

Pre-Feasibility Study

Fruit Juice Manufacturing



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1	PROJECT PROFILE	4
1.1	OPPORTUNITY RATIONALE	4
1.2	PROJECT BRIEF	4
1.2.1	<i>Sport or Isotonnesic Beverages</i>	6
1.2.2	<i>Energy Beverages</i>	6
1.2.3	<i>Nutraceutical Beverages</i>	6
1.2.4	<i>Herbal Beverages</i>	6
1.2.5	<i>Smart Beverages</i>	6
1.2.6	<i>Fun beverages</i>	6
1.3	MARKET ENTRY TIMING	8
1.4	PROPOSED BUSINESS LEGAL STATUS	8
1.5	PROJECT CAPACITY AND RATIONALE.....	8
1.5.1	<i>Basis/Rationale</i>	8
1.5.2	<i>Plant Capacity</i>	9
1.5.3	<i>Raw Material Sourcing – Backward Integration</i>	9
1.6	PROJECT INVESTMENT	9
1.7	PROPOSED PRODUCT MIX.....	9
1.8	PROPOSED LOCATION.....	11
2	KEY SUCCESS FACTORS/PRACTICAL TIPS FOR SUCCESS	12
2.1	BACKWARD INTEGRATION.....	12
2.2	PRODUCT QUALITY	12
2.3	DISTRIBUTION NETWORK	12
2.4	PRODUCT MARKETING AND EXISTING COMPETITION.....	12
2.4.1	<i>Existing Competition</i>	12
2.5	OTHER MARKETING ASPECTS.....	13
2.5.1	<i>Seasonality of Demand</i>	13
2.5.2	<i>Market Characteristics</i>	13
2.5.3	<i>Packaging</i>	13
2.5.4	<i>Product Distribution</i>	14
3	PRODUCT MARKETING	17
3.1	ADVERTISEMENT /PROMOTIONAL ACTIVITIES AND DEMAND CREATION.....	17
3.2	GUIDELINES ON PRODUCT MARKETING.....	18
3.2.1	<i>Road Side Stands</i>	18
3.2.2	<i>Restaurants and Hotels</i>	18
3.3	PRODUCT MARKETING PLAN AND BUDGET EXPENDITURES	18
4	SECTOR & INDUSTRY ANALYSIS	20
4.1	SECTOR CHARACTERISTICS AND OVER VIEW.....	20
4.2	SUB SECTOR INFORMATION	21
4.2.1	<i>Fruit Juice Industry</i>	21
4.3	FRUIT JUICE INDUSTRY – POTENTIAL BARRIERS	24
4.4	TAX STRUCTURE – FRUIT JUICE INDUSTRY.....	24
4.5	GOVERNMENT POLICY DIRECTION.....	24
4.6	QUALITY CONTROL ISSUES.....	24
5	MARKET INFORMATION	25
5.1	MARKET POTENTIAL	25
5.2	OPPORTUNITIES AND THREATS ANALYSIS.....	25
5.2.1	<i>Opportunity</i>	25
5.2.2	<i>Threat</i>	25
6	PRODUCTION PROCESS	26

6.1	FRUIT JUICE - PRODUCTION PROCESS FLOW	26
6.2	FRUIT JUICE PRODUCTION PROCESS	28
6.3	PACKING	28
6.4	STORAGE	28
7	RAW MATERIAL REQUIREMENT	29
7.1	OTHER RAW MATERIAL	29
7.2	PACKAGING MATERIAL AND RATIONALE	30
7.2.1	Aluminum Laminate Pouch Packs:	30
7.2.2	Tin packs:.....	30
7.2.3	Glass /plastic bottles:.....	30
7.2.4	Product Shelf Life	30
7.3	TECHNOLOGY AND PROCESSES	31
8	MACHINERY REQUIREMENT	32
8.1	PACKAGING & STORAGE	34
8.2	MACHINERY SUPPLIERS AND PLANT FABRICATORS	34
8.3	IMPORTED MACHINERY	34
8.4	PLANT AND MACHINERY MAINTENANCE	34
9	LAND & BUILDING REQUIREMENT	35
9.1	SITE DEVELOPMENT	35
9.2	LAND & BUILDING REQUIREMENTS FOR FRUIT JUICE FACTORY	35
10	HUMAN RESOURCE REQUIREMENT.....	36
11	FINANCIAL ANALYSIS & KEY ASSUMPTIONS	38
11.1	LAND & BUILDING	38
11.2	FACTORY / OFFICE FURNITURE & EQUIPMENTS	38
11.3	VEHICLES FOR TRANSPORTATION	39
11.4	POWER GENERATOR.....	39
11.5	DEPRECIATION TREATMENT	39
11.6	UTILITIES	39
11.7	WORKING CAPITAL REQUIREMENTS	40
11.8	PLANT & MACHINERY INSTALLATION & TRIAL RUN EXPENSES	40
11.9	PRE-OPERATING COSTS.....	40
11.10	MISCELLANEOUS EXPENSES	41
11.11	RAW MATERIALS INVENTORY	41
11.12	FINISHED GOODS INVENTORY.....	41
11.13	LOSSES DURING TRANSPORTATION AND DELIVERY	41
11.14	REVENUE PROJECTIONS.....	41
11.15	ACCOUNTS RECEIVABLES.....	42
11.16	ACCOUNTS PAYABLES.....	42
11.17	FINANCIAL CHARGES	42
11.18	TAXATION	42
12	SUMMARY OF ASSUMPTIONS.....	43
13	FINANCIAL STATEMENTS.....	46
13.1	INCOME STATEMENT	46
13.2	BALANCE SHEET	47
13.3	CASH FLOW STATEMENT.....	48

1 PROJECT PROFILE

1.1 Opportunity Rationale

The fruit juice industry coupled with beverage industry is considered to be one of the largest industrial sectors in Pakistan. It is to growing at a robust rate of 27%¹. Modernization of this industry, in consonance with the change in urban life style, massive shift of rural population to the urban areas, growth in population, etc., predict a growing potential for instant solutions in fruit juice segment of the beverage industry. Traditionally in Pakistan and generally all over the world people prefer to use natural drinks rather than carbonated soft drinks and this perception is gaining more currency day by day which also adds to the advantage of the fruit juice industry.

Common people especially young generation is inclined to have ready to consume drinks; in addition hotels, hospitals are also expanding day by day where juices could be marketed successfully. Moreover the global trend of preferring fresh fruits and juices also marks possibilities of growth in this sector. Furthermore, the growing exports volume and withdrawal of CED (customs and excise duty) on fruit juices (produced locally) could further supplement significant growth in the fruit juice industry.

1.2 Project Brief

Fruit juices are produced and consumed for their refreshing character and nutritional qualities being rich in vitamins and minerals and having regulatory functions to the body systems; such as augmenting of alkaline reserve of the blood and proper functioning of blood vessels, including capillary, permeability and fragility as a result of contained falconoid. Juices also increase body retention of calcium, magnesium, nitrogen and are also good sources of quick energy. These qualities need to be maximized in technologies used to process fruit juices.

Juice is generally defined as liquid extracted from the fruit, although many fruit juices are the results of expressing the liquid from the whole or cut fruit. There are some fruits where the distinction is not so apparent, e.g. fruits like mango, apple and banana when squeezed yields little or no juice; rather flesh is obtained which when comminutes will result in a dense puree and directly cannot be consumed as drink. Whereas in case of lemon, expressed fluid cannot be called juice, it is too sour to consume and can only be used as juice when diluted with sugar and water.

For commercial purposes, procedure involved in juice manufacturing varies from fruit to fruit. This process is a bit technical and lengthy which we will discuss in detail later in this document; however, broadly the fruit juice making process starts from fruit washing, drying, skin removing (normally for citrus fruits i.e. orange), deseeding, pulp macerating,

¹ Data obtained from Tetra Pack Reports

pressing, pasteurizing and storage which is then used for producing fruit juices. The process takes place using fruit processing machinery and during the process, preservatives are also added in order to avoid microbial growth and increasing shelf life. During the discussions with the industry experts and business stakeholders it was found that usually C grade (A grade is of export quality, B is consumed locally) fruit is used for the juicing or pulping purposes.

For industrial scale manufacturing of fruit juice, pulp is used which is available round the year; on the other hand, fresh fruits are also being used for 100% pure juice production. However, based on our discussions with industry experts, we understand that business viability could be a question mark when fruit juice business starts with fresh fruits processing.

The primary objective of the fruit processing is to preserve the perishable fruits in a stable form or juice that can be stored and supplied to local and distant markets during all months of the year. Processing also can change fruits into new or more usable forms and make fruits more convenient to prepare.

In Pakistan, people generally prefer fresh fruit juice which is extracted directly from the fresh fruit by using simple equipments like blender or squeezing machine. This type of micro scale commercial setups can be seen in mega cities and towns as an unorganized sector. However, preserved juices using tetra packs and other packaging forms and intended for direct consumption are obtained by the mechanical process from ripe fruits and subsequently preserved exclusively by physical means. The juice may be turbid or clear. The juice may have been concentrated and later reconstituted with water suitable for the purpose of maintaining the essential composition and quality factors of the juice.

It is absolutely necessary for someone starting a juice manufacturing operation to be familiar with the regulations and requirements of the market. For commercial purposes, it is important to define the differences (from other juice products) carefully and ensure that specifications and labeling are correct. There are circumstances where a 100 percent juice or puree product is impractical while dilution with other juices and/or water and sweeteners are practical, as long as the products are correctly identified. Water, sugar, organic acids and low cost bulk juices are much cheaper than higher value fruit solids. Thus, unlabelled dilution and adulteration practices are common in the market.

Following are the main types of fruit drinks:

- Sport or isotonic beverages
- Energy beverages
- Nutraceutical beverages
- Herbal beverages
- Smart beverages
- Fun beverages

1.2.1 Sport or Isotonnesic Beverages

These products are designed to replace fluids and electrolytes and provide extra energy during periods of intense exercise. Typically they have a low content juice base of 5 to 10 percent juice, added levels of sucrose, glucose (less sweet).

1.2.2 Energy Beverages

These are designed to increase the consumers' perception that they could have more energy either by increasing the levels of sugars in the beverage or having a stimulant like caffeine. These can be marketed to office workers in cities or to laborers who need additional energy during a long day.

1.2.3 Nutraceutical Beverages

This category is designed to provide healthful benefits beyond the calories they contain and are aimed at reducing the risk of various diseases. These beverages can contain vitamin C from citrus, vitamin A from fruits or vegetable juices and a mixture of plant extracts that are believed by local consumers to promote good health.

1.2.4 Herbal Beverages

These are similar to Nutraceutical drinks, but are made by adding herbs to a beverage. A word of caution is necessary here - while many of these herbs are safe at low levels of consumption they can become toxic at higher levels.

1.2.5 Smart Beverages

This popular group of beverages is believed to increase mental capacities on a short-term basis. Some of these drinks contain carbohydrates, such as glucose that is readily absorbed. Smart beverages may contain local herbs assumed to be effective for increasing mental capabilities.

1.2.6 Fun beverages

This category of beverages is designed to have a maximum eye appeal and must taste very good. Some of these have suspended colored particles or have weird names that appeal to kids. Typically Fun beverages contain a minimal amount of juice, but a maximum amount of advertising and label hype.

Some common juice designations are given in the following table:

Table 1.1: Juice Categories

S #	Term	Criteria	Remarks
1	Pure juice 100%	All juice	No adjustment, not from concentrate
2	Fresh squeezed	Not pasteurized	Held refrigerated, Food-safety concerns
3	Chilled, ready to serve	All juice	Held refrigerated, made from concentrate or pasteurized juice
4	Not from Concentrate	Single strength	Reconstituted and pasteurized
5	Fresh frozen	Un-pasteurized	Single strength, frozen after extraction
6	Juice blend	Un-pasteurized	Single strength, frozen after extraction
9	Nectar	Pulpy or clear	Sugar, water and acid added, 25 to 50% juice
7	Juice blend	All juice	A mixture of pure juices
8	Puree	Pulp-containing	More viscous than juices, totally fruit
10	Nectar base	Requires reconstitution	Possesses sufficient flavor, acid and sugar to require water dilution for consumption
11	Juice drink	Low in juice	Contains 10 to 20% juice
12	Juice beverage	Low in juice	Contains 10 to 20% juice
13	Fruit + ade	Lemonade	Contains greater than 10% fruit juice, sugar and water
14	Juice extract	Water extract	Fruit extracted by water, then concentrated
15	Fruit punch	Token juice	1% juice, + natural flavours
16	Juice cocktail	Low in juice	Contains 10 to 20% juice
17	*Natural flavored	Token juice	Usually greater than 1% juice + natural flavours

* juice designations we have proposed for this feasibility report

1.3 Market Entry Timing

Beginning of summer (May, in most of the country regions) season is supposed to be the best time to start fruit juice marketing operations, where, production operations could be started from January to February Since fruit juice is considered to be a highly agro based industry, juice production should be started when fresh crop is coming into the market and pulp is easily available at low prices. This will also be highly dependable on what fruit is being selected for juice production, however, for the purpose of this pre-feasibility we propose to go for Mango, Guava and Orange juices for which pulp is available throughout the year at reasonable prices.

Hot weather increases liquid consumption all over the country; and instantly available drinks become more attractive and valuable for the general public in metro cities and towns & for seasonal consumers (especially in Northern areas). All these conduce to a mass consumption of drinks in the form of plain water, carbonated drinks and fresh/instant fruit juices etc. People everywhere in general and in northern areas especially are inclined to use fruit juices for gaining extra energy which supports extra physical activities. This is the most suitable time to market fruit juice.

Another thing that has to be taken into account before entering into this business is that usually in the peak seasons when fresh crops coming into the market people shift to the freshly extracted juices rather than preserved solutions.

1.4 Proposed Business Legal Status

The legal status of business tends to play an important role in any setup; the proposed Fruit Juice Manufacturing setup is assumed to operate as a Private Limited Company.

1.5 Project Capacity and Rationale

1.5.1 Basis/Rationale

In recommending the plant capacity we have considered the following main factors:

- Current and future demand for the products in the local market.
- Trend of imports by the local market, which is not more, then 2%² of the total juice consumed locally.
- Availability of raw materials (fruit pulp) and the seasonal supply.
- The need to have a medium sized but manageable fruit juice processing plant.
- Discussions with the industry experts and entrepreneurs.

² Based on the discussions with the industry experts, entrepreneurs

1.5.2 Plant Capacity

The proposed project will have a capacity to produce 5000 trays of 24 packs in 250ml tetra pack servings of fruit juice daily and the juice specifications and other details would be as follows:

Table 1.2: Proposed Capacity

Product Name	Production Assumption	Juice Criteria	No. of Trays Produced / Day (Year 1)
Guava Juice	15%	Token Juice	450
Mango Juice	50%	Token Juice	1,499
Orange Juice	20%	Token Juice	599
Juice Blend	15%	Token Juice	450

The plant will be operated at 60% capacity utilization for 8 hours a day in the beginning; however, a 5% annual increase in capacity utilization is assumed. Expansion to a higher capacity can be considered later and will mainly be dictated by the level of business performance.

1.5.3 Raw Material Sourcing – Backward Integration

To support the production operations, continuous supply of fruit pulp plays a key role for the success in the fruit juice business. Therefore, it is proposed for the fruit juice manufacturer to finalize the buying deal with the pulp processor **six months prior to the commencement of the production operations.**

1.6 Project Investment

Total cost of the project is estimated at around Rs. 128.31 million. The working capital requirement is around Rs 19.96 million and the rest will be the fixed capital.

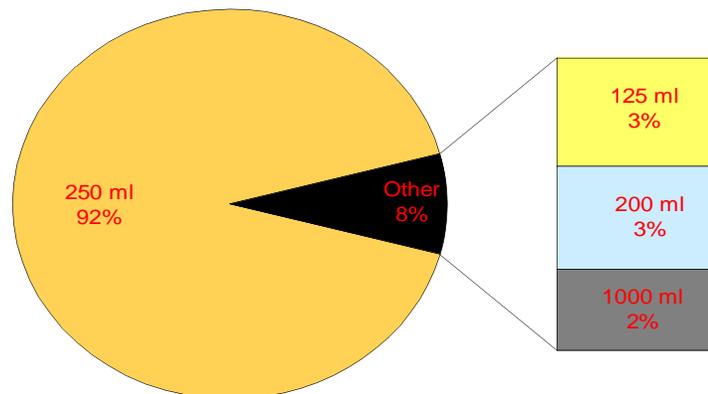
1.7 Proposed Product Mix

For the purpose of this feasibility, the product mix is assumed to be as given on page 9.

Table 1.3: Proposed Product Mix

S. No.	Fruit	Product Name	Product Specification	Packaging	Quantity	Selling Price (Rs.)
1	<u>Guava</u>	<u>Guava Drink</u>	Guava Pulp 4%, Treated Water, Sugar, Citric Acid, Natural Mango Flavor, Color and Preservatives	Tetra pack	250 ml	7.6
2	<u>Mango</u>	<u>Mango Drink</u>	Mango Pulp 4%, Treated Water, Sugar, Citric Acid, Natural Mango Flavor, Color and Preservatives		250 ml	7.6
3	<u>Orange</u>	<u>Orange Drink</u>	Orange Pulp 4%, Treated Water, Sugar, Citric Acid, Natural Mango Flavor, Color and Preservatives		250 ml	7.6
4	<u>Guava, Mango & Orange</u>	<u>Juice Blend</u>	Guava, Mango & Orange Pulp 4%, Treated Water, Sugar, Citric Acid, Natural Mango Flavor, Color and Preservatives		250 ml	7.6

Around 92%³ of the total fruit juice market is accounted for by 250ml tetra pack servings while the rest 08% includes 500ml and 1000ml packs.



³ Data Provided by Tetra Pack

This shows significant convenience (from consumer's perspective) and high sales frequency in 250ml package category. Based on this market situation, it could be observed that the entrepreneur should focus more on small serving packs rather than one liter or other serving sizes.

Since a 100 percent juice or puree product is impractical especially in the case of fleshy/pulpy fruits i.e. mango, to convert them into consumable drink, dilution with other juices and/or water and sweeteners is required. Therefore we have proposed the product mix as presented in the table above. It is expected to be practically workable and financially viable for an entrant in the fruit juice business. Another reason for proposing the above product mix is that high quality 100% pure juices would cover the manufacturing cost only if provided in big size serving packs i.e. one liter or 1 ½ liter or bulk supply to contract customers and mass availability of fruit pulp is ensured, which is a difficult task for a new starter.

In the context of the aforesaid, it is suggested that a new entrant should consider the 100% pure juice production once the first course is complete and understanding of the typical business demographics, export market as well as contemporary fruit juice business skill is developed.

1.8 Proposed Location

Location to setup a fruit juice-processing unit largely depends on the continuous (and at reasonable price) availability of raw material; however, factors like availability of manpower, utilities and easy market access should also be carefully assessed.

Most of the existing fruit juice units are being operated in Lahore, Bahawalpur, Karachi, Hyderabad, Hattar (NWFP), Loralai, and Sargodha. For citrus fruits Sargodha is the best location; and NWFP or Balochistan are preferred locations for setting up processing units for apple, apricot, pear, grape and pomegranate. Province wise proposed locations are provided below:

- Punjab - Lahore, Sargodha, Gujranwala
- Sindh – Hyderabad, Karachi
- NWFP - Malakand or Hattar Industrial State
- Balochistan - Loralai

2 Key Success Factors/Practical Tips for Success

Fruit Juice Business is highly dependent on the trade margins given to the distributors and retailers; however, following additional factors are considered as important for success:

2.1 Backward Integration

Frequent and continuous availability of quality fruit pulp is a prerequisite for Fruit Juice Business. It is the only way to integrate operations from fruit orchards to pulp processing to juice making and packing. Integrated and earlier pulp supply arrangements with pulp producers and suppliers would be critical in business success.

2.2 Product Quality

Quality should be emphasized at each step right from the beginning to the marketing of the product. Over the years, an image of high quality products should be cultivated.

2.3 Distribution Network

Distribution network should be given extra emphasis. Market share could be gained by enhancing retailer, and distributor margins. Normally distribution and retailer margins in fruit juice business are from 15 to 20%.

2.4 Product Marketing and Existing Competition

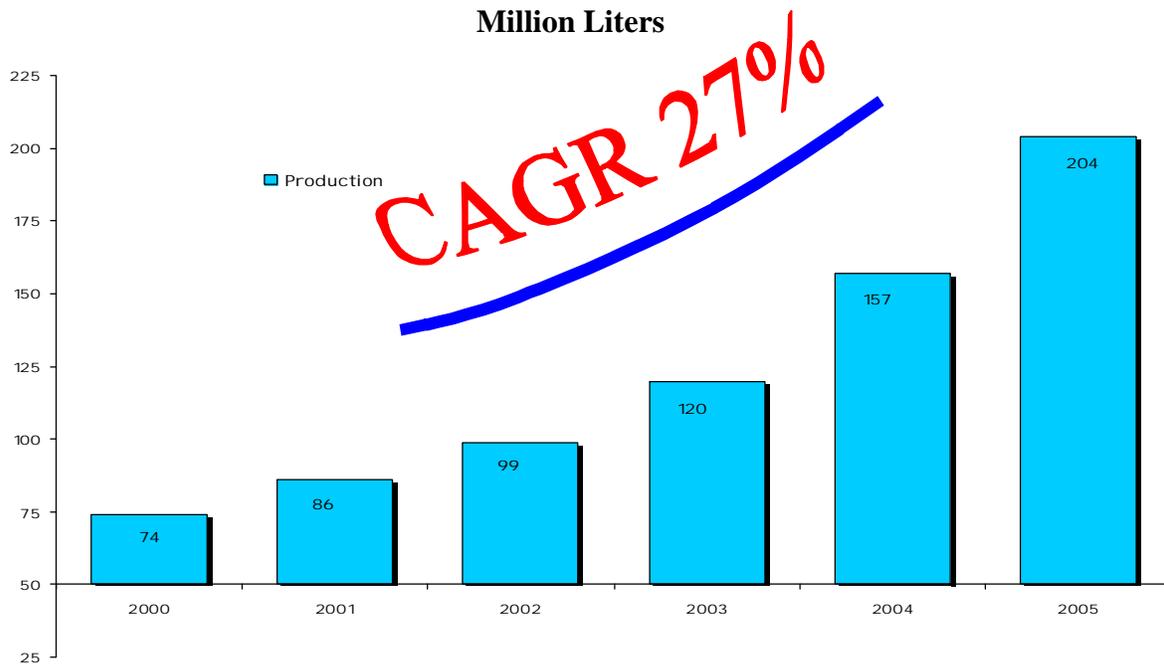
2.4.1 Existing Competition

Imported fruit juices are not more than 2% of the total quantity consumed locally; and are generally available on those departmental stores, hotels, and foodstuff specialty shops almost reserved for high income groups. Therefore, imported juices are not considered as direct or indirect competitors.

Competition from the formal sector might be with FROST and TWIST who are enjoying major share of the Punjab market in 250ml serving packs, where in Sindh, FROOTO is almost a household name in the same fruit juice category. However, there are other juice brands i.e. Golden, Tropic (Marketed by Haleeb), etc. which could be considered as likely competitors.

The major competition threat would be from informal sector units who are engaged bulk juice manufacturing. They produce chemical based, adulterated, fake juices using artificial flavorings and colors with minimum overheads and substandard juice manufacturing methodology, which result in low manufacturing cost and high margins for distributors and retailers. A detailed account of the local competitors and players has been provided in the second section of the report in sector analysis.

Despite the stiff competition, given the right marketing strategies, market penetration is still possible because the market is growing at an annual rate of combined annual growth rate of 27%⁴.



2.5 Other Marketing Aspects

2.5.1 Seasonality of Demand

Processed food products are in great demand during July-December. This is the peak period for tourists and hoteliers as well as tour operators to stock the products in large quantities to cater for the increased number of arrivals. It is also a dry season when the fruit juices are in great demand by the local consumer.

2.5.2 Market Characteristics

Customers are sensitive to the quality, price, color and size (weight) of the product. They would purchase the products frequently, immediately and with minimum effort; to the marketer of food-processed products, this calls for prompt and regular supply of the products and effective marketing/advertising.

2.5.3 Packaging

Processed food products are packed in tins/cans, Tetra packs and aluminum laminate pouch packaging in milliliters/liters or kilograms. The quantity of fruit juice products

⁴ Data provided by Tetra Pack

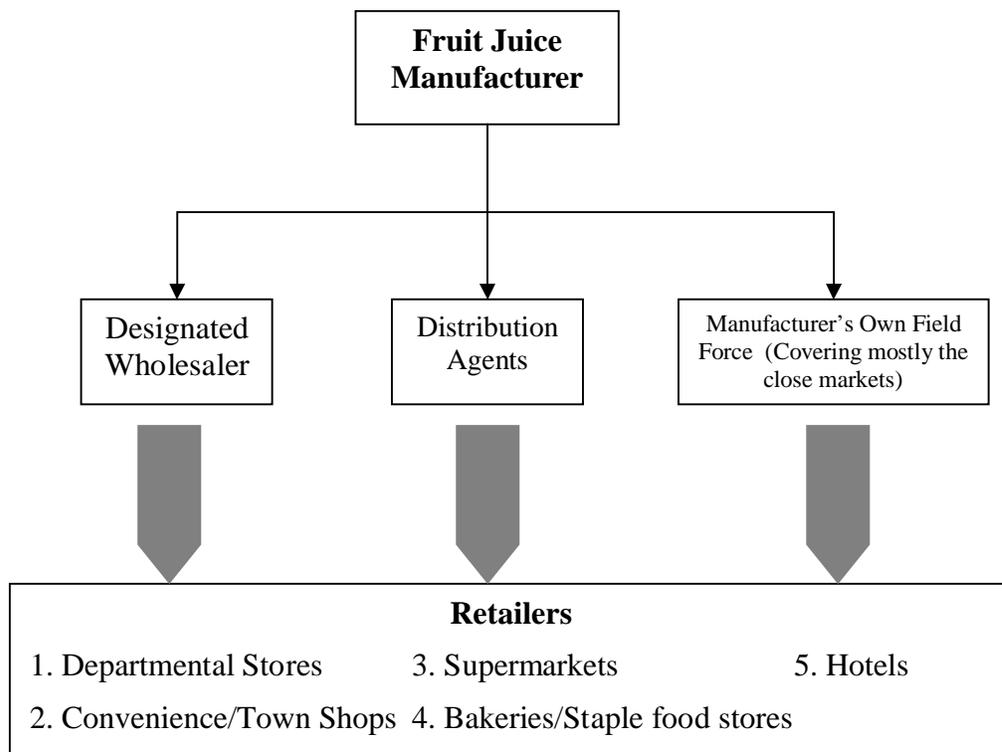
varies from 200 ml to over 1 ½ liter. Most of the local juice manufacturers penetrating the Pakistani market using tetra pack cartons, which come in 1 liter, 500ml and 250 ml handy packs.

Our study has shown that except in few cases, locally processed fruit juice products are characterized by poor packaging, labeling and absence of vacuum packing unlike the imported products, which are well packed and marked. Thus, appropriate and attractive packaging is one of the areas, which a new entrepreneur should strive to effect and maintain.

2.5.4 Product Distribution

The effectiveness of distribution coverage and practice is of paramount importance in achieving the desired fruit juice sales. Understanding of the distribution channels is crucial in order for the manufacturer to plan and implement an effective distribution strategy. Our study shows that the distribution of fruit products and juices is done through multiple channels involving producers, importers, wholesalers, retailers and users. While it is the common practice for the individual customers to buy the products from the retail outlets; institutional/ organizational buyers such as tourist hotels and agencies would normally place orders directly with the producers/importers and wholesalers.

A typical distribution setup in fruit juice business involves the following hierarchy starting from the manufacturer to the consumer:



Fruit Juices are consumed both in rural and urban areas without any exception and brand loyalty does exist for fruit juices i.e. Frooto in Karachi and Twist and Frost have a strong penetration in Punjab's urban and rural markets, whereas, low cost and cheap juices having token juice element are available in the rural areas.

As in case of other consumer goods, the effectiveness of distribution network for fruit juices is a function of similar parameters, i.e. distribution margins, frequency of distribution and product penetration. However, 'sale first pays after' type distribution strategy was also observed during the study in which usually new comers of the industry offers to the retailers to keep the fruit juice in their shop and pay as the product is sold. The distribution and retail margin is around 15% to 20% for the fruit juice industry which is relatively higher than the other consumer goods due to the strong competition.

A domestic producer is generally able to handle distribution within his home city and surrounding areas. Most manufacturers use their own sales force for distribution in the close local area. Very few market players in the fruit juice business have their own national scale distribution networking, e.g. Shezan.

For a fruit juice manufacturer, when he expands the market to another city (or one outside his local distribution capability) he normally signs up a distribution agent to cover the entire city market. Distribution agents generally work to target the city market (including hotels) and cover the full spectrum of retailers; however, a manufacturer can designate own distribution to the hotels where bulk delivery is expected in large packaging.

The wholesaler's main job is to sell and promote the manufacturer's product at one wholesale market. Manufacturers generally appoint a designated (or primary) wholesaler, either one per city, if the city is a bigger one and its markets cater to different non-overlapping localities, or one per wholesale market. Smaller cities move all of their consumer goods through a single major wholesale market. Sometimes manufacturers rent or buy a stand in the major wholesale markets of their home city and act as their own primary wholesaler, although this is rather uncommon.

Secondary wholesalers generally sell to small local retailers (convenience stores), although sometimes their products go onto tertiary wholesalers in even smaller localities. The retail price formation formula varies significantly for different products as they move through the above distribution channels. Generally speaking, lower-value bulk products are modestly marked up by manufacturers and wholesalers and rely on large volumes to achieve profitability.

Based on discussion with industry experts, it appears advisable to operate with a mixed distribution setup. For the purpose of the project under consideration, we propose that company owned distribution team would cover the home city and the factory surrounding areas to capture the niche market which will provide business a room for survival whereas distant distribution operations will be outsourced to the distribution agents playing around the distribution margins and other promotional schemes. Designated wholesalers and secondary wholesalers may also play a key role in capturing far off

markets for the product. For setting up a distribution network and sourcing of distributors across the country for metro cities and town, the following may be considered:

- **Infinity Distributors**
Abdullah Plaza,G-10,Markaz
Islamabad

- **Kamran Distributors (Pvt) Ltd.**
C-1/A,S.I.T.E. Karachi

- **Kohinoor Distributors**
Saddar Bazar,Sahiwal

- **Multichannel Distributors Limited**
S/15,S.I.T.E., Karachi

- **Mushtaq Distributors**
1,Street 17,Housing Colony #1
Toba Tek Singh

- **National Distributors (Pvt) Ltd.**
U-49,Raja Bazar,Rawalpindi

- **National Progressive Distributors**
Plot No.11A,New Karachi,SITE,Gulshan-e-Maymar
Karachi

- **New Mehran Distributors**
22 Police Welfare Centre,Block-E,North Nazimabad
Karachi

- **Prime Distributors**
Industrial Estate,Kohat Road
Peshawar

3 PRODUCT MARKETING

3.1 Advertisement /Promotional Activities and Demand Creation

The marketing and promotional activities of fruit juice and related commodity groups are crucial in increasing the demand for fruit juices. These activities include, but are not limited to, promotion, advertising, new product development, and packaging innovations.

Marketers adopt their strategies in accordance with specified consumer wants and needs. They also create product image and influence consumer purchases. Often, consumer demands for processed food like juices are difficult to categorize. Consumers tend to purchase products and services that cover a broad spectrum of price and value combinations. Servicing the educated, nutritionally aware consumer who dwell in the localities i.e. Defence, Clifton, Gulshan-e-Iqbal etc. in Karachi and same type of consumer category in Lahore and other metro cities is a complex role which marketers strive to master. In these types of areas people use to have a pure fruit juice at least once a day, with an imported or prime local fruit juice. Similarly this market could be catered through intensive marketing and promotion campaign on television or other sophisticated media.

New product developments in conjunction with technological advancements have improved the marketing of fruit juices like many other food items. Relatively recent innovations appearing on supermarket shelves are single serving aseptically packaged fruit juices, fruit roll-ups and fruit juice blends.

Marketing infrastructure, which includes refrigerated transportation facilities and the composition of retail and wholesale markets, is correlated to the consumer demand for high quality produce. Equipment that transports from the field to the supermarket, field wrapping machines, improved cooling techniques, and temperature controlled distribution centers have been developed to ensure the delivery of quality produce to retail outlets.

It is also important to ensure that the product has a meaningful point of difference i.e. sophisticated and healthy attractive packaging, less use of preservatives and clearly mentioning of purity of the juice etc. Most new products fail in the market because they are "me-too" products with no unique benefit (or attraction) for the consumer.

Generally for the fruit juice business advertising budget is around 5% of the Total Revenue but for a small or medium scale unit, it may vary (on the higher side).

Billboards, Television, Radio, F.M Channels, and Newspapers are the conventional mediums, which have been powerfully used for the promotion of fruit juice products.

3.2 Guidelines on Product Marketing

3.2.1 Road Side Stands

Roadside stands in the peak season of the fruit will be helpful for the juice producer to develop the brand awareness in a short time period which would be coinciding with harvest schedules and weather circumstances and seasonality. Advantages of a roadside stand include the following:

- You can manage time more efficiently between factory and stand operations.
- Transportation costs are reduced.
- You can expand production to meet consumer demand.
- You can expand production as you improve your regional-sales ability.
- You can improve facilities as volume and returns increase.

3.2.2 Restaurants and Hotels

Selling directly to restaurants eliminates one or two middlemen which help in increasing profit margins. By assuming traditional wholesaler functions, the juice producer can keep the profit that normally goes to the wholesaler. Often chef and restaurant owners are willing to make the extra effort to get high quality and specialty items, but they demand the same consistent quality and service from the producer that they can get from a wholesaler/importer—broad product line, partial cases of product, clean produce, frequent delivery schedules, convenient ordering, etc.

Urban, suburban, and tourist destination areas usually have the number and type of restaurants that could make selling directly to restaurants economically feasible. A restaurant's needs depend on its style of cuisine, chef's preferences, number of customers, and menu prices. Generally, restaurants that feature regional specialties, vegetarian dishes, or unique cuisine are the best candidates for direct sales. For example, restaurants in the Northern areas and metro cities could be the potential customers.

Frequently cited advantages for direct-to-restaurant/Hotels sale include:

- A higher wholesale selling price
- A potentially higher net profit
- A possible outlet for specialty or unusual products
- More precise production planning
- Effective counter competitive strategy aimed at wholesaler and established brands like Shezan, Maza who have a year-round products line and regular sale staff

3.3 Product Marketing Plan and Budget Expenditures

Marketing and promotion of a new fruit juice brand will be critical. Before going into the details of marketing and promotion it would be recommended to also take into account the following points:

- Fruit juices in smart neat packaging with clearly written specifications (i.e. 100% pure etc.) attracts consumer in first light. Therefore, if the juice is visibly placed on a

separate stand in a neat and clean shop, it is likely to attract the consumer and there will be no requirement of pre-sale buy-in.

- Well balanced price and quality combination will be helpful to attract the consumer.
- Juice stands are good promotional mediums when placed in the restaurant of good reputation in terms of cleanliness and sophistication i.e. KFC, McDonalds, and Pizza Hut (there could be other comparable hotels and restaurants). Although, this type of promotional format would be unconventional, yet it would be a unique point for marketing if somehow made possible.

4 SECTOR & INDUSTRY ANALYSIS

4.1 Sector Characteristics and Overview

Agriculture sector highly depends on the weather circumstances. God has gifted Pakistan with several varieties of fruits and vegetables. Modern processing and packaging techniques make seasonal fruits and vegetables available all year round to almost all parts of the globe. Tropical fruit like mangoes can be enjoyed in temperate countries. Today, the world horticulture industry is a \$77 billion market comprising of the following sub sectors:

- Vegetables; fresh or preserved
- Fruits and nuts; fresh or preserved (excluding oil nuts)
- Fruit and vegetable juices (unfermented).
- Spices
- Bulbs, tubers, rhizomes of flowerings
- Cut flowers and foliage

The break up of the world horticulture market is Fruits 41%, Vegetables 39%, Juices 8%, Flowers 7% and Bulbs 5%.⁵ Pakistan's share in the horticulture market is \$ 12.6 million while the world's fruit and vegetable import markets are estimated at US\$42 billion.

It is interesting to note that in terms of volume, Pakistan is globally ranked 6th for the production of Kinoo, 6th for the production of mangoes and 36th for the production of apples.

Pakistan produces a wide variety of fruits and vegetables, with total annual production estimated at 13.2 million metric tons. Production estimates for various fruits are given in the following table:

Fruit	Production in metric tons(2005)
Citrus Fruit	1,670,000
Mango	1,673,900
Apple	360,000
Guava	570,000
Total Fruit Production	5,751,800

Source: Pakistan Horticulture Development & Export Board

⁵ Source: Pakistan Horticulture Development & Export Board

Provincial fresh fruits production share is provided below:

Province	% Share
• Punjab	59.6
• Sindh	8.6
• NWFP	6.2
• Balochistan	25.6

Source: Pakistan Horticulture Development & Export Board

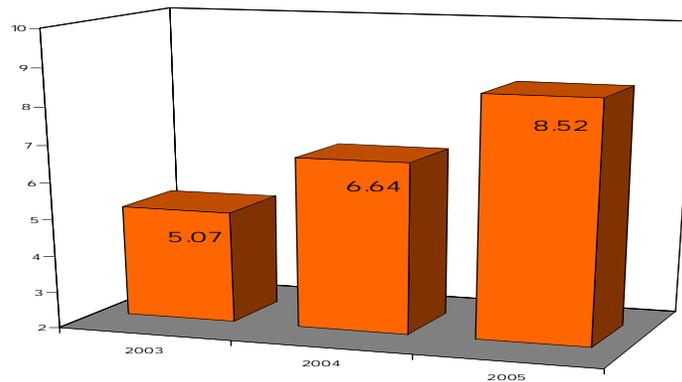
Although mechanized grading and packaging has started but still nearly 50 percent of total fruit and vegetable production is reportedly lost during harvesting, transportation, preservation and storage.

4.2 Sub Sector Information

4.2.1 Fruit Juice Industry

Products which come under beverage industry are: carbonated drinks, fruit juices, squashes, syrups, powder drinks and mineral water; for the purpose of this study, we are confined to the fruit juice segment.

Currently in Pakistan, there are 24 fruit juice/pulp processing units and a number of small units in the informal sector are working. The present installed capacity is estimated around 400,000 metric tons per annum with a demand for juices growing at a combined annual growth rate of 27%. The fruit juice industry reported sales of 8.52⁶ billion Rupees in year 2005.



Most of the fruit juice manufacturing units are operating in Lahore, Sargodha, Bahawalpur, Hyderabad, Gujranwala, Hattar NWFP and Karachi. The following table presents a synopsis of some well known local and imported brands:

⁶ Source: Tetra Pack

Table 4.1: Major Brands

Fruit Juice Brand	Company Name	Juice Category	Available in Packaging
1. Frost	Nestle	Token Juice	250ml Tetra Pak
2. Nestle	Nestle	Orange, Mango, Apple, Red Grape Juice, Pineapple & Mixed Fruit	1000ml Tetra Pak & 250ml Tetra Pak
3. Good Day / Tropico	Haleeb	Apple, Pineapple, Red grape, Mango, Orange, and mixed fruit	1000ml Tetra Pak & 250ml Tetra Pak
4. Golden	Standard Fruits Ltd.	Token Juice	250ml Tetra Pak
5. Poly	-	Token Juice	250ml Tetra Pak
6. Mango Drink	Maaza Pakistan Pvt. Ltd.	Dense or Thick Mango	250ml Tetra Pak and Glass Bottle
7. Frooto	Frooto Industries (Pvt.) Ltd.	Token Juice	250ml Tetra Pak
8. Punch	Shezan International Ltd.	Both in 100% Pure Orange Juice & Mixed Fruit Blended	1000ml Tetra Pak
9. Caution	Shezan International Ltd.	Energy Drink (Not Actually Fruit Juice)	200ml Tetra Pak
10. Twist	Shezan International Ltd.	Token Juice	250ml Tetra Pak
11. Red Bull	Imported	Energy Drink (Not Actually Fruit Juice)	250ml Tetra Pak
12. Lacnor	Imported	100% Pure Orange Juice	1000ml Tetra Pak

Following are considered to be the major players of fruit juice industry.

Table 4.2: Major Players

S. No.	Name	S. No.	Name
1	Sunflo Cit-Russ (Re-Started, but not catering to local market)	14	National Fruit Juices
2	Cargill Pakistan	15	Standard Fruits
3	Fresh Juices	16	Fruit Sap
4	Haleeb	17	FADCO
5	Shezan	18	Pakistan Fruit Juices
6	Milk Pak	19	Ali Hassan Corporation
7	Indus Fruit Juices	20	Kamran Distributors
8	Tops Foods & Beverages	21	Popular Food Industry
9	Malik Food Industry	22	Benz Industries
10	Shaheen Foods	23	Mitchells
11	Sinsas Enterprises	24	Hyderabad Beverages
12	Langar-e-Sulaimani	25	
13	Nestle	26	

Shezan, Ahmed and Mitchell's largely considered market leaders in fruit and vegetable processing industry; yet, each of them has its own product specialty i.e. Ahmed enjoys an almost monopoly like situation in pickle and sauces segment while Mitchell's has been considered the market leader in Jams, Jellies and marmalades. Shezan has an edge over other with its own fruit farms. Currently Shezan is giving tough time to other fruit juice manufacturers due to its quality and huge export volume as well as capturing local fruit juice market where it has competition with Nestle and Haleeb. Most of them offer fruit juice in tetra packs where squashes and syrups are available in glass bottles.

4.3 Fruit Juice Industry – Potential Barriers

- A significant number of fruit juice manufacturers have imported cheap, second hand machinery which is inefficient with high cost of production.
- The packaging material, such as glass bottles are inconvenient and expensive.
- Many manufacturers use small percentage of real fruit juice, rendering low quality product not offering a long life.
- Many units were established through bank loans. The project owing to various reasons could not generate sufficient funds to repay loans and have turned into sick units.
- Lack of infrastructure and limited budget for advertising & publicity.
- Most consumers continue to show a preference for fresh foods.
- High cost of processed food due to high input, processing & packaging costs.
- Low income coupled with erosion in purchasing power
- Inadequate infrastructure facilities including storage & transportation facilities.
- Lack of awareness of standards required for processing of foods.

4.4 Tax Structure – Fruit Juice Industry

Duties and taxes are classified into two categories, namely import duty and sales tax. Import duty on food processing machinery equipments and food products vary from 5% to 25% and on packaging machinery from 0% to 10%. The sales tax is 15% on all categories.

4.5 Government Policy Direction

In the beverages segment, the government has exempted local Fruit Juice Industry from Custom and Excise Duty to give boost to the sector.

4.6 Quality Control Issues

Government has laid down certain regulations, which include registration of food products with Pakistan Standard Quality Control Authority (PSQCA) and carrying a safety logo on the package. Failure to do so is punishable by fine and imprisonment.

5 MARKET INFORMATION

5.1 Market Potential

Installed capacity of fruit juices in Pakistan is around 400,000 Mt. as provided in the EAC-2003 report, where as the demand for juices have grown at 27%⁷ in last 5 years.

Pakistan's population for the year 2005-06 is estimated around 153.45⁸ million with a population growth rate of 1.9% per annum. If we simply workout the total fruit juice consumption on population growth rate, we can safely observe that juice consumption will definitely increase. Moreover, current developments in the local and global economic scenario also add to the constructive growth in all sectors of the country. The improvement in economic affairs of Pakistan over the last few years, government's positive measures towards expansion of the industrial sector, revision of the duty structures and exemption from excise duty (especially for fruit juices), etc. are factors which are likely to further reinforce the development of the industrial sector.

5.2 Opportunities and Threats Analysis

5.2.1 Opportunity

- Healthy organic and natural drinks oriented global and local culture.
- Limited options in locally produced real fruit juices.
- High Export potential.
- With good pre-harvest planning, which is around 50% of the total production, could be turned into potential business opportunity.
- Reduction in excise and import duties on food processing machinery.

5.2.2 Threat

- Unavailability of adequate industry statistics.
- Single product company
- High processing and packaging costs
- High cost of backward integration (availability of raw material)
- Threat from other fruit juice exporting countries (India and china who are already in foreign market).
- Price sensitivity and low consciousness towards quality amongst consumers.
- Wide availability of sub-standard (with token juice) substitutes.
- Heavy advertising from existing giant players.
- High cost to meet international quality standards.

⁷ Tetra Pack, ⁸ Economic Survey of Pakistan 2005-06

6 PRODUCTION PROCESS

Fruit juice production procedures involved in fruit juice manufacturing depending on what type of the juice the unit is going to make. For the purpose of this -feasibility, we propose the 4% token juice drink of Citrus fruit (Orange), Mango and Guava.

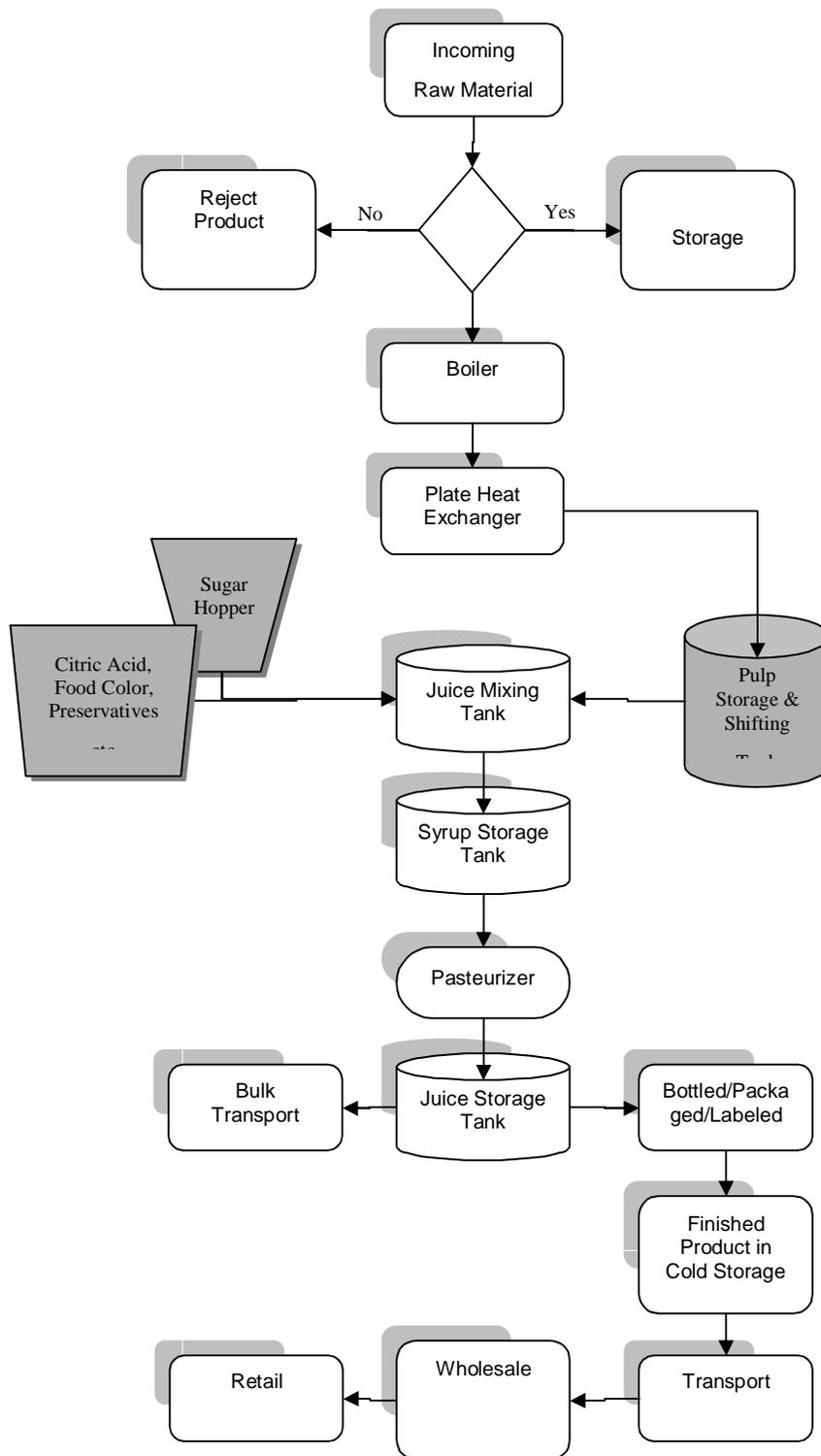
6.1 Fruit Juice - Production Process Flow

Production of fruit juices is a standardized process and type of technology depends on type of fruits, scale of operations and availability of investment financial resources. For the purpose of this pre-feasibility, the focus is on Citrus fruit (Orange), Mango and Guava juices. Initial preparatory processes for all fruits will be similar, as will be the last stages of juice/pasteurization section and packaging, although differences in handling juice composition arise in certain cases due to the nature of the fruit and percentage of pulp involved. Basically, preparation process of juices involves the following steps:-

- Boiling of fruit pulp
- I) Pulp Storage in Tank
- II) Sugar Hopper
- Pulp and ingredients mixing
- Syrup Storage in Tank
- Juice Preparation
- Juice Storage Tank
- Filling and Packaging
- Cooling and Storage

In the following pages the process flowchart and brief description of the various processes involved in fruit juice production is outlined.

Fruit Juice Production Process Flow



6.2 Fruit Juice Production Process

Pulp is shifted to the boiler where it is cooked and shifted to the plate heat exchanger. Pulp is then stored in the pulp storage tank. Pulp is then supplied to the mixing tank in the desired quantity while in mixing tanks; any additives to the pulp are made at this stage before it is pumped to syrup storage tanks. Blended juice is then pumped through pasteurizer; where it is heated to 90°C to inactivate enzymes and living organism. After pasteurization the juice passes through final filtration, before loading it into a juice storage tank. Juice from the tank is ready for packaging

6.3 Packing

The juice will be then packed in the quantities demanded by the market. Consumer packs as we have proposed for this pre-feasibility will be in units of 250ml tetra packs.

6.4 Storage

Products will be stored in cool dry store before distribution.

7 RAW MATERIAL REQUIREMENT

Raw material required for manufacturing fruit juice are fruit pulp, citric acid, food color, sugar, preservatives and fruit flavors. Although, juice manufacturers use molasses to thicken the juice, this is not a good practice and therefore should be avoided. All raw materials are easily available in the local market, however, fruit pulp is considered to be the principal component of the high quality fruit juice, therefore, its continuous and within the required quantity availability will need some advance planning.

Fruit pulp could be purchased from open market or directly from pulp producers, however, it would be safe to sign a contract or negotiate with a pulp producer to insure the availability of pulp before the commencement of production operations. Prices for the fruit pulp have been collected from the market and are given below:

Fruit(s)	Purchasing Price/k.g.
Guava pulp	Rs. 25
Mango pulp	Rs. 35
Orange pulp	Rs. 30

(Price quoted above are subjected to the volume and payment terms)

It is also observed that pulp prices fluctuate with the fruit prices and crop quality/quantity. Therefore, it would be a sane decision to firm up the pulp buying deal with the producer during the peak season of the fruit when it is available in low prices so that the unit could get into the value chain and get maximum discount and desired quantity. Seasonal availability calendar of the above fruits in Pakistan is as below:

Fruit	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Guava												
Mango												
Orange												

7.1 Other Raw Material

The ratio and utilization of other raw material depends on what percentage of pure juice the unit is going to produce; however, following are the main ingredients which will be required for the juice production proposed for this pre-feasibility:

- Treated Water 80%
- Fruit Pulp 4%
- Sugar } 10%-16%
- Citric Acid }
- Fruit Flavor }
- Preservative }

7.2 Packaging Material and Rationale

Packaging of processed foods has always been critical to decide, since health and safety matters have been of prime concern to all consumers who go for preserved food stuff. Fruit juice, being in liquid and drinkable form could be harmful for consumers' health because of high probability of microbial growth and little shelf life. That is the primary reason why 'tetra pack' packaging got enormous popularity vis-à-vis other packaging materials i.e. tin pack, aluminum laminate pouch pack, glass bottles and plastic bottles.

Though materials like aluminum laminate pouch packs, bottles of glass and plastic and tin packs are also safe for packaging food stuff; however, the material cost, availability and comparable cost and similar related factors make it difficult to prefer them over tetra pack.

In the following lines we have outlined our findings regarding different foodstuff packaging materials:

7.2.1 Aluminum Laminate Pouch Packs:

- It is not locally available and need to be imported.
- Juice manufacturer will have to import the material in minimum 3 ton quantity.
- Material for one 250ml pack will cost around 10 rupees, which is financially unfeasible.
- Machinery costs around 250 million Euros which when coupled with the raw material, appears to be very high.

7.2.2 Tin packs:

- Locally available tin plates are not of good quality and food grade.
- Substandard tin plates reduce the shelf life of the product.
- Not safe for fruit juices

7.2.3 Glass /plastic bottles:

Plastic and glass bottles are not feasible in small serving packs due to high cost of material and huge distribution logistics requirement.

7.2.4 Product Shelf Life

Fruit juice shelf is a matter of high importance and should be given ample attention before getting into the course of juice production operations. It was observed that generally most of the juice packs are provided with their shelf life written very clearly;

however, it was observed that a juice in 250ml or in small serving packs have shelf life of less than 6 months, whereas, 100% pure juices in large packs are available with longer shelf life from 6 months to 1 year. Shelf life mainly depends on the preservatives, their quality/quantity and the production process followed.

7.3 Technology and Processes

Machinery required for the processing of fruit and juice packaging is available both local and imported. Local packaging machinery reportedly give poor quality output especially for fruit juice packaging which is considered to be highly sophisticated and hygienic; hence it could not be done by using local machinery. However, pulp processing and juice production could be done on locally fabricated machinery. Following machinery will be required for setting up a fruit juice plant:

- I. Fruit Juice Pre-Packaging Production Line
- II. Fruit Juice Filling & Packaging Line

8 MACHINERY REQUIREMENT

For the fruit juice production, packaging and storage both local and imported machinery can be used, however, for packaging it is proposed to use imported machinery rather than local machinery which is although a low cost option, yet do not provide good quality and quantity of output.

On the other hand for juice production and processing machinery; local machinery fabricators use local and imported material and parts (available locally), and their performance is considered to be as good as of imported plant in quality and output. It will also help in reducing the fixed cost of the project. Required machinery for the proposed project will include the following for which cost and other specifications are also being provided:

Table 8.1: Plant & Machinery

Pre-Packaging Processing Plant/ Machinery/Equipments					
S. No.	Machine	Required No. of Units	Capacity	Total Cost (in million Rupees)	Local/Imported
1	Boiler	2	2 tons	800,000	Local
2	Air Compressor	2	7 Bar	1,200,000	Local
3	Plate Heat Exchanger	2	2,500 liter	3,500,000	Local
4	Sugar Hopper	1	500 k.g.	300,000	Local
5	Syrup Storage Tank (316 Grade Stainless Steel)	2	3,000 liter	1,000,000	Local
6	Mixing Tank with Scale Moderator	1	5,000 liter	500,000	Local
7	Juice Storage Tank	2	5,000 liter	1,000,000	Local
8	CIP Tank	3	2,000 liter	750,000	Local
9	Pulp Storage & Shifting Tanks	1	500 liter	100,000	Local
10	Balance Tank	1	100 liter	50,000	Local
11	Turbine	2	1/2 Cusec	1,000,000	Local
12	Fork Lifter (Second Hand)	2	2.5 tons	900,000	Local

13	Shrink Wrapping / Tray Making Machine	2	400 tray/hr.	300,000	Local
14	Conveyor		-	1,000,000	Local
15	Misc Fitting / Pippings, Motors, Pumps, Valves		-	2,500,000	Local
Total				14,900,000	

Packaging Machinery Requirement

S. No.	Machine	Required No. of Units	Capacity	Total Cost (in million Rupees)	Local/Imported
1	Tetra Pak - TBA 19	2	7,500 packs of 250ml/hr	\$988,000	Tetra Pak
2	Freight			\$40,000	Tetra Pak
Total				PKR 61,680,000	

Other Machinery Requirement

S. No.	Machine	Required No. of Units	Capacity	Total Cost (in million Rupees)	Local/Imported
1	Electric Generator	1	200 KVA	2,000,000	Local
2	Cold Storage Machinery & Equipment	-	1,000 sq. ft.	3,000,000	Imported
3	Tools & Equipment	-	-	500,000	-
4	Laboratory Equipment & Water Treatment	-	-	1,000,000	-
5	Installation Charges			1,000,000	
	Total			7,500,000	
Total Machinery Cost				84,080,000	

Source: Based on the information gathered from the market experts and other sources during the study

8.1 Packaging & Storage

To maintain the quality of product, it is proposed to have a cold storage facility for storing pulp and finished product. For this purpose refrigeration machinery and chilling room building has been included in the project cost.

8.2 Machinery Suppliers and Plant Fabricators

Some of the local fabricators of *fruit juice pre-packaging production machinery* are as follows:

- Installation & Fabrication Engineers (Private) Limited 21/22 K. M. Ferozepur Road, Lahore
- Unique Engineering works (Private) Limited, 233-S, Industrial Estate, Township, Lahore
- Central Engineering Services (Private) Limited, 119-S Industrial Estate, Township, Lahore
- Two Star Industrial Estate, Township, Lahore

For *refrigeration machinery* following could be contacted:

- Pakistan Air-conditioning Engineering Co. (Private) Limited Gardee Trust Building, Napier Road, Lahore
- Kold Kraft, Industrial Estate, 247-S Kot Lakhpat, Lahore

8.3 Imported Machinery

Imported Plants from Italy and China are available comprising of main sections of the plant only, which is to be supplemented with ancillary local components. Offices of suppliers of foreign plants for fruit juice pre-packaging production line process are located at:

- Burtuzi, Lahore Cantt.
- Tetra Pak, Upper Mall, Lahore

8.4 Plant and Machinery Maintenance

Plant and Machinery is expected to be serviced on an annual basis. During the projection period, maintenance expenses are estimated to be around 1.5% of the cost of machine for first five years and thereafter rise to 2.5% for the next five years.

9 LAND & BUILDING REQUIREMENT

9.1 Site Development

The fruit juice processing project is estimated to require a total area 1 acre. This area will give ample space in the beginning for sitting buildings and different services necessary for the project i.e. juice processing and packaging machinery installation, storage and vehicle parking area, etc.

9.2 Land & Building Requirements for Fruit Juice Factory

Building requirements for the fruit juice factory would be as follows:

Table 9.1: Land & Building

Details	Size/Area (Sq. Ft.)	Civil Works /Construction Cost/Sq. Ft.	Total Construction Cost
Land			
1 acre of Land at Sundar Estate @ 3.5 million / acre			3,500,000
Factory / Covered Area			
Process Hall	15,000	650	9,750,000
Cold Storage	1,000	500	500,000
Storage Godown (Raw Material)	5,000	500	2,500,000
Factory Office	1,000	800	800,000
Other Services (water plant, boiler, tool shop)	2,500	500	1,250,000
Total Covered Area	24,500		14,800,000
Parking Area	2,500	100	250,000
Ground for Expansion	16,500	30	495,000
Total Land/Construction Cost	43,500	-	19,045,000

10 HUMAN RESOURCE REQUIREMENT

A total 33 persons will be required to handle the business operations of a fruit juice manufacturing unit. The business unit will work on one shift basis. Technical staff with relevant experience is sufficient to look after specific tasks at the plant while trained staff will be required for operating production plant and packaging machine.

Total approximate manpower required for the business operations along with the respective salaries are given in the table below: (Rs.)

Table 10.1: Human Resource

Staff Title	No of Persons	Monthly Salary	Annual Salary
Production Staff (Factory)			
1. Business Unit Manager/Owner	1	100,000	1,200,000
2. Factory Manager (Technical Manager)	1	50,000	600,000
3. Processing Supervisor	1	30,000	360,000
4. Production Supervisor	1	30,000	360,000
5. Electrician	2 (@ 8,000)	16,000	192,000
6. Chemist	1	15,000	180,000
7. Skilled Workers	5(@ 10,000)	50,000	600,000
8. Helpers	8(@ 5,000)	40,000	480,000
Total Factory Staff	20	331,000	3,972,000
General Administration/ Selling & Distribution Staff			
9. Selling & Distribution Incharge*	1	40,000	480,000
10. Selling & Distribution Officer*	2(@20,000)	40000	480,000
11. Accountant/Cashier	1	15,000	180,000
12. Store Keeper	1	7,000	84,000
13. Purchase Officer	2 (@ 8,000)	16,000	192,000
14. Guard/Chowkidar	4(@5,000)	20,000	240,000
15. Driver	2 (@ 5,000)	10,000	120,000
Total G A /S & D Staff	13	148,000	1,776,000
TOTAL	33	479,000	5,748,000

A chemist with bachelor degree in chemistry with some experience in food processing sector is recommended. The electrician should be a diploma holder and production and processing staff will be with sufficient (at least one year) experience in plant operations. However, awareness to food, safety, health and hygiene standards would be a pre-requisite for all the factory staff.

11 FINANCIAL ANALYSIS & KEY ASSUMPTIONS

The project cost estimates for the proposed “Fruit Juice Business” have been formulated on the basis of discussions with industry stakeholders and experts. The projections cover the cost of land, machinery and equipment including office equipment, fixtures etc. Assumptions regarding plant and machinery have been provided, however, the specific assumptions relating to individual cost components are given as under.

11.1 Land & Building

As we have given above, factory land would be purchased and factory building would be constructed. Total initial outflow for acquisition of land and factory building would be as follows:

Table 11.1: Land & Building - Cost

Land for factory	Purchased	Rs.	3,500,000
Construction			15,545,000
Total		Rs.	19,045,000

11.2 Factory / Office Furniture & Equipments

The business will have office equipment and furniture of Rs: 1,221,000. Details are given in the table below.

Table 11.2: Furniture & Equipment

Description	Unit	Cost	Total Cost
AC	5	50,000	250,000
Electrical Fittings	1	200,000	200,000
Furniture	1	350,000	350,000
Total			800,000
Office Equipment			
Computers	10	28,000	280,000
Printer	2	18,000	36,000
Fax	2	10,000	20,000
Scanner	1	10,000	10,000
Photocopier	1	75,000	75,000
Total			421,000

11.3 Vehicles for Transportation

The proposed setup would require two vehicles to carryout all factory and office activities and to cater delivery requirements. The cost of vehicles is assumed to be Rs. 2,000,000.

Table 11.3: Vehicles

Description	Unit	Cost	Total Cost
Delivery Truck(Second Hand)	1	1,100,000	1,200,000
Hyundai Shehzor	1	650,000	650,000
Fiber Glass Body (Hyundai)			150,000
Total			2,000,000

11.4 Power Generator

Due to the perishable nature of the product, finished goods and raw material (fruit juice and pulp) could be spoiled in case of power failure/non-availability. Therefore to cover up this risk, a power generator with 200 KVA capacities will be purchased. A generator of this capacity will cost around Rs. 2,000,000/-.

11.5 Depreciation Treatment

The treatment of depreciation would be on a diminishing balance method at the rate of 10% per annum on the following.

- Plant & machinery
- Land & Building Construction and Renovation
- Vehicles
- Furniture and Fixtures etc.

11.6 Utilities

The proposed fruit processing machinery will be operated using electricity for running production, packaging and refrigeration machineries. This would draw considerable amount of electricity. The cost of the utilities including electricity, Gas, Diesel/fuel (for power generator), telephone, and water is estimated to be around Rs. 270,000/- per month. The utility expenses are assumed to increase at 10% per annum:

Table 11.4: Utilities

Utility	Total Monthly Cost (Rs.)
1. Electricity	150,000
2. Gas or Furnace Oil, Lubricants etc.	25,000
3. Diesel for Generator	20,000
4. Water	50,000
5. Telephone	25,000
Total	270,000

11.7 Working Capital Requirements

It is estimated that an additional amount of approximately Rs. 19.96 million will be required as cash in hand to meet the working capital requirements, contingency cash for initial stages and to finance the receivables. These provisions have been estimated based on the following assumptions for the proposed fruit juice business.

Table 11.5: Working Capital Requirement

Cost	Amount in Rs.
First Three Months Salaries,	1,437,000
First Three Months Utilities Charges	810,000
Misc. Expenses	1,000,000
Inventory (Raw Material-2 Month) (Excluding Packaging Material)	6,218,176
Permanent portion of working capital in the form of Cash	10,500,000
Total	19,965,176

11.8 Plant & machinery Installation & trial run expenses

Plant and machinery installation and trial run expenses has been assumed to be around Rs. 1,000,000/-. It has been included in the plant and machinery cost.

11.9 Pre-Operating Costs

A lump sum provision of Rs. 2,000,000 is assumed to cover all preliminary expenses like registration, documentation charges, and salaries during the construction period, utilities, fuel, etc. These will be amortized over the 5 year period.

11.10 Miscellaneous Expenses

Miscellaneous expenses of running the business are assumed to be Rs. 1,000,000 per year. These expenses include various items like office stationery, daily consumables, fuel expenses of vehicles, traveling allowances, entertainment etc. and are assumed to increase at a nominal rate of 10% per annum.

11.11 Raw Materials Inventory

It is assumed that an initial raw material inventory (excluding packaging material) for two month would be purchased the total cost of which would be around Rs.5.1 million. The cost of raw materials is expected to increase at the rate of 5% per annum for the projected period.

11.12 Finished Goods Inventory

The proposed setup is assumed to maintain a Finished Goods Inventory of 15 days of the total annual production.

11.13 Losses during Transportation and Delivery

As per our findings during the discussions with existing industry players and experts, losses during transportation and delivery are expected in fruit juice industry because of the delicate packaging. The losses are assumed to be around 0.5% of the total gross production.

11.14 Revenue Projections

For the revenue projections, fruit juice is assumed to be produced in 250ml Tetra pack with following initial prices.

Table 11.6: Revenue Projections

Juice Type/Category	<u>Price charged / Tray (RS)</u>
GUAVA JUICE	Rs: 182 / Tray
MANGO JUICE	Rs: 182 / Tray
ORANGE JUICE	Rs: 182 / Tray
BLENDED JUICE	Rs: 182 / Tray

Of total juice production Mango juice will be 50%, Guava and Blended juice is 30% and Orange juice is assumed to be 20%.

It has been assumed that it will take some time for the business to reach the optimal capacity utilization point for the projected period. Therefore the first year sales are assumed to be based on 50% capacity utilization and an annual increase of 5% in capacity utilization is assumed over the projection period. It is also assumed that the *sales*

price of the product will increase at 5% every year. A provision for wastage is assumed to be around 0.01% of the daily production.

11.15 Accounts Receivables

A collection period of 60 days is assumed for sales which are based on our findings during the discussions with the industry experts. A provision for bad debts has been assumed equivalent to 3% of the annual gross sales.

11.16 Accounts Payables

A payable period of 60 days is assumed for raw material purchases.

11.17 Financial Charges

It is assumed that long-term financing for 7 years will be obtained in order to finance the project investment cost. This facility would be required at a rate of 14% per annum with 84 monthly installments over a period of seven years. The installments are assumed to be paid at the end of every month.

11.18 Taxation

The business is assumed to be run as a private limited company; therefore, tax rate of 35% which is applicable on the income of a private limited company is used for income tax calculation of the business.

12 SUMMARY OF ASSUMPTIONS

Total project cost for Juice plant is estimated to be around Rs. 128.31 million. This includes capital expenditure as well as working capital. Details are highlighted below.

Table 12.1: Summary Assumptions

Project Investments	
Land	3,500,000
Construction	15,545,000
Plant & Machinery	84,080,000
Furniture & Fixtures & Office Equipment	1,221,000
Vehicles	2,000,000
Pre-Operating Costs	2,000,000
Total Fixed Assets	108,346,000
Initial Working Capital	19,965,176
Total Project Investment	128,311,176
Project Analysis	
NPV @ 16.4%	29,237,034
IRR	21%
Pay Back	4.9 Years
Cost of Capital	
Required Rate of Return on Equity	20%
Cost of Debt	14%
Debt to Equity ratio	60:40
WACC	16.4%
Revenue Generation	
Daily Production of Fruit Juices	120,000 (Packs of 250 ml / Day)
Annual Production	37,440,000 Packs of 250 ml
First Year's Capacity Utilization (%)	60%
Fruit Juice Production (First Year)	22,464,000 Packs of 250 ml

Sales Price / Tray (Guava)	Rs: 182 / Tray
Sales Price / Tray (Mango)	Rs: 182 / Tray
Sales Price / Tray (Orange)	Rs: 182 / Tray
Sales Price / Tray (Blended)	Rs: 182 / Tray
First Year's Revenue (Rs.)	Rs: 162,822,443
Sales Price growth rate	5% / Year
Operation Assumptions	
Guava Juice (Sales % in Total Sales)	15%
Mango Juice (Sales % in Total Sales)	50%
Orange Juice (Sales % in Total Sales)	20%
Blended Juice (Sales % in Total Sales)	15%
Working Months in a year	12
Days Operational in a month	26
Days operational in a Year	312
Shifts Operational	1
Hours per shift	8
Initial year Capacity utilization	60%
Capacity Utilization growth rate	5%
Maximum Capacity utilization	90%
Raw Material Inventory (days)	60
A/C Receivable (days)	60
A/C Payables (days)	60
Finished Goods Inventory (days)	15
Marketing Expense (% of Revenue)	10%
Utilities Expense per month	270,000
Utilities Expenses Growth Rate	10%
Salaries Growth rate	10%
Repair and Maintenance (as percentage of machinery)	From year 1-5, 1.5 %

	From year 6-10, 2.5%
Long-term interest Rate	14%
Debt tenure (Years)	7
Depreciation on machinery (Straight Line method)	10%
Depreciation on F&F, Office Equipment	10%
Depreciation on Vehicles	10%
Misc Expense	1,000,000 / Year
Tax rate	35%
Amortization of pre-operating expenses	5 Years

Ingredients cost breakdown of one tray - (One tray = 24 packs of 250 ml each)

Material	Quantity	Price (Rs)
Guava Pulp Cost	240 grams	6
Mango Pulp Cost	240 grams	8.4
Orange Pulp Cost	240 grams	7.2
Sugar	600 grams	15
Treated Water	5.2 Liters	1.5
Food Color, Citric Acid, Preservative and Flavor		5
Juice Serving Pack Including Straw	2.6	62.4
Shrink Wrapping and Tray Packing Material		7
Cost of Guava Juice / Tray	24	107
Cost of Mango Juice / Tray	24	109
Cost of Orange Juice / Tray	24	108
Cost of Blended Juice / Tray	24	108

13 FINANCIAL STATEMENTS

13.1 Income statement

Projected Income Statement (Rs.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net (Adjusted Sales)	162,822,443	184,687,380	203,617,910	224,488,828	247,499,022	272,867,771	300,836,826	316,293,476	332,105,524	348,707,913
Cost of Sales	108,685,044	119,807,231	132,067,640	145,582,756	160,480,991	176,903,895	195,007,506	205,396,707	216,369,249	227,960,690
Raw Material	101,473,044	111,874,031	123,341,120	135,983,584	149,921,902	165,288,897	182,231,009	191,342,559	200,909,687	210,955,171
Labor (Production Staff)	3,972,000	4,369,200	4,806,120	5,286,732	5,815,405	6,396,946	7,036,640	7,740,304	8,514,335	9,365,768
Utilities	3,240,000	3,564,000	3,920,400	4,312,440	4,743,684	5,218,052	5,739,858	6,313,843	6,945,228	7,639,751
Gross Profit	54,137,399	64,880,149	71,550,271	78,906,071	87,018,031	95,963,876	105,829,319	110,896,769	115,736,275	120,747,223
Gross Profit Margin	33%	35%								
General Administrative & Selling Expenses										
Salaries	1,776,000	1,953,600	2,148,960	2,363,856	2,600,242	2,860,266	3,146,292	3,460,922	3,807,014	4,187,715
Rent Expense	-	-	-	-	-	-	-	-	-	-
Amortization of Preliminary Expenses	400,000	400,000	400,000	400,000	400,000	-	-	-	-	-
Depreciation Expense	10,284,600	9,256,140	8,330,526	7,497,473	6,747,726	6,072,953	5,465,658	4,919,092	4,427,183	3,984,465
Maintenance Expense	1,261,200	1,261,200	1,261,200	1,261,200	1,261,200	2,102,000	2,102,000	2,102,000	2,102,000	2,102,000
Selling & Distribution	16,282,244	18,468,738	20,361,791	22,448,883	24,749,902	27,286,777	30,083,683	31,629,348	33,210,552	34,870,791
Misc Exp	1,000,000	1,100,000.00	1,210,000.00	1,331,000.00	1,464,100.00	1,610,510.00	1,771,561.00	1,948,717.10	2,143,588.81	2,357,947.69
Subtotal	31,004,044	32,439,678	33,712,477	35,302,412	37,223,170	39,932,506	42,569,194	44,060,079	45,690,338	47,502,919
Operating Income	23,133,355	32,440,471	37,837,794	43,603,659	49,794,861	56,031,370	63,260,125	66,836,691	70,045,937	73,244,304
Financial Charges (14% Per Annum)	10,342,090	9,301,073	8,104,588	6,729,418	5,148,877	3,332,295	1,244,421	-	-	-
Earnings Before Taxes	12,791,265	23,139,398	29,733,206	36,874,241	44,645,984	52,699,075	62,015,704	66,836,691	70,045,937	73,244,304
Tax	4,476,943	8,098,789	10,406,622	12,905,984	15,626,095	18,444,676	21,705,497	23,392,842	24,516,078	25,635,506
Net Profit	8,314,322	15,040,608	19,326,584	23,968,257	29,019,890	34,254,399	40,310,208	43,443,849	45,529,859	47,608,797
Monthly Profit After Tax	692,860	1,253,384	1,610,549	1,997,355	2,418,324	2,854,533	3,359,184	3,620,321	3,794,155	3,967,400

13.2 Balance sheet

Projected Balance Sheet (Rs.)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
Current Assets											
Cash & Bank Balance	13,747,000	(318,563)	12,192,636	27,302,560	44,462,767	63,921,887	85,258,437	109,442,176	154,738,447	201,542,433	249,822,142
Raw Material Inventory	6,218,176	16,912,174	18,645,672	20,556,853	22,663,931	24,986,984	27,548,149	30,371,835	31,890,426	33,484,948	35,159,195
Finished Goods Inventory	0	5,174,895	5,704,581	6,288,486	6,932,159	7,641,719	8,423,910	9,286,168	9,776,729	10,294,444	10,840,932
Accounts Receivable	0	27,137,074	30,781,230	33,936,318	37,414,805	41,249,837	45,477,962	50,139,471	52,715,579	55,350,921	58,117,985
Total Current Assets	19,965,176	48,905,581	67,324,119	88,084,217	111,473,662	137,800,426	166,708,458	199,239,649	249,121,182	300,672,746	353,940,255
Fixed Assets											
Plant Machinery & Facility	84,080,000	75,672,000	68,104,800	61,294,320	55,164,888	49,648,399	44,683,559	40,215,203	36,193,683	32,574,315	29,316,883
Factory Construction	15,545,000	13,990,500	12,591,450	11,332,305	10,199,075	9,179,167	8,261,250	7,435,125	6,691,613	6,022,452	5,420,206
Land for Factory	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000
Furniture & Fixtures	1,221,000	1,098,900	989,010	890,109	801,098	720,988	648,889	584,001	525,600	473,040	425,736
Vehicle	2,000,000	1,800,000	1,620,000	1,458,000	1,312,200	1,180,980	1,062,882	956,594	860,934	774,841	697,357
Total Fixed Assets	106,346,000	96,061,400	86,805,260	78,474,734	70,977,261	64,229,535	58,156,581	52,690,923	47,771,831	43,344,648	39,360,183
Intangible Assets											
Preliminary Expenses	2,000,000	1,600,000	1,200,000	800,000	400,000	0	0	0	0	0	0
Total Assets	128,311,176	146,566,981	155,329,379	167,358,951	182,850,922	202,029,961	224,865,039	251,930,572	296,893,013	344,017,393	393,300,438
Owner's Equity	51,324,470	59,638,792	74,679,401	94,005,984	117,974,241	146,994,131	181,248,530	221,558,737	265,002,586	310,532,445	358,141,243
Short-term Liabilities											
Account Payable	0	16,912,174	18,645,672	20,556,853	22,663,931	24,986,984	27,548,149	30,371,835	31,890,426	33,484,948	35,159,195
Long Term Liability											
	76,986,705	70,016,014	62,004,306	52,796,113	42,212,750	30,048,846	16,068,360	0	0	0	0
Total Equity & Liabilities	128,311,176	146,566,981	155,329,379	167,358,951	182,850,922	202,029,961	224,865,039	251,930,572	296,893,013	344,017,393	393,300,438

13.3 Cash Flow Statement

Projected Statement of Cash Flows (Rs.)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cash Flow From Operating Activities											
Net Profit	0	8,314,322	15,040,608	19,326,584	23,968,257	29,019,890	34,254,399	40,310,208	43,443,849	45,529,859	47,608,797
Add: Depreciation Expense	0	10,284,600	9,256,140	8,330,526	7,497,473	6,747,726	6,072,953	5,465,658	4,919,092	4,427,183	3,984,465
Amortization Expense	0	400,000	400,000	400,000	400,000	400,000	-	-	-	-	-
(Increase) / decrease in Receivables	-	(27,137,074)	(3,644,156)	(3,155,088)	(3,478,486)	(3,835,032)	(4,228,125)	(4,661,509)	(2,576,108)	(2,635,341)	(2,767,065)
Increase / (decrease) in Payables	-	16,912,174	1,733,498	1,911,181	2,107,077	2,323,053	2,561,166	2,823,685	1,518,592	1,594,521	1,674,247
(Increase) / decrease in RM	-	(10,693,998)	(1,733,498)	(1,911,181)	(2,107,077)	(2,323,053)	(2,561,166)	(2,823,685)	(1,518,592)	(1,594,521)	(1,674,247)
(Increase) / decrease in FG Inventory	-	(5,174,895)	(529,686)	(583,905)	(643,673)	(709,560)	(782,191)	(862,257)	(490,561)	(517,715)	(546,488)
Net Cash Flow From Operations	0	(7,094,872)	20,522,907	24,318,117	27,743,571	31,623,023	35,317,036	40,252,099	45,296,271	46,803,986	48,279,709
Cash Flow From Financing Activities											
Receipt of Long Term Debt	76,986,705										
Repayment of Long Term Debt		(6,970,691)	(8,011,708)	(9,208,193)	(10,583,363)	(12,163,904)	(13,980,486)	(16,068,360)	-	-	-
Owner's Equity	51,324,470	0	0	0	0	0	0	0	0	0	0
Net Cash Flow From Financing Activities	128,311,176	(6,970,691)	(8,011,708)	(9,208,193)	(10,583,363)	(12,163,904)	(13,980,486)	(16,068,360)	0	0	0
Cash Flow From Investing Activities											
Capital Expenditure	(105,125,000)					0					0
Factory/Office Furniture	(1,221,000)										
Preliminary Operating Expenses	(2,000,000)										
Raw Material Inventory (2 Months)	(6,218,176)										
Net Cash Flow From Investing Activities	(114,564,176)	0	0	0	0	0	0	0	0	0	0
NET CASH FLOW	13,747,000	(14,065,563)	12,511,198	15,109,924	17,160,208	19,459,119	21,336,550	24,183,739	45,296,271	46,803,986	48,279,709
Cash at the Beginning of the Period	0	13,747,000	(318,563)	12,192,636	27,302,560	44,462,767	63,921,887	85,258,437	109,442,176	154,738,447	201,542,433
Cash at the End of the Period	13,747,000	(318,563)	12,192,636	27,302,560	44,462,767	63,921,887	85,258,437	109,442,176	154,738,447	201,542,433	249,822,142