

## 1 MANGO AND OTHER FRUITS AND VEGETABLES PROCESSING

### 1.1 Introduction

Processing is one of the most effective solutions to reduce the wastages. In India processing of fruits and vegetables is extremely low and is below 2%. Value addition to the raw produce is only 7% compared to as much as 23% in China, 45% in the Philippines and 88% in the UK. Thus the processing (including value addition through post harvest management) industry holds tremendous potential not only for contributing to the GDP but also for generating employment in rural areas and business opportunities for entrepreneurs.

Among various processing technologies (canning, dehydration, pickling, provisional preservation, bottling etc), freezing is one of the most popular methods for preservation of foods. Main advantages of freezing technology include:

- Preservation of produce for 9-12 months without changing the basic characteristics and nutritional value of the food
- No preservatives are used
- Cost of processing is relatively less as compared to canning, bottling etc.
- The product is hygienic
- Convenience and off season availability

On the other hand there are certain special requirements such as maintenance of cold chain all through the sales channel and high power requirement for freezing and storage.

In last couple of years frozen mango pulp has become very popular in retail market. Even second rung cities like are becoming quite attractive and major players have set up distribution network in these cities.

### 1.2 Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up such a unit, technology and financial parameters of various components for preparation and submission of project proposal to bank for sanction of long term loan. This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility.

### 1.3 Raw Material Availability

The production of different fruits and vegetables in the state is given in the table below. Thus the availability of the raw materials would not be a problem.

Name of crops	Area	Production	Yield
Banana	<b>14941</b>	<b>5.976</b>	<b>40.00</b>
Guava	<b>2763</b>	<b>0.553</b>	<b>20.00</b>
Papaya	<b>684</b>	<b>0.185</b>	<b>27.00</b>
Potato	<b>47602</b>	<b>7.140</b>	<b>15.00</b>
Sweet Potato	<b>4192</b>	<b>0.252</b>	<b>6.00</b>
Onion	<b>35704</b>	<b>5.713</b>	<b>16.00</b>
Tomato	<b>18254</b>	<b>2.738</b>	<b>15.00</b>
Brinjal	<b>13208</b>	<b>1.981</b>	<b>15.00</b>
Cabbage	<b>3349</b>	<b>0.670</b>	<b>20.00</b>
Cauliflower	<b>7665</b>	<b>1.226</b>	<b>16.00</b>
Pea	<b>17278</b>	<b>1.901</b>	<b>11.00</b>

## 1.4 Market Opportunities

Refrigerated & frozen Foods showcase the fastest growing segment of the food and beverage industry - the entire chilled and frozen food market.

### 1.4.1 Market size and share of different companies

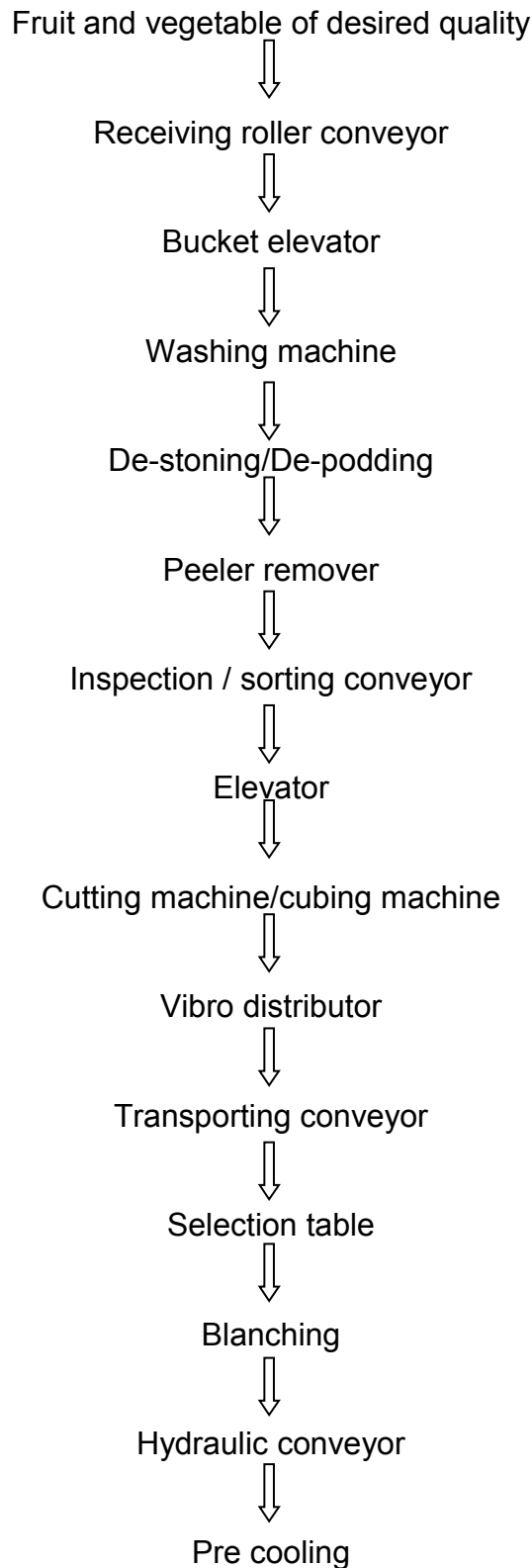
As per information compiled from the trade circles, the quantum of sale of various products in Indian market is as follows:

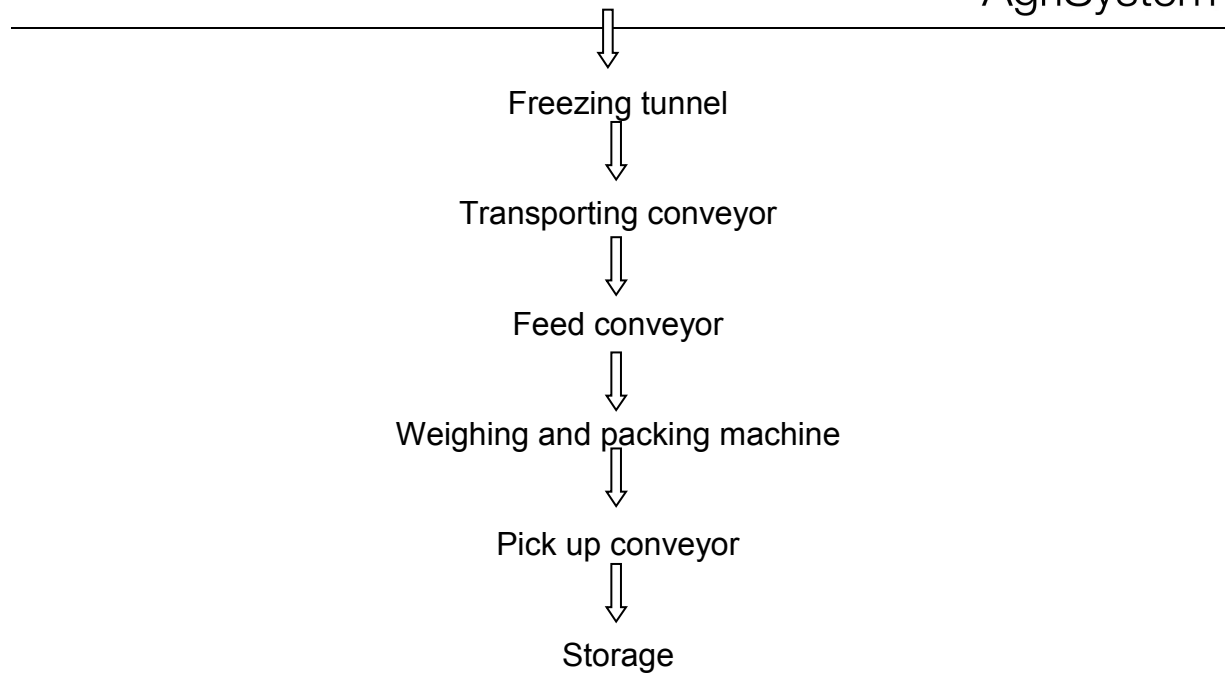
- Frozen peas, which is also the largest selling product in the market with annual sale of mere than 15,000 MT
- French fries (mostly imported) market is 2,500 MT
- Frozen mango products (pulp and cubes) 5000 MT
- Others 5,000 MT

## 1.5 Project description

### 1.1.1 Manufacturing Process

Figure 1 Process flow diagram for mango cubes, fruits and vegetables cubes, sweet corn and baby corn etc.





**Process description for frozen vegetables**

Procedure (in sequential order)	Description
<b>Grower Storage</b>	Produce arrive at the plant for processing.
<b>Inspection</b>	Samples of the unprocessed produce are taken to be graded and for grower payment.
<b>Raw Receiving</b>	Unprocessed produce is off-loaded from trucks and inspected to decide if it requires sorting. In case of mangoes, the produce is first ripened
<b>Peeling</b>	Unprocessed produce is peeled.
<b>Cutting</b>	Those products as may require cutting are cut according to buyer specifications. A special cutting equipment is proposed for the unit
<b>Grading</b>	Pieces that are too small or misshapen are removed from the main processing line and used in other products.
<b>Blanching</b>	Product like peas and sweet corn require blanching at 160°-180°F for 15-40 minutes to remove natural sugars, stabilize enzymes, and create a good texture.
<b>Pre-cool</b>	Blanched produce is pre-cooled at 0°F for 15 minutes before entering the freeze tunnel.
<b>Freeze Tunnel</b>	Produce is quickly frozen for 30 minutes at -40°F.
<b>Packaging</b>	The frozen products are packaged into bags.
<b>Warehouse</b>	Packages are stored in a cold storage warehouse until shipment to grocery stores, restaurants and other customers.

**Mango processing line**  
(Freezing system 1000 MT/hr)

- Pre-cooling belt
- Freezing tunnel
- Air moto condensing plant with screw compressor for pre-cooler and injection refrigeration plant for freezing tunnel with 3 nos. double screw compressor

**Packaging system**

- Transporting belt
- Inclined belt for feeding to weighing machine
- Weighing machine
- Form filling and sealing machine
- Pick-up conveyor
- Air compressor

**1.6 Capacity of Plant**

The planned capacity of the unit is 2498 Mt per annum.

**1.7 Project component and cost**

PARTICULARS	AMOUNT
LAND	201.04
BUILDING	394.91
PLANT & MACHINERY	464.87
MISC. FIXED ASSETS	33.50
CONTINGENCIES	109.43
PRE-OPERATIVE EXPENSES	173.50
MARGIN MONEY FOR WORKING CAPITAL	81.61
	<b>1458.88</b>

**1.8 Plant and Machinery**

The main machineries required are following:

FEEDING CONVEYOR
DEPODDER
WASTE CONVEYOR
GRAIN HANDLING SYSTEM
INSPECTION CONVEYOR
WASHER
BLANCHER
COOLER/CHILLER
VIBRATOR
INCLINED CONVEYOR WITH FOOD GRADE BELT
PEELING CONVEYOR WITH WASTE DISPOSAL SYSTEM
SHIFTING CONVEYOR
FEEDING TO IFQ, TANK-PUMP
FINISHER-TANK-PUMP
PHE ( 5 STAGES)
TANK- FILLING -PARKING

**1.9 Building**

The building development charges would cost around Rs. 394.91 lakhs.

### 1.10 Miscellaneous Assets

A provision of Rs. 33.50 lakhs would take care of all the requirements.

### 1.11 Preliminary & Pre-operative Expenses

A provision of Rs.173.50 lakhs would take care of pre-production expenses like establishment, professional charges, security deposits etc.

### 1.12 Working Capital Assessment

RAW MATERIALS	48.59	54.45	54.45	54.45	55.66
LABOUR COST	2.96	3.58	3.58	3.58	3.72
FINISHED GOODS	188.69	214.00	214.17	214.49	219.91
<b>TOTAL</b>	<b>240.23</b>	<b>272.04</b>	<b>272.20</b>	<b>272.52</b>	<b>279.29</b>
<b>MARGIN (%)</b>	72.07	81.61	81.66	81.76	83.79
<b>MPBF (%)</b>	168.16	190.43	190.54	190.76	195.51
<b>INTEREST ON WC LIMIT</b>	23.54	26.66	26.68	26.71	27.37
(14%)					

### 1.13 Means of Finance

<b>EQUITY</b>	679.44	46.57
<b>SUBSIDY</b>		
MFPI - Equipment	50.00	3.43
<b>TERM LOAN</b>	729.44	50.00
	<b>1458.88</b>	100

### 1.14 Cash flow statement

PARTICULARS	Year 1	Year 3	Year 5	Year 7
<b>SOURCES OF FUNDS</b>				
INCREASE IN SHARE CAPITAL	-	-	-	-
NET PROFIT	87.71	217.90	189.27	165.66
(INTEREST ADDED BACK)				
DEPRECIATION	45.39	45.39	45.39	45.39
PRELIMINARY EXP.W/O	17.35	17.35	17.35	17.35
INCREASE IN TERM LOAN	-	-	-	-
INCREASE IN WC	168.16	0.11	4.74	-
	<b>318.61</b>	<b>280.75</b>	<b>256.75</b>	<b>228.40</b>

### 1.15 Projected balance sheet

PARTICULARS	Year 1	Year 3	Year 5	Year 7
<b>LIABILITIES</b>				
SHARE CAPITAL	679.44	679.44	679.44	679.44
RESERVES & SURPLUSES	(37.95)	157.40	408.40	681.09
TERM LOAN	729.44	531.22	266.93	-
W.C	168.16	190.54	195.51	195.51
<b>TOTAL</b>	<b>1,539.09</b>	<b>1,558.60</b>	<b>1,550.27</b>	<b>1,556.03</b>

### 1.16 Profitability

PARTICULARS	Year 1	Year 3	Year 5	Year 7
INCOME	1202.02	1372.71	1403.62	1403.62

EXPENDITURE	1051.57	1082.66	1108.16	1108.16
VARIABLE	938.79	969.88	995.38	995.38
FIXED	112.78	112.78	112.78	112.78
GROSS PROFIT	150.45	290.05	295.46	295.46
DEPRECIATION	45.39	45.39	45.39	45.39
PROFIT AFTER TAXES	-37.95	121.48	129.15	138.29
RETAINED PROFIT	-37.95	121.48	129.15	138.29

### 1.17 Key Indicators

NET PRESENT VALUE at current Inflation (Rs in lakhs)	56.91
INTERNAL RATE OF RETURN %	22.45
AVERAGE DSCR	2.26
BREAK EVEN POINT %	71.42
PAY BACK PERIOD ( YEARS)	4.99

### 1.18 Manpower Requirement

PARTICULARS	NO.
<b>PERMANENT STAFF</b>	
MANAGER ( MARKETING)	1
MANAGER ( OPERATIONS)	1
TECHNOLOGIST/MANAGERS	1
MARKETING/SALE EXE.	3
ACCOUNTANT	2
ELECTRICIAN/MACHANIC	2
WATCHMAN/GUARD	4
<b>PROCUREMENT</b>	
TECHNICAL STAFF	2
<b>PRODUCTION</b>	
SUPERVISORY STAFF	4

### 1.19 Assumptions

<b>Project &amp; Financing</b>			
Contingencies on Building			10%
Contingencies on Equipment			10%
Term Loan			50%
Rate of Interest on Term Loan			10%
Subsidy Considered	Subject to ceiling	50 lakhs	25%
Expected time of Installation		Months	12
Moratorium		Months	6
<b>CAPACITY</b>			
Rated Capacity Per Annum	90% of Installed capacity	TPA	3000
Number of Operational Days	DAYS		210
Working Hours Per day	Hrs		3 shift
<b>CAPACITY UTILIZATION</b>			
Year I			85%
Year II			95%
Year III			95%
<b>OTHER EXPENSE</b>			
Commission			10.0%
Marketing Expenses			2.5%
<b>POWER</b>			
Connected Load	KWH		150

<b>DEPRICIATION AS PER COMPANY'S ACT</b>	
BUILDING	3.34%
PLANT & MACHINERY	5.28%
MISC. FIXED ASSETS	6.23%
LAND & SITE DEVELOPMENT	1.63%
<b>MAINTENANCE</b>	
BUILDING	1.00%
PLANT & MACHINERY	3.00%
MISC. FIXED ASSETS	2.00%
LAND & SITE DEVELOPMENT	1.00%

### 1.20 Selling and Raw material Price

	Green	Mango	Mango By -products		Sweet	Mix	Baby
	Peas	Dice	Bits	Pulp	corn	Veg	corn
Sales Rate per ton	RS/MT						
<b>Domestic Bulk sales</b>	42000	0	0	42000	45000	40000	50000
<b>Retail sales</b>	50000	0	0	0	50000	50000	55000
<b>Export sales</b>	50000	60000	65000	45000	50000	50000	60000
<b>Raw Material Cost (Landed Rs per kilo)</b>	8.00	12.00			6.00	9.00	7.00

The actual cost of projects may deviate on change of any of the assumptions.