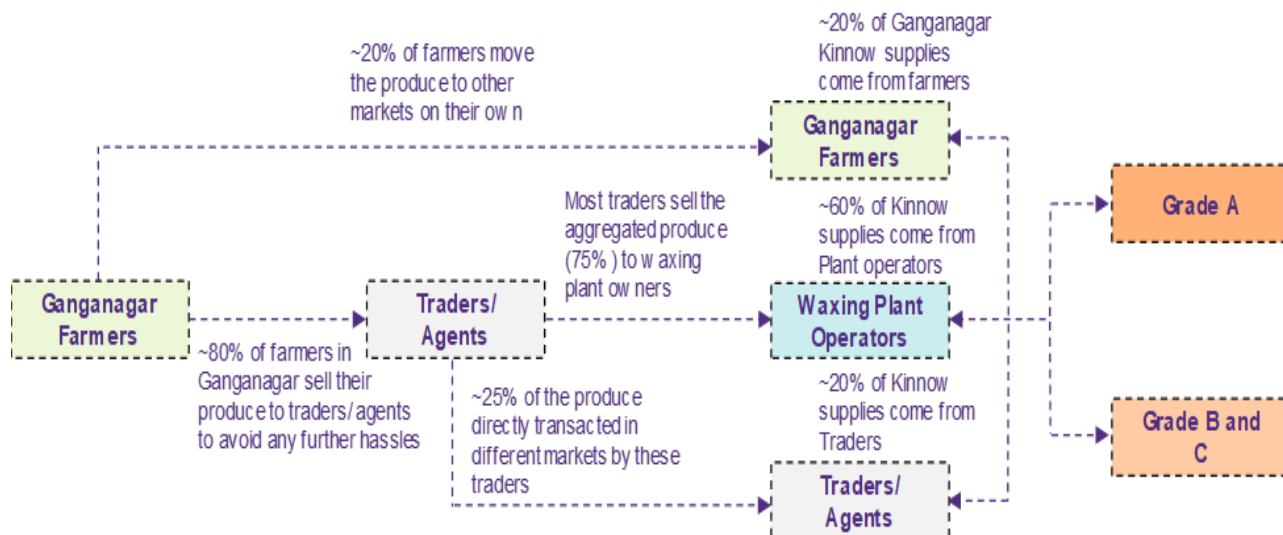
Figure 8: Kinnow Suppliers for Waxed Kinnow



Source: Primary Interview, GT analysis

The Kinnow harvested from Ganganagar is supplied in both waxed and non-waxed form. According to our primary interview, nearly 60-65% of Kinnow supplied from Ganganagar are waxed products and the remaining 35-40% are non-waxed products. The waxed products are further segregated where 60-65% are supplied in crates and 35-40% are supplied in paper based cartons. There are 2 types of boxes, 10kg box 90-95% of Kinnow supply is packed and in 20 kg box 5-10% of Kinnow supply, used for packing and supplying of waxed products to domestic and exports market.

Figure 9: Supply Chain Network of Kinnow



Source: Primary Interview, GT analysis

The above flowchart gives us an understanding of the Kinnow supplier network where 80% of Ganganagar farmers are dependent on trader/agents to sell their produce and around 20% farmers move their produce to other markets. The traders/agents sell their aggregated produce to the waxing plant operators which is 75% and the rest 25% they produce directly transacted in different markets. Out of the total graded and waxed Kinnow supply, 20% of total supply comes from the farmers, 60% supply comes from the waxing plant operators and the remaining 20% from traders/agents. The overall produce is segregated into grade A, B and C respectively according to their quality.

During January and February, the demand for Kinnow remains high in Rajasthan. An average of 100-125 MT of Kinnow supply arrives in Muhana Mandi in Jaipur, the largest wholesale Mandi in Rajasthan during the season i.e. January and February. This further gets distributed in districts around the vicinity. During the off-peak season (December and March), the daily procurement of Muhana Mandi keeps around 30 - 40 MT i.e. three to four trucks of 10 MT each. The mandi commission agents who plays key role in supply chain charge ~6% commission from farmers along with ~1.5% of Mandi Tax which will be further deposited to Mandi Authority.

The key sizes for Kinnow produced and consumed in Rajasthan is mentioned in the table below:

Table 3: Analysis of Kinnow in Rajasthan

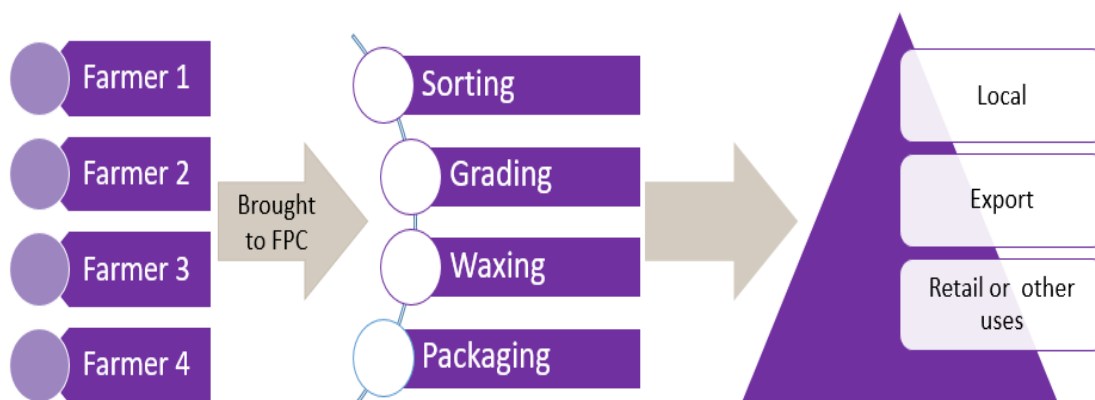
Number of Pieces (10 kg Box)	Juice Content	Retail Demand/ Price Realization
36	High	Moderate
45	High	High
54	High	High
60	Moderate	Moderate
72	Low	Low
84	Low	Low
96	Low	Low
120	Low	Low

Chapter 3- Introduction to Waxing of Kinnow

3.1. Waxing of Kinnow

The operations that come in the gamut of the process of Waxing involve Sorting, Grading, Waxing and Packaging. The current scenario involves the production of farmers to be taken for the 4 processes that attribute to the operations of waxing plant. The ideal scenario involves the Farmer Producer Corporation to be the key aggregator of Kinnow Produce from various farmers for the 4 operations.

Figure 10: Operating Model



The stage of sorting and grading categorizes Kinnow on the parameter of weight and size and the process culminates in categorization in Grade A, B, C. After the stage of being sorted and graded, the process of waxing applied to the entire produce before supplying the produce to Local, Domestic or Export Market.

Waxing is a process in which the fruit of Kinnow is coated with wax to ensure that the same has been protected against the environmental conditions and the moisture content that negatively impacts the crop.

The stage of waxing necessitates the process of drying to ensure that condition is then apt for packaging. Packaging ensures minimum product loss and facilitates prolonged sales by keeping the product intact and consistent with quality. The type of packaging that Kinnow is entitled to is mentioned in the list below:

1. Cartons
2. Standard boxes
3. Half-boxes

4. Wire-bound boxes
5. Net bags

The process of Sorting, Grading, Waxing and Packaging is a necessity for the production not only because it brings in protection from external environment and ensures ease in inventory management bringing in prolonged sales due to longer life of the product but also because of the ease it brings to the customer on the parameters of enhanced and better quality and well categorized products making selection as per use easy and time saving.

There are nearly 30 waxing plants operating in Ganganagar of which nearly 8 -10 organised players such as Tek Chand, Bhagwan Chaudhary, Mohan Traders, etc. are operating in the region. During the Kinnow season all plants operate for nearly 100 – 110 days and for a minimum average of 10-12 hours with a maximum limit for 20 hours.

Out of total 30 plants, two to three plants have operating capacity of 10 TPH, three to four have a capacity of ~ 2TPH and the remaining plants have operating capacity of 5 TPH. Nearly ~65-70% of Kinnow supply moving out from Ganganagar is waxed produce, which further gets distributed in other markets in crates and cartons. The crates hold the majority share of waxed Kinnow followed by supply in cartons (10 kg). Of late, a few traders have started supplying waxed Kinnow in 20 kg of carton boxes.

Majority of waxing plants performing sorting, grading, waxing and packing activities for captive use, followed by a few of waxing units utilise their plants on job work for which they charge a rental revenue of ~INR 1.5-2 per kg.

The below mentioned is the tentative cost being spent on Kinnow waxing and packing in 10 kg packed boxes:

- ❖ Rs. 1.5 – 2 per kg - Sorting, grading, waxing and packing
- ❖ Rs. 20- 30 per box (10 KG) - Carton used for packing
- ❖ Rs. 1.5 - 2 per kg – Transportation cost (including loading and unloading)

Kinnow suppliers doing sorting, grading, waxing and packing activities generally earn higher price than other Kinnow supply:

- ❖ A Grade and Waxed produce can help farmers/ FPOs in getting ~INR 8-10 higher price of per kg supply.
- ❖ B Grade and Waxed produce can help farmers/ FPOs in fetching an additional per kg price of ~INR 5-6 per kg

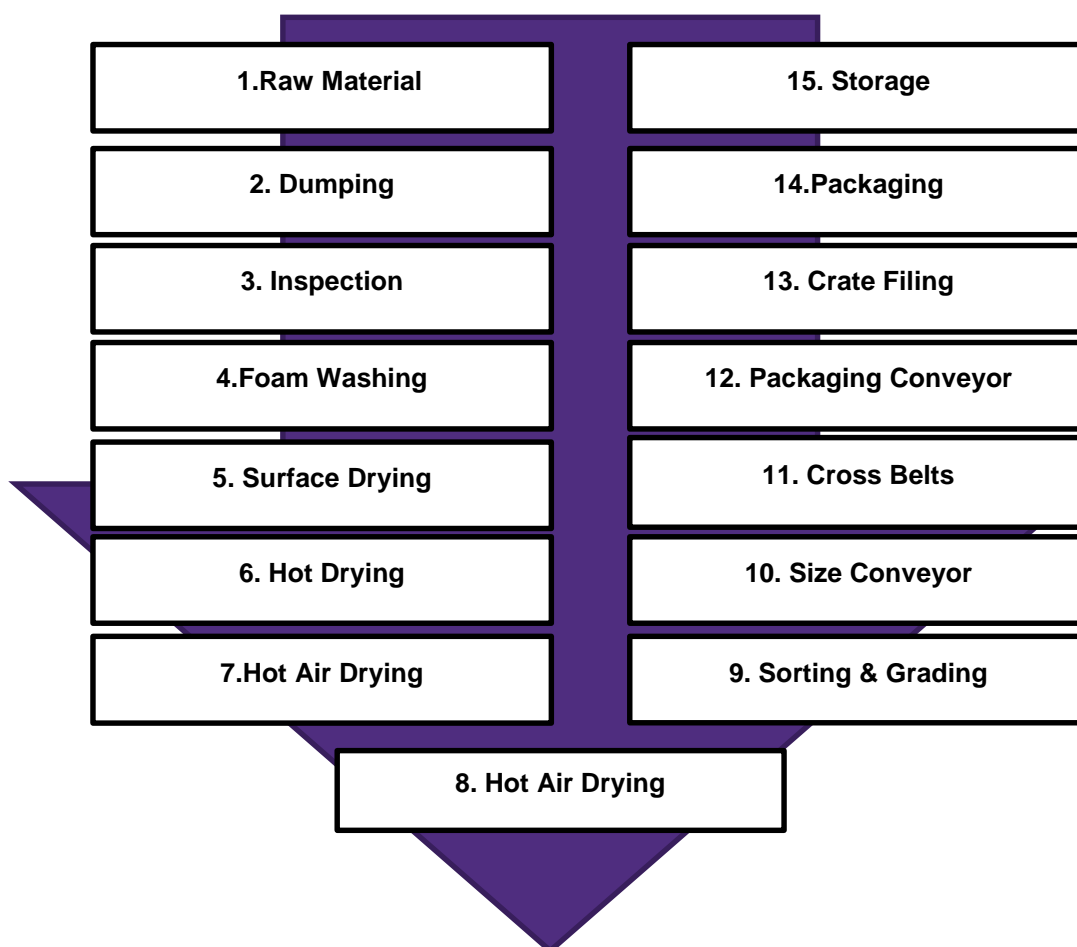
A lot of non-waxed Kinnow are consumed in nearby Mandi areas including Jodhpur, Bikaner, Jaisalmer etc. due to the additional cost that comes with waxing and thus discourages consumers to make purchases.

Chapter 4- Process Flow

4.1 Process flow for final Output

The diagram below highlights the flow of operations for the fruit of Kinnow.

Figure 11: Process Flow



4.1.1 Dumping

Kinnow needs to be removed from the field bin or harvesting container and then has to be sent to pack house. This process has to be undertaken gently by use of either water assisted methods or without the water assistance. Wet dumping can decrease bruising and abrasions by using moving chlorinated (100-150 ppm) water to carry delicate produce while using dry dumping, padded, sloped ramps or moving conveyor belts can decrease injuries to produce.

While dumping products from one container to another, one has to be careful enough to avoid mechanical damage to the commodity. When using dry dumping practices, the filled container should be emptied slowly and gently onto a tilted ramp with padded edges. Wet dumping is often used to reduce mechanical damage, either by dumping into water rather than into a dry ramp, or by immersion and floatation. If the specific density of the produce, such as apples is lower than that of water the produce will float. For some produce, such as pears, salts (such as sodium lignin sulfonate, sodium silicate or sodium sulphate) must be added to the water to increase its specific density and assure fruit floatation.

4.1.2 Inspection

This stage involves thorough checks for removal of defects like bruises that generally occur because of movement in slack packs, pressure from a tight pack or weight from adjacent carton. Bruises will have soft areas that, when cut, contain mushy areas in the underlying flesh. Affected fruit may be flattened on two or more sides. If the underlying flesh is not affected, these flattened areas may regain their shape.

4.1.3. Cleaning/ Washing:

For some commodities, such as kiwifruits and avocados, dry brushing may be sufficient to clean the produce. Other commodities, however, such as Kinnow, bananas and carrots, require washing. The choice of brushing and/or washing will depend upon both the type of commodity and the type of contamination.

Sanitation is essential, both to control the spread of disease from one item to another, and to limit spore build up in wash water or in the packinghouse air. Chlorine treatments can be used in wash water to help control pathogen buildup during packing operations.

Steel drums can be used to make a simple washing stand. The drums are cut in half fitted with drain holes and all the metal edges are covered with split rubber or plastic hose. The drums are then set into a sloped wooden table. The table top is constructed from wooden slats and is used as a drying rack before packing. Because steel drums are often used to store petroleum and chemical products, they should be thoroughly cleaned before being used as a washing stand.

4.1.4. Sorting

The simplest way of sorting of Kinnow is a belt conveyor, where the sorter must handle the produce manually in order to see all sides and inspect for damage. A push-bar conveyor causes the produce to rotate forward as it is pushed past the sorters. A roller conveyor rotates the product backwards as it moves past the sorter.

When sorting for rejects, and removing any product that is too small, decayed or damaged, the height of the sorting table should be set at a level comfortable for sorters. Stools, or a firm rubber pad on which to stand, can be provided to reduce fatigue. Locations of the table and the sorting bins should be chosen to minimize hand movements.

It is recommended that the workers' arms create a 45-degree angle when s/he reaches toward the table, and that the width of the table be less than 0.5 meter to reduce stretching. Good lighting will enhance the ability of the sorter to spot defects, and dark, dull belts or table tops can reduce eye strain.

If a conveyor system is in use, the product must not flow too fast for the sorters to do their work. The rotational speed of push-bar or roller conveyors should be adjusted to rotate the product twice within the immediate field of view of the worker.

4.1.5. Grading and Sizing

According to farmers, grading is done manually and they grade according to Grade A, B, C.

4.1.6. Waxing / Coating

It is the process of applying wax on the surface of commodity by spraying, dipping or immersing, brushing, fogging or foaming. Some fruits develop natural fruit wax on their surface at the time of maturity. i.e. plum, apple, citrus, grapes etc. and rest require the process to facilitate the same.

The benefits that come in with Waxing are elaborated below:

- **Longevity of Fruit:** Application of ~12 percent wax-emulsion in Kinnow mandarin along with GA 200 ppm concentration have proved to be the most effective for reducing the physiological loss in weight (17.89%) against control (36.62%) at the 28th day of storage period. Increasing the thickness of wax-

emulsion coating (concentrations) reduced the weight loss to a greater extent as compared to control.

- **Wastage:** With the application of waxing on Kinnow, the produce can now be transported to longer distance with a minimal wastage. According to industry experts, waxing has significantly reduced the amount of wastage in transit produce. For example, earlier 35-40% of non-waxed Kinnow used to get wasted in transportation from Ganganagar to Bangalore as compared to present situation wherein only ~2-3% of waxed Kinnow gets wasted.
- **Demand:** The demand for waxed Kinnow has been growing on the back with the increasing disposable income, easy access to information and awareness about waxed fruits.

4.1.6. Dryer

Pre-drying dryers with 'donut' sponge rollers and cold air fans are used for fruits like Kinnow, apples, tomatoes, peaches etc. Tunnel unit dryers with hot air generators for fruits like Kinnow, oranges, lemons, mandarins, apples etc. The hot air generators vary 90Kcal up to 200 Kcal. They work with diesel or LPG burners, with sensors to control and adjust the inside temperature and with hot air recycling system. The machines are fully insulated for best performance.

4.1.7. Packaging and Transport

Packinghouse operations can range from simple moving produce from a field lug into a shipping container to include a variety of handling practices, from cleaning, waxing, sizing, and quality grading to colour sorting. The provision of shade during the packing operations is extremely important. Shade can be created using palm leaf fronds, a plastic mesh or canvas sheet hung from temporary poles, or via a permanent roofed structure.

In the simplest packinghouse, produce is delivered in picking containers, immediately after harvest, directly to the packers. The packers then sort, grade, size and pack the produce directly into appropriate transport containers. In this case, each worker must be knowledgeable regarding produce defects, grade and size requirements, and packing methods. As the size and complexity of the packinghouse increases, more operations and workers trained in specific tasks might be added.

Kinnow is mainly transported in cartons, standard boxes, half-boxes, wire-bound boxes and fruit crates made of corrugated board or wood. They are sometimes also transported in net bags.

In the supermarkets we usually find them in bags or nets up to 3 kg or in boxes up to 15 kg for the consumer to select them. In many shopping centre, in order to save space in the consumer's pantries, Kinnows are displayed in expanded polystyrene trays of 6 units, covered with plastic film.

The means of transport for Kinnow is Ship, aircraft, truck, and railroad. While transportation of Kinnow takes place via Refrigerated container with fresh air supply or controlled atmosphere. Because of its impact- and pressure-sensitivity, the fruit has to be handled with appropriate care.

The required refrigeration temperature must always be maintained, even during cargo handling. In damp weather (rain, snow), the cargo must be protected from moisture, as there is otherwise a risk of premature spoilage.

4.1.8. Storage

The production of the fruit is seasonal, but its demand remains for a longer period, therefore storage is very essential for extending the consumption of fruits, as well as for regulating their supply to the markets. The main aim of storage is to ensure better return to the growers. According to DOMI (2009) the ideal temperature and relative humidity is 40-45° F and more than 60% humidity for the storage. Improper storage can be caused shrivelling of surface, weight loss and infection of disease. The establishment of appropriate cold storage, which have proper storage system with technical expert, will help to improve the quality of mandarin that will be given healthy price in the domestic market for farmers.

Chapter 5- Technology Options Available

We propose two technology options i.e. **Low end** and **High end** available for Kinnow waxing. The high end technology option would require higher capital investment as compared to the low end technology option. The high end option includes a Fully Automatic waxing line of 5 TPH (tonnes per hour) that performs waxing operations with minimal human interventions.

On the other hand, the low end technology option is a semi-automatic line and requires less capital as compared to high end line. In addition, the semi-automatic line would require higher number of labour for making the operations.

5.1 Low End Technology – Semi Automatic Waxing Line

Business Assumption:

The business plan has assumed that the business model operates under two segments i.e. Leasing Model and Captive Mode.

While the Leasing model brings revenue by leasing of facility to the third party, Captive Model involves direct owning of Kinnow that is subjected to the process of Sorting, Grading and Waxing.

The assumptions for the line of Sorting Grading and Waxing for both Rental and Captive Model is given below:

Table 4: Assumptions for Rental and Captive Model

Business Case – Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Rental Model	100%	100%	90%	80%	70%	70%	70%	70%	70%	70%
Captive Trading	0%	0%	10%	20%	30%	30%	30%	30%	30%	30%

The assumptions for the line of Sorting Grading and Waxing for Operating Capacity is given below:

Table 5: Assumptions for Operating Capacity

Business Case - Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating Capacity	0%	40%	60%	80%	90%	90%	90%	90%	90%	90%

5.1.1. Project Cost

The total cost of the project is estimated at Rs.44.7 Lakhs, out of which civil cost constitutes Rs 14.8 Lakhs, plant and machinery constitutes Rs.17.9 Lakhs, utilities & support of Rs. 2.7 lakhs and miscellaneous fixed assets of Rs. 7.3 Lakhs. The detailed description of each component of project cost is depicted in the tables below.

Table 6: Project Cost Summary

Capex Components	Year 1
Civil Cost	14.8
Plant & Machinery	17.9
Utility & Support	2.7
Mis. Fixed Assets	7.3
IDC	2.0
Total Capex	44.7

Note: We have not considered the land cost in this business model

5.1.2. Proposed Means of Finance

The promoter's equity in the project is Rs. 22.35 Lakhs which is 50% per cent of the total project cost. The term loan considered for the project is estimated at Rs. 22.35 Lakhs which is 50 per cent of the total project cost.

Table 7: Means of Finance Summary

Means of Finance (INR Lacs)	Year 1
Total Project Cost	44.7
Funding	
Equity (Promoters Cost)	22.35
Debt	22.35
Total Funding Required	44.7

Note: We have not considered grant in aid being offered by National Horticulture Board or any other government entity/institutions. Which may have an impact on the overall profitability of the project in a positive way.

5.1.3 Civil Work

The total cost of civil work has been estimated to be Rs 14.8 lakhs, which includes technical civil work of Rs 12.6 Lakhs and non-technical civil work of Rs. 121.61 Lakhs. Cost of civil work comprises of the cost of process building, Raw material warehouse, Finished goods warehouse, transformer house & Utility building. The total cost of technical civil works has been arrived at on the basis of the estimates provided by the Chartered Engineer (Civil) and are substantiated with the requisite certificate.

Table 8: Civil Cost Summary

Civil Cost	Total Area Required (SQM)	Total Civil Cost (Lacs)
Sorting Line		
Sorting, Grading and Waxing Line	150	12.6
Non-Core Area		
Utilities and Support Infrastructure	10	0.8
Other (Mis Area)	16	1.3
Total Civil Cost	176	14.8

5.1.4 Utilities and Mis. Fixed Assets

The total cost of Utilities has been estimated to be Rs 2.7 lakhs, which includes water storage of 10,000 LT, generator set of 10 KVA and truck weigh bridge. The total expenditure towards miscellaneous fixed asset is estimated at Rs. 7.3 Lakhs which comprises of 1,600 crates, 3 SS tables, 16 pallets to keep crates and 4 hand pallets trucks.

Table 9: Utilities and Mis Fixed Assets Summary

Utility & Support Infrastructure	Capacity (No. of Units)	Overall Cost (INR Lacs)
Water Storage	10000 LT	0.6
Generator	10 KVA	1.0
Weighing Scale	500 KG	1.2
Total Utility & Support		2.7

Mis Fixed Assets	Quantity	Total Cost (INR Lacs)
Crates	1600	5.2
SS TABLE (8*4*3 ss304)	3	0.9
Pallets	16	0.4
Hand Pallets Trucks	4	0.8
Total Mis Fixed Assets		7.3

5.1.5. Plant and Machinery

The total cost of plant and machinery has been arrived on the basis of quotation received from various suppliers of equipment and machinery. The total cost of P&M is considered as Rs. 19.4 Lakhs (including IGST). The following table captures the distribution of P&M and utilities.

Table 10: Plant and Machinery

Plant & Machinery	Capacity	Total Cost (Lacs)
Sorting, Grading and Waxing Line	2.5 TPH	17.9
Total Cost		17.9

5.1.6. Income Statement

The below mentioned is the income statement for the Low end waxing line:

Table 11: Income Statement

INR Lacs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Financial Snapshot - Income Statement										
Revenue	-	24.6	113.9	259.5	419.1	429.6	440.3	451.3	462.6	474.1
EBITDA	-	4.9	18.6	61.3	93.0	94.9	96.8	98.7	100.7	102.7
Depreciation	-	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
EBIT	-	2.0	15.7	58.4	90.0	91.9	93.9	95.7	97.8	99.8
Interest Cost	-	2.5	2.0	1.6	1.1	0.7	0.2	-	-	-
EBT	-	(0.5)	13.7	56.8	88.9	91.3	93.7	95.7	98.4	103.6
Tax	-	-	4.0	16.5	25.9	26.6	27.3	27.9	28.7	30.2
PAT	-	(0.5)	9.7	40.3	63.0	64.7	66.4	67.9	69.8	73.5
Profitability Ratio (%)										
Revenue Growth		N/A	362.8%	127.9%	61.5%	2.5%	2.5%	2.5%	2.5%	2.5%
EBITDA Margin	-	20.0%	16.4%	23.6%	22.2%	22.1%	22.0%	21.9%	21.8%	21.7%
EBIT Margin	-	8.0%	13.8%	22.5%	21.5%	21.4%	21.3%	21.2%	21.1%	21.1%
EBT Margin	-	(2.0%)	12.0%	21.9%	21.2%	21.2%	21.3%	21.2%	21.3%	21.9%
PAT Margin	-	(2.0%)	8.5%	15.5%	15.0%	15.1%	15.1%	15.0%	15.1%	15.5%

5.1.7. Balance Sheet

The below mentioned is the balance sheet statement for the Low end waxing line:

Table 12: Balance Sheet

INR Lacs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Shareholders' Equity										
Equity Share Capital	22.4	51.9	82.0	100.8	100.8	100.8	100.8	100.8	100.8	100.8
Reserves & Surplus	-	(0.3)	10.0	50.4	113.6	178.4	244.9	312.8	382.7	456.3
Quasi Receipt (Grants)	-	-	-	-	-	-	-	-	-	-
Total Shareholders' Funds	22.4	51.6	92.1	151.2	214.3	279.1	345.6	413.6	483.4	557.0
Liabilities										
Trade Payables	-	-	63.0	172.3	298.0	305.5	313.1	320.9	329.0	337.2
Total Current Liabilities	-	-	63.0	172.3	298.0	305.5	313.1	320.9	329.0	337.2
Long Term Borrowings	22.4	18.6	14.9	11.2	7.5	3.7	0.0	0.0	0.0	0.0
Total Non-Current Liabilities	22.4	18.6	14.9	11.2	7.5	3.7	0.0	0.0	0.0	0.0
Total Equity and Liabilities	44.7	70.2	170.0	334.7	519.8	588.3	658.7	734.5	812.4	894.2
Assets										
Cash and Cash Eq.	-	-	-	-	4.5	63.8	124.6	190.6	233.7	214.4
Fixed Deposits	-	-	-	-	-	-	-	-	24.6	115.2
Total Inventories	-	3.7	17.1	38.9	62.9	64.4	66.0	67.7	69.4	71.1
Trade Receivables	-	24.6	113.9	259.5	419.1	429.6	440.3	451.3	462.6	474.1
Total Current Assets	-	28.3	130.9	298.4	486.4	557.8	631.0	709.6	790.3	875.0



Net Block	44.7	41.9	39.1	36.2	33.4	30.6	27.7	24.9	22.1	19.3
Total Non-Current Assets	44.7	41.9	39.1	36.2	33.4	30.6	27.7	24.9	22.1	19.3
Total Assets	44.7	70.2	170.0	334.7	519.8	588.3	658.7	734.5	812.4	894.2

5.1.8. High End Technology – Semi Automatic Waxing Line

Business Assumption:

The high end business plan has also assumed that the business model operates under two segments i.e. Leasing Model and Captive Mode.

While the Leasing model brings revenue by leasing of facility to the third party, Captive Model involves direct owning of Kinnow that is subjected to the process of Sorting, Grading and Waxing.

The assumptions for the line of Sorting Grading and Waxing for Operating Capacity is given below:

Table 13: Assumptions for Operating Capacity

Business Case - Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating Capacity	0%	40%	60%	80%	90%	90%	90%	90%	90%	90%

The assumptions for the High end-line of Sorting Grading and Waxing for both Rental and Captive Model is given below:

5.1.9. Project Cost

The total cost of the project is estimated at Rs.291.8 Lakhs, out of which civil cost constitutes Rs 40.0 Lakhs, plant and machinery constitutes Rs.218.1 Lakhs, utilities & support of Rs. 4.8 lakhs and miscellaneous fixed assets of Rs. 15.7 Lakhs. The detailed description of each component of project cost is depicted in the tables below.

Table 14: Project Cost Summary

Capex Components	Year 1
Civil Cost	40.0
Plant & Machinery	218.1
Utility & Support	4.8
Mis. Fixed Assets	15.7
IDC	13.3
Total Capex	291.8

Note: We have not considered the land cost in this business model

5.1.10 Proposed Means of Finance

The promoter's equity in the project is Rs. 145.9 Lakhs which is 50% per cent of the total project cost. The term loan considered for the project is estimated at Rs. 145.9 Lakhs which is 50 per cent of the total project cost.

Table 15: Means of Finance Summary

Means of Finance (INR Lacs)	Year 1
Total Project Cost	291.8
Funding	
Equity (Promoters Cost)	145.9
Debt	145.9
Total Funding Required	291.8

Note: We have not considered grant in aid being offered by National Horticulture Board or any other government entity/institutions. Which may have an impact on the overall profitability of the project in a positive way.

5.1.11. Civil Work

The total cost of civil work has been estimated to be Rs 40.0 lakhs, which includes technical civil work of Rs 37.8 Lakhs and non-technical civil work of Rs. 2.2 Lakhs. Cost of civil work comprises of the cost of process building, Raw material warehouse, Finished goods warehouse, transformer house & Utility building. The total cost of technical civil works has been arrived at on the basis of the estimates provided by the Chartered Engineer (Civil) and are substantiated with the requisite certificate.

Table 16: Civil Cost Summary

Civil Cost	Total Area Required (SQM)	Total Civil Cost (Lacs)
Sorting Line		
Sorting, Grading and Waxing Line	450	37.8
Non-Core Area		
Utilities and Support Infrastructure	10	0.8
Other (Mis Area)	16	1.3
Total Civil Cost	476	40.0

5.1.12. Utilities and Mis. Fixed Assets

The total cost of Utilities has been estimated to be Rs 4.8 lakhs, which includes water storage of 20,000 LT, generator set of 20 KVA and four truck weigh bridge. The total expenditure towards miscellaneous fixed asset is estimated at Rs. 15.7 Lakhs which comprises of 4,000 crates, 4 SS tables, 25 pallets to keep crates and 4 hand pallets trucks.

Table 17: Utilities and Mis Fixed Assets Summary

Utility & Support Infrastructure	Capacity (No. of Units)	Overall Cost (INR Lacs)
Water Storage	20000 LT	1.2
Generator	20 KVA	2.4
Truck Weigh Bridge	500 KG	1.2
Total Utility & Support		4.8
Crates	4,000	13.1
SS TABLE (8*4*3 ss304)	4	1.2
Pallets	25	0.6
Hand Pallets Trucks	4	0.8
Total Mis Fixed Assets		15.7

5.1.13. Plant and Machinery

The total cost of plant and machinery has been arrived on the basis of quotation received from various suppliers of equipment and machinery. The total cost of P&M is considered as Rs. 218.1 Lakhs (including GST). The following table captures the distribution of P&M and utilities.

Table 18: Plant and Machinery

Plant & Machinery	Capacity	Total Cost (Lacs)
Fully Automatic Sorting, Grading and Waxing Line	5 TPH	218.1
Total Cost		218.1

5.1.4. Income Statement

The below mentioned is the income statement for the High end waxing line:

Table 19: Income Statement

INR Lacs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Financial Snapshot - Income Statement										
Revenue	-	49.2	227.7	519.0	838.2	859.1	880.6	902.6	925.2	948.3
EBITDA	-	26.1	(33.5)	141.3	206.4	210.6	215.5	218.8	223.8	229.0
Depreciation	-	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
EBIT	-	7.6	(51.9)	122.8	187.9	192.1	197.0	200.3	205.4	210.5
Interest Cost	-	15.5	12.7	9.9	7.1	4.3	1.5	-	-	-
EBT	-	(7.9)	(64.6)	112.9	180.8	187.8	195.5	201.0	210.8	227.6
Tax	-	-	-	32.9	52.6	54.7	56.9	58.5	61.4	66.3
PAT	-	(7.9)	(64.6)	80.0	128.1	133.1	138.5	142.5	149.4	161.3
Profitability Ratio (%)										
Revenue Growth		N/A	362.8%	127.9%	61.5%	2.5%	2.5%	2.5%	2.5%	2.5%
EBITDA Margin	-	53.1%	(14.7%)	27.2%	24.6%	24.5%	24.5%	24.2%	24.2%	24.1%
EBIT Margin	-	15.5%	(22.8%)	23.7%	22.4%	22.4%	22.4%	22.2%	22.2%	22.2%
EBT Margin	-	(16.0%)	(28.4%)	21.8%	21.6%	21.9%	22.2%	22.3%	22.8%	24.0%
PAT Margin	-	(16.0%)	(28.4%)	15.4%	15.3%	15.5%	15.7%	15.8%	16.2%	17.0%

5.1.5. Balance Sheet

The below mentioned is the balance sheet statement for the Low end waxing line:

Table 20: Balance Sheet

INR Lacs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Shareholders' Equity										
Equity Share Capital	145.9	216.2	365.9	408.2	408.2	408.2	408.2	408.2	408.2	408.2
Reserves & Surplus	-	(7.9)	(72.5)	7.5	135.7	268.8	407.3	549.8	699.2	860.5
Quasi Receipt (Grants)	-	-	-	-	-	-	-	-	-	-
Total Shareholders' Funds	145.9	208.3	293.4	415.7	543.9	677.0	815.5	958.0	,107.4	1,268.7
Liabilities										
Trade Payables	-	-	126.1	344.6	596.1	611.0	626.2	641.9	657.9	674.4
Total Current Liabilities	-	-	126.1	344.6	596.1	611.0	626.2	641.9	657.9	674.4
Long Term Borrowings	145.9	121.6	97.3	73.0	48.6	24.3	-	-	-	-
Total Non-Current Liabilities	145.9	121.6	97.3	73.0	48.6	24.3	-	-	-	-
Total Equity and Liabilities	291.8	329.9	516.7	833.3	1,188.6	1,312.3	1,441.8	1,599.9	1,765.3	1,943.1
Assets										
Cash and Cash Eq.	-	-	-	-	6.7	124.8	248.1	374.5	384.4	279.5
Fixed Deposits	-	-	-	-	-	-	-	24.8	172.9	447.5
Total Inventories	-	7.4	34.2	77.9	125.7	128.9	132.1	135.4	138.8	142.2
Trade Receivables	-	49.2	227.7	519.0	838.2	859.1	880.6	902.6	925.2	948.3
Total Current Assets	-	56.6	261.9	596.9	970.6	1,112.8	1,260.8	1,437.4	1,621.3	1,817.5
Net Block	291.8	273.4	254.9	236.4	217.9	199.5	181.0	162.5	144.0	125.6
Total Non-Current Assets	291.8	273.4	254.9	236.4	217.9	199.5	181.0	162.5	144.0	125.6
Total Assets	291.8	329.9	516.7	833.3	1,188.6	1,312.3	1,441.8	1,599.9	1,765.3	1,943.1





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