Pre-feasibility Study

PRODUCTION UNIT FOR CANNED FRUITS, VEGETABLES, PRESERVES, JAMS AND JELLIES

November 2023

"The figures and financial projections are approximate due to fluctuations in exchange rates, energy costs, and fuel prices etc. Users are advised to focus on understanding essential elements such as production processes and capacities, space, machinery, human resources, and raw material etc. requirements. Project investment, operating costs, andrevenues can change daily. For accurate financial calculations, utilize financial calculators on SMEDA's website and consult financial experts to stay current with market conditions"

Small and Medium Enterprises Development Authority
Ministry of Industries and Production
Government of Pakistan

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1. DISCLAIMER

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2. EXECUTIVE SUMMARY

Agriculture plays an important role in the economy of Pakistan. According to the Economic Survey of Pakistan 2020-21, the agriculture contributes 19.2% to the GDP and provides employment to around 38.5% of the labor force. More than 65-70% of the population depends on agriculture for its livelihood.[1] Horticulture crops constitute an important share of the total agricultural produce of the country. However, a large volume of horticulture production (fruits, vegetables, condiments) gets wasted due to lack of proper post-harvest practices and lack of processing facilities. These losses can be minimized by introducing efficient post-harvest and value addition activities.

Food preservation is used to store food products for longer periods of time while maintaining their texture, flavor and nutritional value. The practice of preserving food dates back to prehistoric times. The oldest methods of preservation are freezing, refrigeration and fermentation. New and advance methods, adopted during recent past, include canning, pasteurization, freezing, irradiation, and chemical preservation.

Canning is one of the methods of preserving food from spoilage by storing it in airtight containers in an anaerobic (without oxygen) environment. It provides a shelf life that typically ranges from one to five years, although under specific circumstances, it can even be longer.

The fast-paced lifestyle, increasing share of working population, rising consumer awareness towards hygienic food and increasing demand of consumers for ready-to-eat food, are the major driving factors in the growth of canned food market. Further, due to better retention of nutrients, better taste, original flavor and better food safety, the canned foods are preferred by a large share of population. This type of preservation makes it easy for travelers, tourists and household users to store and carry ready-to-eat foods.

Jams and Jellies constitute an essential food item of almost every modern household and are widely consumed and liked by the local consumers; especially during breakfast. People use jam as the bread spread and as a filling for cakes and cookies. Fruit jams and jellies basically represent a preserved and processed form of fruit pulp which is ready to eat and stored in glass or plastic bottles.

This "Pre-feasibility Document" provides details for setting up a "Production Unit for Canned Fruits, Preserves, Vegetables, Jams and Jellies". The proposed products included in this study are fruits (sliced apples), vegetables (carrots and peas), jams (Lemon Ginger Marmalade) and jellies (Apple Jelly). The proposed unit has an annual capacity of producing 295,667 jars/cans of jam, 443,500 jars/cans of jelly, 450,000 cans of sliced apples, 1,500,000 cans of sliced carrots and 450,000 cans of peas at a maximum capacity of 100%. The initial operating capacity of the project has been assumed to be 70% which translates into 206,967 jars/cans of jam, 310,450 jars/cans of jelly, 315,000 cans of apple, 1,050,000 cans of carrots and 315,000 cans of peas.

[1]: https://www.finance.gov.pk/survey/chapters_21/PES_2020_21.pdf

A 5% annual increase of capacity utilization has been assumed to achieve a maximum operational capacity of 90% in year 5.

This unit may be established in large cities like Karachi, Lahore, Islamabad, Peshawar, Quetta, Faisalabad, Multan, Rawalpindi, Hyderabad, Gujranwala, Sialkot, Sukkur, etc. In addition, the investors may also consider establishing this unit in the areas where the raw materials (the targeted fruits and vegetables) are grown in abundance. Districts Killa Saifullah, Zhob, Mastung, Pishin and Killa Abdullah in northern Balochistan, and districts Swat and South Waziristan in Khyber Pakhtunkhwa are the major apple-producing districts in the country. These districts also produce large variety of vegetables; including the ones targeted in this study. Therefore, such districts are also suitable locations to establish this unit. Location selection decision must be made while evaluating other important requirements like presence of adequate industrial infrastructure and availability of skilled manpower.

The production unit will be set up in a constructed building with an area of 5,400 square feet. The project requires a total investment of PKR 68.29 million. This includes capital investment of PKR 31.38 million and working capital of PKR 36.92 million. It is proposed that the project shall be financed through 100% equity. The Net Present Value (NPV) of project is PKR 124.24 million with an Internal Rate of Return (IRR) of 37% and a Payback period of 3.54 years. Further, this project is expected to generate Gross Annual Revenues of PKR 460.14 million during 1st year, Gross Profit (GP) ratio ranging from 17% to 19% and Net Profit (NP) ratio ranging from 3% to 6% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 46% (1,562,809 units) with annual breakeven revenue of PKR 327.26 million.

The proposed project may also be established using leveraged financing. At 50% financing at a cost of KIBOR+3%, the proposed business provides Net Present Value (NPV) of PKR 173.33 million, Internal Rate of Return (IRR) of 37% and Payback period of 3.60 years. Further, this project is expected to generate Net Profit (NP) ratio ranging from 3% to 6% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 47% (1,618,476 units) with breakeven revenue of PKR 338.91 million.

The proposed project will provide employment opportunities to 67 people, working in 3 shifts of 8 hours each during 214 days in a year. As the production of proposed project will based on season of horticulture products so the proposed project will also require temporary labor in production seasons. The average number of temporary labors required is 14 per month during production. High return on investment and steady growth of business is expected with the entrepreneur having some prior experience or education in the related field of business. The legal business status of this project is proposed as “Private Limited Company”.

3. INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with the objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectorial research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need-based capacity building programs of different types in addition to business guidance through help desk services.

National Business Development Program for SMEs (NBDP) is a project of SMEDA, funded through Public Sector Development Program of Government of Pakistan.

The NBDP envisages provision of handholding support / business development services to SMEs to promote business startup, improvement of efficiencies in existing SME value chains to make them globally competitive and provide conducive business environment through evidence-based policy-assistance to the Government of Pakistan. The Project is objectively designed to support SMEDA's capacity of providing an effective handholding to SMEs. The proposed program aimed at facilitating around 314,000 SME beneficiaries over a period of five years.

4. PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors in setting up a "Production Unit for Canned Fruits, Vegetables, Preserves, Jams and Jellies" by providing a general understanding of the business with the intention of supporting them in making informed investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business setup and its successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form the basis of any Investment Decision.

5. BRIEF DESCRIPTION OF PROJECT & PRODUCTS

Pakistan is the fifth most populous country in the world with a population of around 225 million. It is the 33rd largest country in terms of area, spanning 881,913 square kilometers. Agriculture is the lifeline of Pakistan's economy; contributing 19.2% to the GDP of the country and providing employment to around 38.5% of the labor force. 65-70% of the population depends on agriculture for its livelihood.[2] Currently, the production of fruits and vegetables in Pakistan has often not been accompanied by appropriate post-harvest management practices and processing for value added products; which causes huge losses to farmers. As per estimates, at least 30% of vegetables/fruits gets wasted due to negligence and lack of processing facilities.[3]

This document provides details for setting up a "Production Unit for Canned Fruits, Vegetables, Preserves, Jams and Jellies". The products include fruits (sliced apples), vegetables (carrots and peas), jams (Lemon Ginger Marmalade) and jellies (Apple Jelly).

Canning is an accepted preservation technique for fruits and vegetables to increase their supply and make them available over longer periods of time. After being harvested, fruits and vegetables have limited shelf life when stored under ordinary conditions. Their life can be extended for more weeks/months by improving and modifying the storage conditions, such as keeping them in lower temperatures in a cold store. In order to preserve fruits and vegetables for even longer periods i.e., for 1-2 years, different techniques, including drying, freezing and canning may be adopted. Some of these methods extend the shelf life for few weeks, while others extend it for as long as two years.

The basic objective of fruits and vegetables canning is to convert the perishable agricultural produce into a stable form that can be stored and supplied to the consumers round the year. The fruits and vegetables are processed and preserved during the production season and made available during the off-season. The processing also changes the vegetables into improved and/or more usable forms making foods more convenient to prepare and consume by better retention of nutrients, better taste, original flavor and better food safety.

Fruit jams, jellies and preserves market is driven by the changes in lifestyles and preference for ready-to-eat products. The fast-paced lifestyle, increasing share of working population, rising consumer awareness about the importance of hygienic food and increasing demand of consumers for ready-to-eat food, are the major driving factors in the growth of canned fruit, preserves, vegetables, jams and jellies. Jams and

[2]: https://www.finance.gov.pk/survey/chapters_21/PES_2020_21.pdf
[3] Source: https://www.afpf.org.pk/about-us

jellies are essential food items of the current age and are widely consumed in modern households. People use jams as the bread spread and as filling for cakes and cookies.

Technically, canning process effects preservation by destroying all pathogenic and spoiling microorganisms in the product and preserving them by preventing their recontamination by microorganisms. Heat is the most common mode used to destroy microorganisms whereas removal of oxygen helps preventing the growth of oxygen-dependent microorganisms. Figure 1 shows different sizes of tin cans and glass jars used for fruits and vegetables value-added products.

Figure 1: Different sizes of Tin Cans and Glass Jars

Tin Cans **Glass Jar (450 gram)** **Glass Jar (250 gram)**

The canning process of each product is briefly discussed hereunder.

Production and Procurement of Horticulture Products

The products proposed in this study include canned products i.e., fruits (sliced apples), vegetables (sliced carrot and peas), jams (lemon ginger marmalade) and jellies (apple jelly). Raw materials required for production of these products include apples, lemons, carrots, peas, ginger, sugar, citric acid, citrus pectin, ascorbic acid, etc. The packaging materials include jars, tin cans, labels, liquid gum for packing the preserved products and corrugated boxes for outer packing. The packing material is procured from local market. The horticulture products required for the production of the proposed products are seasonal and only available during their respective seasons during a year. Table 1 shows the seasons and the major production areas.

Table 1: Seasons and Areas

Raw material	Season	Province	Districts
Apple	September and November	KP	Swat, South Waziristan, Mansehra, Abbottabad,

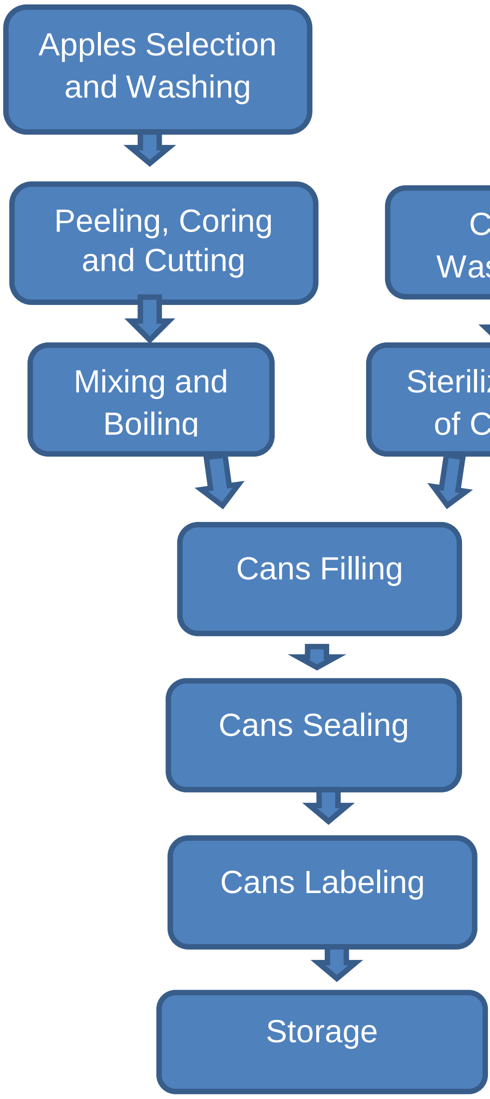
		Balochistan	Pishin, Kalat, Mastung, Killa Saifullah, Killah Abdullah, Ziarat and Zhob
Lemon	July and August	Punjab	Sargodha, Jhang, Sahiwal, Lahore, Multan, Gujranwala, Sialkot and Mianwali
		Sindh	Sukkur, Nawabshah and Khairpur
		KP	Peshawar, Mardan, Swat, Hazzara, Nowshera and Swabi
		Balochistan	Sibbi, Makran and Kech
Carrots	November to March	Punjab	Sheikhupura, Kasur, Mandi Bahau Din, Gujrat, Faisalabad and Gujranwala
		KP	Buner, Swabi, Malakand, Pashawar, Lower Dir, Bajour Agency,Sawat and Chitral
		Balochistan	Kila Saifullah, Bolan and Loralai
Peas	September and November	Punjab	Gujranwala, Nankana Sahib, Multan, Sahiwal, Toba Tek Singh, Sialkot, Jhang and Sheikupura
		KP	Sawat, Chitral
Ginger	March and April	Sindh	Mirpurkhas, Umerkot, Jamshoro, Hyderabad, Badin

All horticulture products used in production are easily available in the local market. For the proposed study, the raw material is assumed to be purchased from wholesale markets.

5.1.1. Canned Fruit - Sliced Apple

Figure 2 shows the canning process of sliced apple.

Figure 2: Canning Process – Sliced Apple



<u>Apples Selection and Washing</u>

The apples are passed through an initial inspection stage where only the fruit of good quality is selected for canning. This selection is done by labor through visual inspection while they are sorted for washing. Fresh and crispy apples are selected whereas defective, pest-affected, physically damaged, decayed or de-shaped apples are removed by the labor from the sorting rollers.

Apples are washed by high-pressure water sprays or by strong-flowing streams of water as they pass on a moving belt/rollers. Washing removes the dust and any other contaminants from the apples. Figure 3 shows apples washing process.

Figure 3: Washing of apple

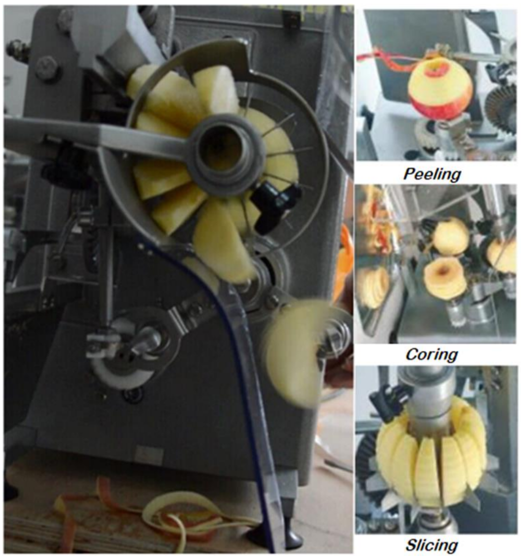
Peeling, Coring and Cutting

Apples are peeled to remove the outer skin. This is done to meet the quality and safety requirements of the subsequent processing steps of cutting, and canning. It may be done by mechanical peeling, steam peeling or lye peeling. In steam peeling, the fruit is treated with steam to loosen the skin, which is then removed by mechanical means. Lye peeling is done by passing the material through hot solution of caustic soda (NaOH) which loosens the skin of the fruit which is then removed by water jet.

In the proposed project, mechanical peeling is used to remove the outer skin of apples. This method is widely used in commercial activity due to less wastage of raw material. This process starts by feeding the washed apples to peeling and cutting machine which first peels apples by revolving knives or blades.

After peeling, the apples are moved to cutting and coring section of the machine where apples seeds are removed by making a stroke in middle of the apple and slicing the apple in required size and shape. Most commonly, 1-inch-thick slices are produced by the slicing machine for canning the apple in sliced form. Figure 4 shows the process of slicing of apples on peeling and slicing machine.

Figure 4: Peeling, Coring and Slicing of Apple on Automatic Machine



Mixing and Boiling

To prevent discoloration, sliced apples are put into water containing ascorbic acid. Drained slices are placed in large saucepan and mixed with sugar syrup. After that, the mixture is boiled for 5 minutes and stirred occasionally to prevent from burning. After five minutes, sliced apples are ready to be canned. Figure 5 shows boiling of apple slices.

Figure 5: Boiling of Sliced Apple

Washing of Cans

Before sterilization, cans are first examined to identify any nicks, cracks and rough edges. Presence of these defects will not permit an airtight seal on cans and will result in canned fruit spoilage. The selected cans are then washed in soapy water using cans washer machine.

Sterilization of Cans

Sterilization is done by applying heat so as to eliminate the growth of spoilage-causing microorganisms; including bacteria and spores. Steam/ Autoclave sterilizer is used for this process, which heats the food cans to high temperature by using steam. This heating mechanism kills harmful bacteria, viruses, fungi, and spores in the cans. The usual procedure is to heat at 1.1 kilograms/square centimeter (kg/cm^2) steam pressure, which yields a temperature of 121 C. At this temperature, the time of sterilization is generally considered to be 15-20 minutes, depending on the volume of the load. Figure 6 shows sterilization process of empty cans.

Figure 6: Sterilization of Empty Cans

Cans Filling

The filling of tin cans is done automatically by filling machines. Sterilized tin cans are filled with sliced apples and hot sugar syrup or hot water. The sugar helps retain the apple flavor, color and shape. The concentration of sugar syrup can be varied to satisfy dietary needs and/or personal tastes. In the proposed recipe, 18% sugar syrup is added in canned apples. Usually, filling is carried out by leaving an empty space of 5-15% of the total volume of cans. The headspace of under-filled cans becomes too large, resulting in too much air being left in the can. Overfilling may lead to seams being strained during processing and the ends becoming distorted and bulged. Overfilling also affects heat penetration in the can and may lead to spoilage outbreaks.

The filled cans are then passed through a hot-water or steam bath in an exhaust box which expands the food and drives out the remaining air. In the water exhaust box, the cans are placed in such a manner that the level of water is 4-5 cm below their tops. The exhaust box is heated till the temperature of water reaches 82 to 100 C. The boiled water applies heat to the air molecule within the can due to which they move faster and collide with side, the lid and each other and pushes out of can.

The time of exhausting varies from 6 to 10 minutes, depending on the nature of the product. It is preferable to exhaust the cans at a lower temperature for a longer period to ensure uniform heating of the contents. Exhausting at higher temperature should be avoided because the higher the temperature, the more is the volume of water vapor formed, and consequently the greater the vacuum produced in the can.

Sealing

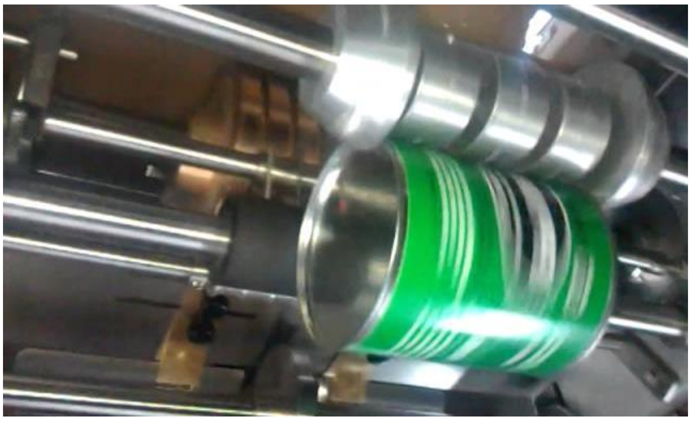
Immediately after air removal, the cans are closed and sealed. A sealing machine places the cover (Tin lids) on the tin cans, and the curl on the can cover. Tin cans are sealed through automatic sealing machine. Figure 7 shows can sealing process.

Figure 7: Sealing of Tin Cans

Labeling

After sealing, the cans are ready for labeling. Labeling machine applies glue and plastic labels in a high-speed operation. Brand name, instructions for use and expiry dates are printed and labeled on tin cans. Figure 8 shows labeling of tin cans.

Figure 8: Labeling of Tin Cans



Storage

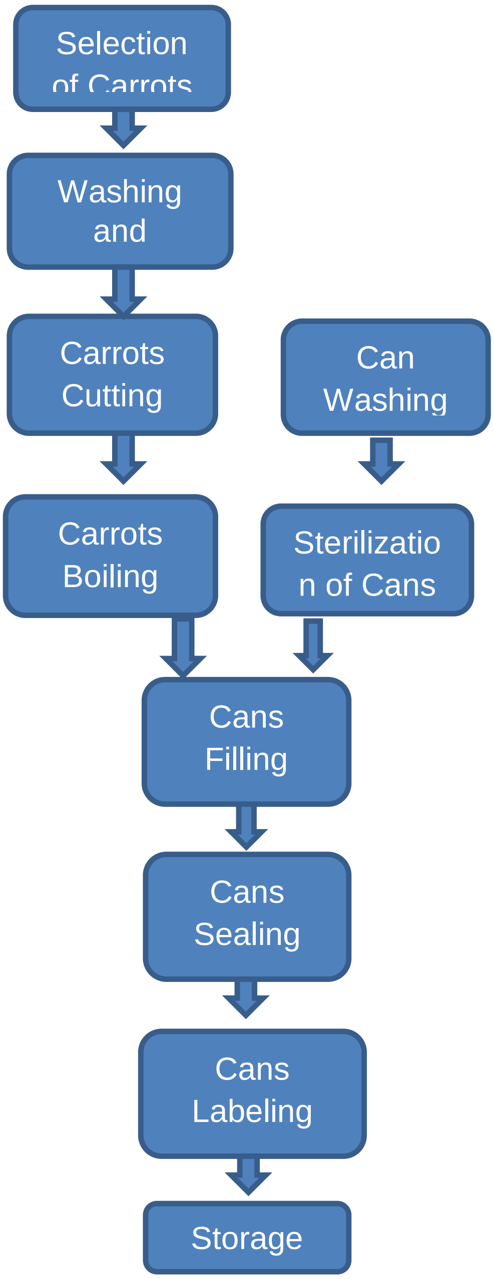
The sealed apples cans are left at room temperature for cooling. Cans should be placed in single layer in the room. The cans should be thoroughly cooled within 24 hours and then rearranged into shipping cartons / corrugated trays. At the end, the ready cartons are carried to finished goods store for storage until they are sold out. Figure 9 shows can of sliced apple.

Figure 9: Canned Sliced Apple

5.1.2. Canned Vegetable -Sliced Carrot

Figure 10 shows the canning process of carrots.

Figure 10: Canning Process – Carrot



Selection of Vegetables

The fresh carrots passes through an initial inspection stage where only the good quality carrots are selected. This selection is done through visual inspection by labor as they are sorted for washing. Defective, pest damaged, physically damaged or rotten carrots are removed. Fresh, crispy and fine color carrots are selected for canning.

Washing and Peeling

The selected carrots are washed thoroughly to remove the sticking soil by using high-pressure water sprays or by strong-flowing streams of water. After washing, peeling of carrots is carried out by feeding them into the peeling machine. During peeling, continuous water showering washes away all the peeled material in the form of sludge. Showering at the final stage completely cleans the carrots. Peeling machines are of various capacities with 5-7 minutes peeling time for each batch. Figure 11 shows washing and peeling process of carrots.

Figure 11: Process of Washing and Peeling-Carrot

Carrots Cutting

Mostly, ¼ inch thick slices are cut by the slicing machine, if carrots are to be canned in sliced form. The slicing machine receives the carrots in a hopper from where they are cut into slices, and pushed forward on to a cubing block. This machine consists of multiple sharp knives which cuts the carrots in slice shape. The cutting length can be adjusted according to need. The blades are replaceable and different shapes can be cut. Figure 12 shows slices/cutting pieces of carrots.

Figure 12: Slices of Carrots after Cutting Process

Carrots Boiling

Carrots are boiled for 5 minutes in a pan or cooker and salt solution is mixed into it. The salt solution is added to improve the taste. It also helps to retain the color and shape and to enhance the flavor of canned vegetables. In the proposed recipe, 0.5% salt is added in canned carrots. Figure 13 shows boiling process.

Figure 13: Carrot Slices in Pan to be boiled

Washing of Cans

Before sterilization, cans are first examined to identify any nicks, cracks and/or rough edges. Presence of these defects does not permit an airtight seal on cans and results in spoilage of the canned vegetables. The selected cans are then washed in soapy water using cans washer machine.

Cans Sterilization

Cans sterilization is done by of heat treatment to eliminate growth of spoilage causing microorganisms including bacteria and spores. Steam/ Autoclave sterilizer is used for this process which heats the food cans to high temperature by using steam. This heating mechanism kills harmful bacteria, viruses, fungi, and spores in the cans. The usual procedure is to heat at 1.1 kilograms/square centimeter (kg/cm^2) steam pressure, which yields a temperature of 121 C. At this temperature, the time of sterilization is generally considered to be 15-20 minutes, depending on the volume of the load.

Cans Filling

Sterilized tin cans are filled with carrots and boiled water is poured into tin cans on filling machine. The sliced carrots, already made soft and flexible by the heat, are easily filled. Slices are not forced into the cans as this will break others and present a poor appearance when the can is opened.

Cans Sealing

After filling the cans, the sealing machine places the cover (tin lids) on the tin cans, and the curl on the can cover. Tin cans are sealed through automatic sealing machine.

Cans Labeling

Brand name, instructions for use and expiry dates are printed and labeled on tin cans by labeling machine.

Storage

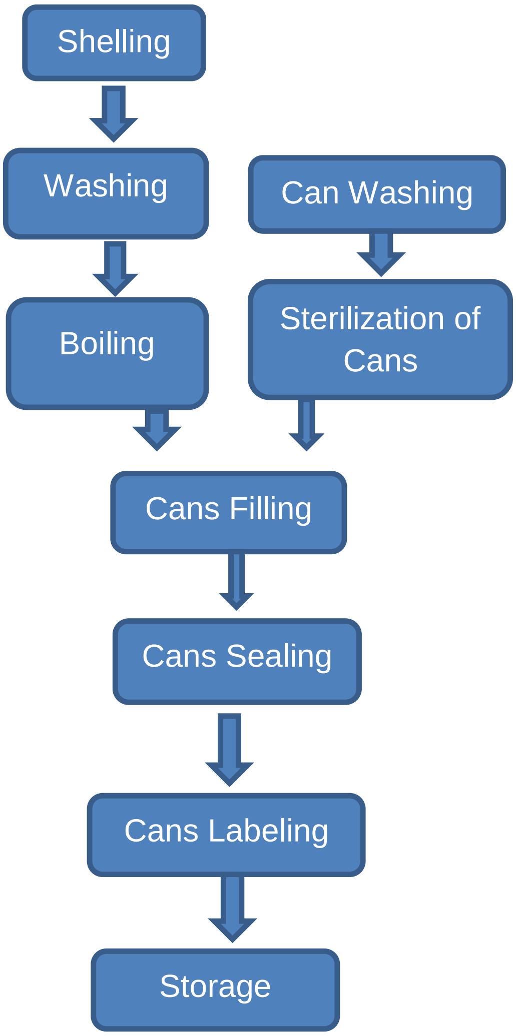
At the end, the ready canned carrots are packed in shipping cartons and carried to the finished goods store for storage till being shipped to the customers. Figure 14 shows tin cans filled with carrots.

Figure 14: Canned Carrots

5.1.3. Canned Vegetable – Peas

Figure 15 shows the canning process of peas.

Figure 15: Canning Process – Peas



<u>Shelling</u>

Shelling is the process through which the peas are separated from pea pods. Mature and dry pea pods are selected for canning process. Shelling is done through automatic shelling machine and discolored peas are sorted out by labor. Figure 16 shows peas shelling process.

Figure 16: Peas Shelling Process

Washing

After shelling, the peas are washed using high-pressure water sprays or by strong-flowing streams of water. Figure 17 shows the process of washing of peas.

Figure 17: Washing of Peas

Boiling

Boiling is an important step for canning process of peas during which the peas are boiled at 90-100 C for 4-6 minutes in boiling pan. Stainless steel boiling pan having capacity of 600 kg is used in this process. This operation accomplishes:

a. Deactivation of enzymes that may cause deterioration of the peas

b. Reduction of microbial load on the peas

c. Reduction of starch content of the peas

Figure 18 shows boiling of peas.

Figure 18: Boiling of Peas

Washing of Cans

Before sterilization, cans are first examined to identify any nicks, cracks and rough edges. Presence of these defects does not permit an airtight seal on cans and results in canned vegetables spoilage. The selected cans are then washed in soapy water using cans washer machine.

Sterilization

Cans sterilization is done by of heat treatment to eliminate growth of spoilage causing microorganisms including bacteria and spores. Steam/ Autoclave sterilizer is used for this process which heats the food cans to high temperature using steam. This heating mechanism kills harmful bacteria, viruses, fungi, and spores in the cans. The usual procedure is to heat at 1.1 kilograms/square centimeter (kg/cm^2) steam pressure, which yields a temperature of 121C. At this temperature, the time of sterilization is generally considered to be 15-20 minutes.

Cans Filling

Immediately after the boiling, the peas are filled into the cans. To improve taste and flavor of the canned peas, salt solution is used in peas canning. Half inch of headspace is left empty in the can. Figure 19 shows tin cans after filling of peas.

Figure 19: Filled Tin Cans

Cans Sealing

After filling, the sealing machine places the cover (can lids) on the tin cans, and the curl on the can cover. Tin cans are sealed through automatic sealing machine.

Cans Labeling

Brand name, instructions for use and expiry dates are printed and labeled on tin cans through labeling machine.

Storage

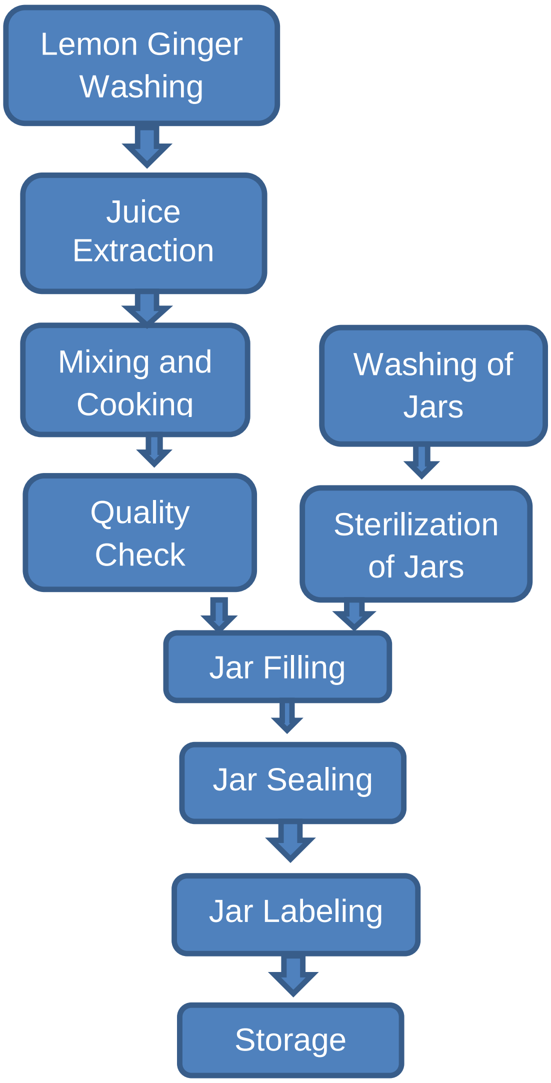
At the end, the ready canned peas are packed into shipping cartons and carried to finished goods store for storage till they are shipped. Figure 20 shows canned peas.

Figure 20: Canned Peas

5.1.4. Jam - Lemon Ginger Marmalade

Figure 21 shows the production process of jam- Lemon Ginger Marmalade.

Figure 21: Production Process of Jam – Lemon Ginger Marmalade



<u>Lemon and Ginger Washing</u>

Fresh and fine color lemons and ginger are selected for jam production. This selection is done through visual inspection by labor. Defective, pest-damaged or decayed lemons and ginger are removed. Selected lemons and ginger are washed by high-pressure water sprays or by strong-flowing streams of water while being passed along a moving belt/rollers. Figure 22 shows washing of lemons and ginger.

Figure 22: Washing of Lemons

Washing of Lemons	Washing of Ginger

Juice Extraction

Juice is extracted from lemons through extractor (pulp is extracted through pulping machine if apple or mango is to be processed). Lemon peels are not wasted in lemon ginger marmalade jam because their shred is also used in jam making. Likewise, ginger shred is also used in it.

Figure 23 shows extraction of lemon juice on juice extracting machine.

Figure 23: Extraction of Lemon Juice on Juice Extracting Machine

Figure 24 shows lemon peel and lemon peel shred and ginger shred.

Figure 24: Lemon Peel and Lemon Peel Shred

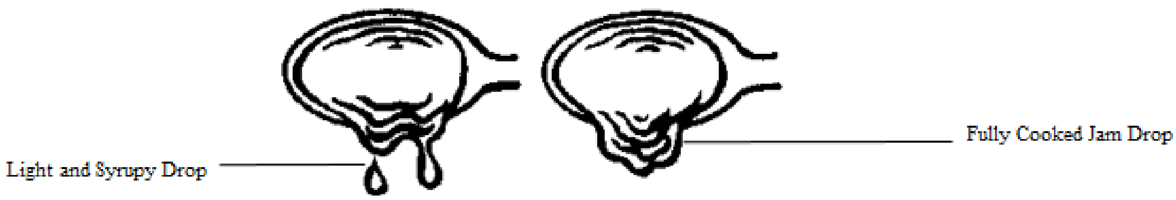
Lemon Peel **Lemon Peel Shred** **Ginger Shred**

<u>Mixing and Cooking</u>

After extracting, initially, sugar syrup is made at 75 brix[4] in a pan. Pre-measured quantities of lemon juice, lemon shred, ginger shred, sugar syrup, and pectin are added in cooking pan. The prepared mixture kept on burner for cooking. It is heated at 105 C for 5-7 minutes. After that, when sugar is completely dissolved in mixture, citric acid is added during boiling. Temperature is maintained at 105 C during this process. When the mixture reaches the required viscosity and sweetness, it is pumped to the filling machine. Viscosity of the jam is tested through sheet test. In this test, cool metal spoon is dipped into the boiling mixture. If the drops are light and syrupy, the mixture needs to be boiled further. As the mixture continues to boil, the mixture's viscosity increases and starts falling in the form of drops. Figure 25 shows the sheet test performed to check the viscosity of the mixture.

Figure 26 shows raw material in pan to be cooked.

Figure 25 Sheet Test



[4] Brix is a measure of the amount of dissolved solids in a liquid and is used especially to measure the dissolved sugars. One degree Brix is 1 gram of sucrose in 100 grams of solution.

Figure 26: Lemon and Ginger Shred in Pan to be cooked

After cooking, the ready jam is poured into open tubs which are then carried to the filling machine.

Quality Check

Total soluble solids (TSS) of jam are determined by keeping sample on the prism of the calibrated refractometer. The result is measured in term of brix. The recommended value of TSS is 65 brix. If the meter shows the required brix of TSS, the jam is considered ready, otherwise more cooking is done to achieve the required brix. The pH of the jam is measured by placing probe of calibrated digital pH meter in the beaker containing jam sample. The recommended range of pH is 3.2-3.7. If it falls below 3.2, lemon juice is added and if it increases above 3.7, acetic acid is added.

Jar Washing

Before sterilization, jars are first examined to identify any nicks, cracks and rough edges. Presence of these defects does not permit an airtight seal on jars and results in spoilage of jam. The selected jars are then washed in soapy water.

Sterilization

Jars sterilization is done by heat treatment to eliminate growth of microorganisms including bacteria and spores. Autoclave sterilizer is used for this process which heats the food jars to high temperature by using steam. This heating mechanism kills harmful bacteria, viruses, fungi, and spores in the jars. The usual procedure is to heat at 1.1 kilograms/square centimeter (kg/cm^2) steam pressure, which yields a temperature of 121 C. At this temperature, the time of sterilization is generally considered to be 15-20 minutes.

Filling

Sterilized glass jars are filled with jams (named as lemon ginger marmalade) through filling machine.

Sealing

After filling, sealing machine places the cover (tin lids) on the jars, and the curl on the cover. Jars are sealed through automatic sealing machine.

Labeling

Brand name, instructions for use and expiry dates are printed and labeled on jars through labeling machine.

Storage

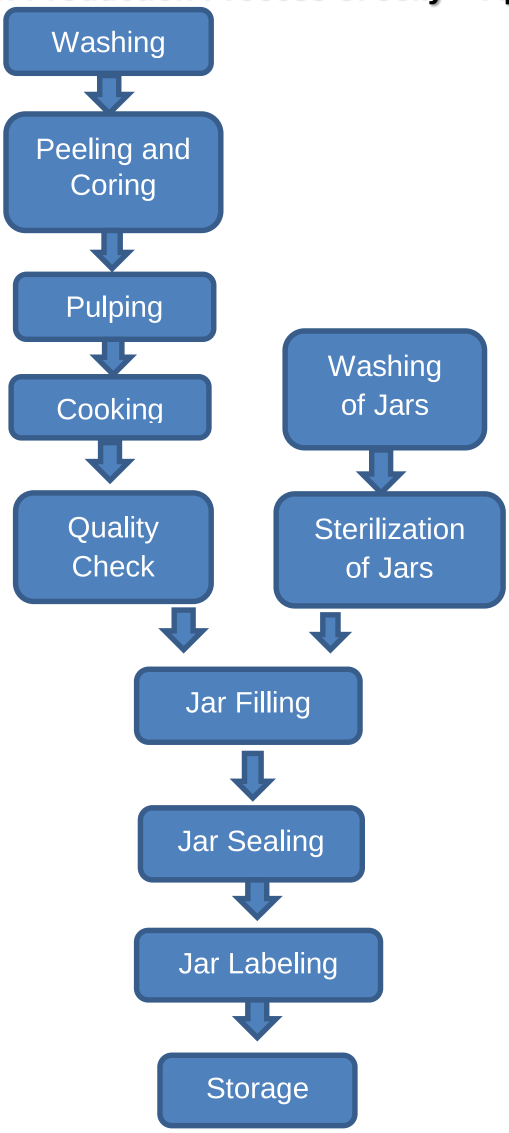
At the end packed cans/jars are carried to finished goods store for storage. Figure 27 shows lemon ginger marmalade jam.

Figure 27: Jam - Lemon Ginger Marmalade

5.1.5. Jelly - Apple Jelly

Figure 28 shows the production process of apple jelly.

Figure 28: Production Process of Jelly – Apple Jelly



<u>Washing</u>

The apples are passed through an initial inspection stage, where only good-quality apples are selected for processing. Defective, pest-damaged, physically damaged, decayed or de-shaped apples are removed. This selection is done by manual labor through visual inspection while they are sorted for washing. Selected apples are washed by high-pressure water sprays or by strong-flowing streams of water while being passed on a moving belt. Washing removes the dust and any other contaminants from the apples. Figure 29 shows washing of apples on washer/washing machine.

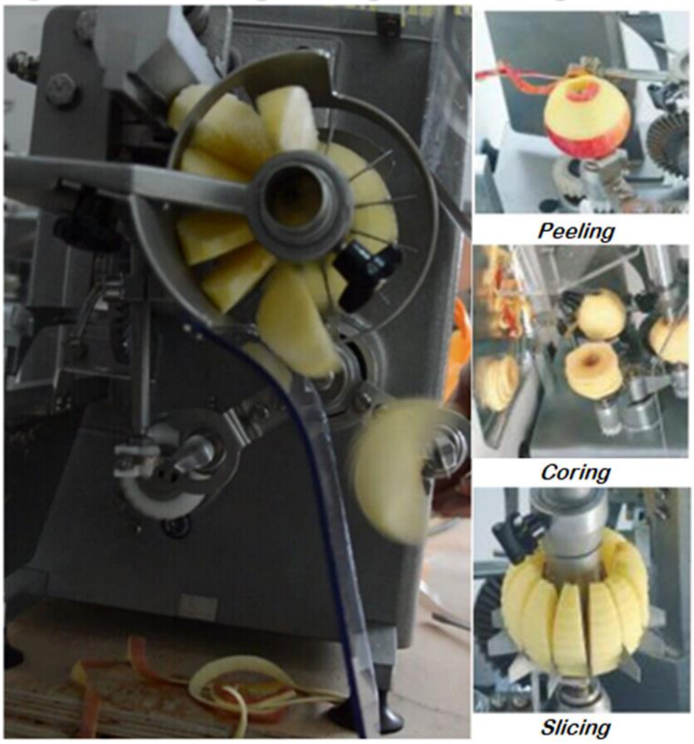
Figure 29: Washing of Apples on Washer/Washing Machine

Peeling and Coring

Apples are peeled to remove the outer skin. This is required to meet the high quality and safety requirements for the subsequent processing. In the proposed project, mechanical peeling is used to remove the outer skin of apples. This method is widely used in commercial activity due to less wastage of raw material. This process starts with feeding the washed apples to peeling and cutting machine which first peels apples by revolving knives or blades.

After peeling, the apples are moved to cutting and coring section of the machine where seeds are removed by making a stroke in middle of the apple and slicing it. Figure 30 shows the process of slicing of apples on peeling and slicing machine.

Figure 30: Peeling Coring and Cutting Process



Pulping / Extracting

Apple pulp is extracted through pulping machine; after which water is added into it. The ratio of apple pulp and water is 1:2. Figure 31 shows apple pulp.

Figure 31: Apple Pulp

Cooking

After pulping, the next process is cooking. Initially, sugar syrup is made in the pan. Pre-measured quantities of apple pulp, sugar syrup, and pectin are added in cooking pan. The prepared mixture is heated at 105 C for 5-7 minutes. When sugar is completely dissolved in the mixture, citric acid is added during boiling. Temperature is maintained at 105 C during this process. When the mixture reaches the required viscosity and sweetness, it is pumped to filling machines. Viscosity of the jelly is tested through sheet test. In this test, cool metal spoon is dipped into the boiling jelly mixture. If the drops are light and syrupy, the mixture needs to be boiled further. As the mixture continues to boil, the mixture's viscosity increases and starts falling in the form of drops. When the mixture achieves the require viscosity level, jelly is poured into open tubs, which are carried to filling machine. Figure 32 shows material to be cooked.

Figure 32: Material to be cooked – Apple Jelly

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Quality Check

Total soluble solids (TSS) of the prepared jelly are determined by keeping sample on the prism of the refractometer; where the result is expressed in term of brix. The recommended brix of the jelly is 65. If the meter shows the required brix, the jelly is considered ready, otherwise more cooking is done to achieve the required brix. The pH of the jelly is measured by placing probe of calibrated digital pH meter in the beaker containing jelly sample. The recommended range of pH is 3.2-3.7. If it falls below 3.2, apple pulp is added and if it increases above 3.7, acetic acid is added.

Jar Washing

Before sterilization, jars are first examined to identify any nicks, cracks and rough edges. Presence of these defects does not permit an airtight seal on jars and results in canned vegetables spoilage. The selected jars are then washed in soapy water.

Sterilization

Jars sterilization is done by heat treatment to eliminate growth of microorganisms including bacteria and spores. Steam autoclave sterilizer is used in this process which heats the jars to high temperature by using steam. This heating mechanism kills harmful bacteria, viruses, fungi, and spores in the jars. The usual procedure is to heat at 1.1 kilograms/square centimeter (kg/cm^2) steam pressure, which yields a temperature of 121 C. At this temperature, the time of sterilization is generally considered to be 15-20 minutes.

Filling

Immediately after cooking, the jelly is filled in the jars. Half inch of headspace is left empty in the jar. Sterilized jars are filled with apple jelly through filling machine.

Sealing

After filling, sealing machine places the cover on the jar, and the curl on the jars cover. Glass jars are sealed through automatic sealing machine.

Labeling

Brand name, instructions for use and expiry dates are printed and labeled on jars through labeling machine.

Storage

At the end, ready apple jelly is carried to finished goods store for storage. Figure 33 shows apple jelly.

Figure 33: Canned Apple Jelly

Machinery

Fruit and Vegetable Washer

Washing is required to remove dirt, dust, harmful pesticides, wax, chemicals and germs from the surface of fruits and vegetables. As the fruits and vegetables get cleaned properly, they stay fresh for longer time; since the decaying process gets delayed due to the removal of impurities. To wash fruits and vegetables at large scale, Washer/Washing machine is used. Water is sprayed by multiple nozzles at different places in the washer. Nozzles are frequently used to control the flow rate, speed, direction, mass, shape, and/or the pressure of the stream. Figure 34 shows vegetable and fruit washer/washing machine.

Figure 34: Fruit and Vegetable Washer

Apple Peeling and Cutting Machine

Apple peeling and cutting machine is an integrated machine for peeling and cutting of apples. The cut shapes of the fruit can be slice or shred. Capacity of the proposed machine is 200 kg per hour. Power consumption of the proposed machine is 5 KW. Up to 3 apples can be held at one time. The Apple can be cut into 2, 4, 6 or 8 pieces at the same time. The apple peeling machine comprises of machine rack, transmission system, fruit insert part and peeling device. With the imitate shape knife and lead rail movement, not only peel skin, but core is also removed and the apple is cut into 2, 4, 6 or 8 pieces at the same time. Figure 35 shows apple peeling and slicing machine.

Figure 35: Apple Peeling and Slicing Machine

Vegetable (Carrot) Cutting Machine

The proposed machine can process all kinds of hard and soft root vegetables and stem vegetables. Carrot can be cut into pieces, cubes, rhombic and curving patterns. The stainless-steel vegetable cutting machine can efficiently complete the cutting requirements of 2-25 mm, and the centrifugal slicing structure of the feed head can complete the slicing function of hard fruits and vegetables. The conveyor belt device of the vegetable cutting machine can deliver the products of the feed head directly to the knife holder and process the pieces, roots, stems and other vegetables or other products into pieces, blocks and other shapes through different blades.

The thickness of the centrifugal slices is adjustable from 2-10 mm and the width of the cut dicing blade is 19 mm. Cutting specifications can be adjusted according to different needs, convenient and fast, with two sets of tools randomly. Rated power consumption is 0.75 KW. Production capacity is 600 kg per hour. Figure 36 shows automatic carrot cutting machine.

Figure 36: Automatic Carrot Cutting Machine

Jam and Jelly making Machinery

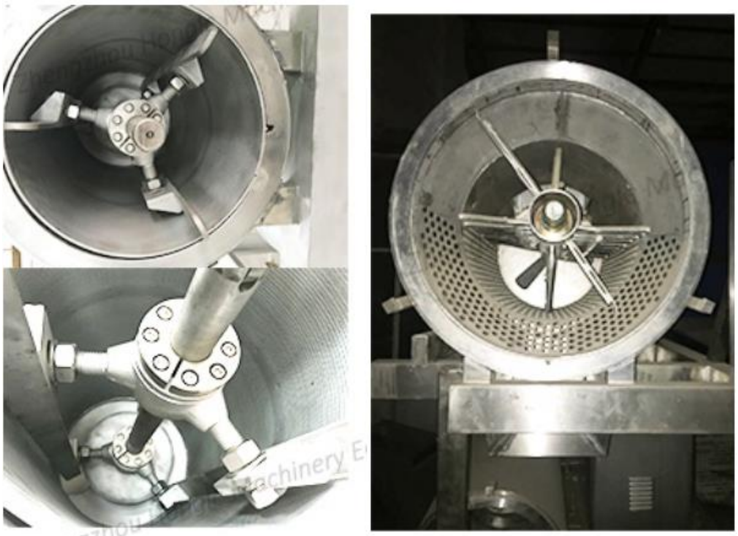
Pulping Machine (Apple)

This machine is used to make fruit pulp and its juice. The machine's part which contacts the fruits is made of stainless steel. It is important to keep the product safe from any contaminants. It is widely used in fruit processing industry. The proposed business uses it to extract pulp and juice from apple. Its capacity is 500kg/hour and electricity consumption is 3 KW. The proposed machine has automatic control for easy operation. It can be produced stand-alone or incorporated into the production line. Figure 37 shows pulping machine.

Figure 37: Pulping Machine

Figure 38 shows internal structure of pulping machine.

Figure 38: Internal Structure of Pulping Machine



Lemon Juice Extractor

Juice extractor is a machine that extracts the juice from whole fruit (Lemons). The pulp and skin are left behind. That pulp and skin contains many nutrients as well as fiber. The proposed machine is suitable for extracting juice of fruits; especially for fruits with seeds that can ensure the juice quality without destroying the seeds. The proposed machine has an automatic control system for easy operation. It can be produced standalone or incorporated into the production line. The proposed lemon juice extractor has capacity to extract juice up to 300 liter per hour and electricity consumption is 5.5 KW. Figure 39 shows lemon juice extractor.

Figure 39: Lemon Juice Extractor

Jam and Jelly making Cooking Mixer Machine

The proposed project uses the gas operated stainless steel jam and jellies cooking mixer. Its capacity is 400 liter per hour. The mixer has user friendly control panel, moveable paddle and a bowl. The movable paddle is used to mix the material efficiently and to prevent the food from burning. The bowl can be tilted to 90 degrees, so that the food in the bowl can come out easily. Its electricity power is 1000 W, paddle size of 150 mm, paddle length of 600 mm and a speed range of 350-700 rpm.

Figure 40 shows jam and jelly making automatic cooking mixer machine.

Figure 40: Jam and Jelly making Automatic Cooking Mixer Machine

Filling Machine

This machine automatically fills jar and cans of different sizes. Its capacity is to fill 2400 cans or jar/minute. The electricity requirement of this machine is 1,800 Watts. Its material is made up of stainless steel.

Figure 41 shows filling machine.

Figure 41: Filling Machine

Sterilizer

This is used for sterilization of cans/jars. Sterilizing is a process to remove any bacteria, yeasts or fungi thus protecting the food fill into the jar/can. Dirty or jars/cans not properly sterilized will infect the food inside, and it will reduce the shelf life of the food. The temperature is controlled in the range 103−134C to sterilize different kinds of objects i.e., tin cans and jars under a suitable working temperature. The sterilizer is equipped with a built-in electrical heater, sterilization timer, temperature and pressure automatic control regulator, safety valve, steam release valve, temperature and pressure indicator, alarm for finished sterilization, heating power automatic cut off, etc. The proposed sterilizer has the advantages of reliable sterilization effects, convenient operation, safe use, energy saving, and durability. The LED displays the dialog box during the whole sterilization process. The sterilization is automatically controlled without supervision. The water temperature is set at 50−101 C, so that the objects of various types can be boiled at a suitable working temperature. The electric heating element of the proposed sterilizer is an immersion electrical heating tube with high thermal efficiency and AC 220V voltage. Figure 42 shows sterilizer.

Figure 42: Sterilizer

Tin cans sealer/Sealing machine

A can sealer is used to seal the can lids to the can body in a way that it becomes completely airtight. The can sealer interlocks the outer end of the lid with the top part of the can body. This process is called double seaming. The double seam creates a strong mechanical joint to seal the product inside the can. 50 tin cans can be sealed per minute on the proposed automatic cans sealer machine shown in Figure 43.

Figure 43: Tin Cans Sealer Machine

Figure 44 shows can lid which is sealed with tin can through sealer machine.

Figure 44: Tin Can Lid

Figure 45 shows tin can with and without can lid.

Figure 45: Tin Can before and after Sealing Process

Tin Can without Can Lid (Before Sealing) **Tin Can with Can Lid (After Sealing)**

Labelling Machine

The automatic labelling machine is used to label round bottles, glass bottles/jars) and tin cans). It is mainly used for labeling of round containers in food and beverages, medicine, and chemical industries. Labelling machine applies labels and decoration onto all types of packaging containers (bottles, tins and jars etc.). Maximum capacity of the proposed machine is 40 pieces per minute. The containers are fed to the labelling machine at a constant speed on the conveyor.[5] Figure 46 shows a labelling machine.

[5] Conveyor Systems are mechanical devices or assemblies that transport material with minimal effort. While there are many different kinds of conveyor systems, they usually consist of a frame that supports either rollers, wheels, or a belt, upon which materials move from one place to another.

Figure 46: Labelling Machine

5.2. Installed and Operational Capacities

The production of proposed project is based on season of horticultural products to be used as raw materials. The proposed production unit will run for 24 hours a day in 3 shifts for 214 days (280-(22*3)) in a year. The proposed unit has an annual capacity of producing 295,667 jars/cans of jam, 443,500 jars/cans of jelly, 450,000 cans of sliced apples, 1,500,000 cans of sliced carrots and 450,000 cans of peas at a maximum capacity of 100%. The initial operating capacity of the project has been assumed to be 50% which translates into 147,834 jars/cans of jam, 221,750 jars/cans of jelly, 225,000 cans of apple, 750,000 cans of carrots and 225,000 cans of peas. A 5% annual increase of capacity utilization has been assumed to achieve a maximum operational capacity of 90% in year 9.

Table 2 shows seasons and their duration of required horticulture products.

Table 3 and Table 4 shows details of maximum installed capacity and operational capacity utilized during 1st year of operations.

Table 2: Season's Duration of related Fruits and Vegetables

Particulars	Months of Harvesting	Total Months	Seasonal Production Plan (Days)
Apples	September - November	3	90
Carrots	November – March	5	150
Peas	September -November	3	90
Lemons	July – August	2	60

Table 3 shows installed and operational capacity.

Table 3: Installed and Operational Capacity

Name of Machine	No of Machines	Time / Batch (Hour)	Available Machine Hours / Day	Batch Processed /Day	Machine Capacity / Batch (kgs)	Capacity / Day (kgs)	Seasonal Production Days	Annual Capacity based on season (kg)
	A	*B*	*C*	*D=A*B*C*	*E*	*F=D*E*	*G*	*H=F*G*
Jam making Auto Cooking Mixing Machine	1	1	10	10	200	2,000	60	120,000
Jelly making Auto Cooking Mixer Machine			10	10	200	2,000	90	180,000
Peeling & Slicing Machine	1	1	20	20	200	4,000	90	360,000
Carrot Cutting Machine	1	1	20	20	400	8,000	150	1,200,000
Shelling Machine	1	1	20	20	200	4,000	90	360,000

Table 4: Installed and Operational Capacity

Products	Annual Capacity Based on Season (kg)	Production Ratio	Product wise Capacity (kg)	Per Unit Weight (Gram)	Production Units (Cans/Jars)	Production Units (Cans/Jars) @ 70%
Jam	*A*	*B*	*C=(A*B)*	*D*	*E=(C*1000)/D*	*F=E*50%*
Jam – 250 Gram	120,000	30%	36,000	250	144,000	100,800
Jam – 450 Gram		40%	48,000	450	106,667	74,667
Jam – 800 Gram		30%	36,000	800	45,000	31,500
Jelly						
Jelly – 250 Gram	180,000	30%	54,000	250	216,000	151,200
Jelly – 450 Gram		40%	72,000	450	160,000	112,000
Jelly – 800 Gram		30%	54,000	800	67,500	47,250
Canned Products						
Canned Apple – 800 Gram	360,000			800	450,000	315,000
Canned Carrot – 800 Gram	1,200,000			800	1,500,000	1,050,000
Canned Peas – 800 Gram	360,000			800	450,000	315,000

6. CRITICAL FACTORS

Before making the decision to invest in the proposed business, one should carefully analyze the associated risk factors. The important considerations in this regard include:

- Hiring of trained labor
- Use of modern technology
- Strict compliance to hygiene and food safety standards
- Availability of trained resources
- Use of high-quality raw material
- Use of better preservation methods
- Effective marketing

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

This unit may be established in metropolitan cities like Karachi, Lahore, Islamabad, Peshawar, Quetta, or other large to medium cities such as Faisalabad, Multan, Rawalpindi, Bahawalpur, Hyderabad, Sialkot, Sukkur, Gujranwala, etc. These cities have been proposed due to availability skilled and low-cost labor. In addition, the investors may also consider establishing this unit in the areas where the raw materials (the targeted fruits and vegetables) are grown in abundance. Districts Killa Saifullah, Zhob, Mastung, Pishin and Killa Abdullah in northern Balochistan, and districts Swat and South Waziristan in Khyber Pakhtunkhwa are the major producers of apple in the country. These districts also produce large variety of vegetables; including the ones targeted in this study. Therefore, such districts may also be considered as suitable locations to establish this unit. However, this decision must be made while evaluating the other important requirements like presence of adequate industrial infrastructure and availability of manpower.

8. POTENTIAL TARGET MARKETS

With everything changing in this busy, challenging and innovative world, the trends of taste are also changing in Pakistan and subject to busy life, people are switching to consume substitutes of fresh foods. The middle, upper-middle and upper-class consumers in urban areas are choosing more packaged food products with the passing times.

According to Global Industry Analytics, Inc. USA, the global market for canned fruits was estimated at US$10.5 Billion in the year 2020. It is projected to reach at US$12.7 Billion by 2026, growing at a CAGR of 3.4% over the analysis period.[6] Figure 47

[6] Source: https://www.researchandmarkets.com/reports/4845873/canned-fruits-global-market-trajectory-

shows growth of global canned food market by product and Figure 48 shows the market by distribution channels.

Figure 47: Global Canned Food Market - By Product

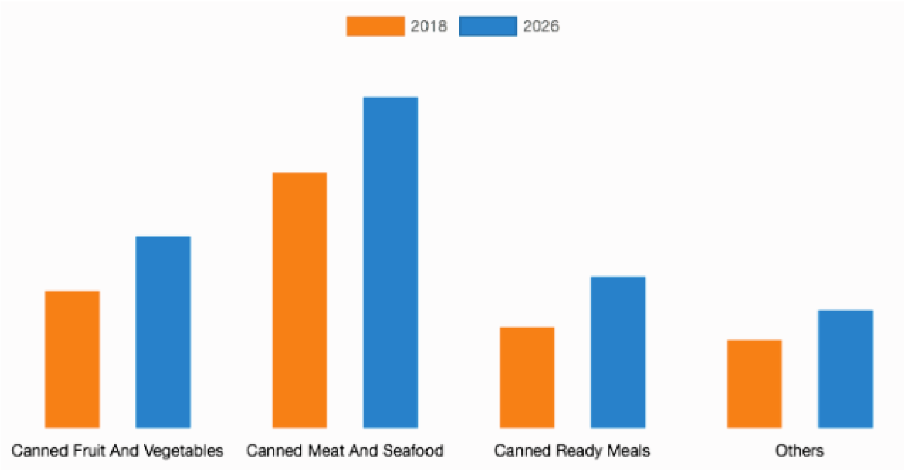
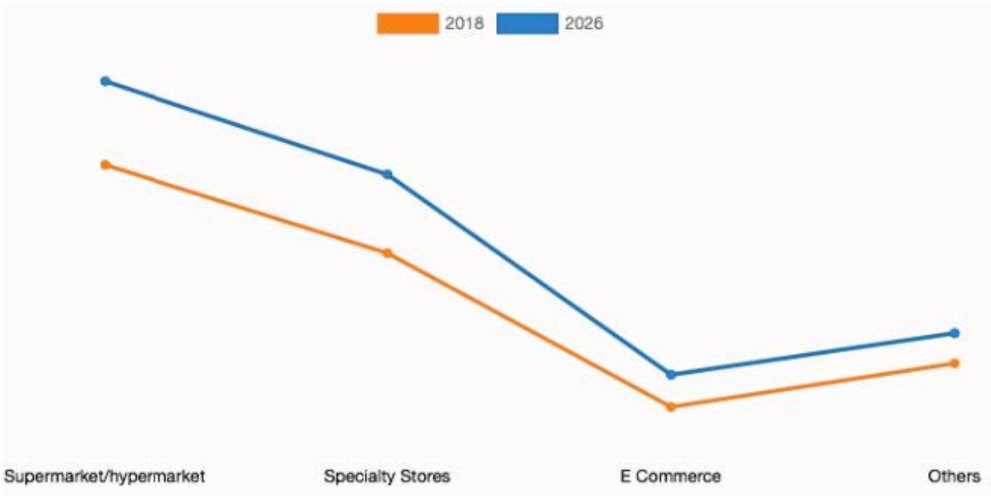


Figure 48: Canned Food Market - By Distribution Channel



The potential target market for the produced jam / jelly and marmalades is the general public of middle and upper-middle income group of urban cities, who generally prefer to buy grocery from super markets and big departmental stores.

The global jams and preserves market is expected to experience steady growth during the period 2021-2026. With a growing demand for varieties of jams and preserves, a positive outlook in the years to come is expected. The market is driven by changes in consumer eating habits, changes in consumer taste preferences, and growing demand for organic foods. Along with these, with an increase in disposable incomes, consumers not only want to try new products, but are also willing to pay higher prices for premium products. The growing demand for natural and organic products is one of the key trends stimulating the growth of this market during the forecast period. The global jam, jelly, and preserves market is projected to register a CAGR of 3.6% during the forecast period as shown in Figure 49.

Figure 49: Global Jams and Jellies Market Forecast

The leading countries to import canned vegetables in terms of dollar value are USA, Germany, Japan and France. The overall market of USA is much larger than evident from the import/export figure as it has a huge domestic trade. Japan is considered to have strict custom rules for food items where China may face challenges in future. There is an opportunity for products from Pakistan in the European Union markets and Gulf countries, especially to benefit out of the negative perception of food products of China.

The domestic market of Pakistan has shown positive growth with an increasing demand that is fed through imported products mainly from Thailand, Philippines, Australia, China and Malaysia. An opportunity lies in the international market keeping in view the massive production of fruit and vegetables in Pakistan accompanied by a small but growing domestic market.

In Pakistan, a number of large formal units and small cottage level units are working in this sector. These units are operating in all the major cities of Pakistan. The key players currently operating in this sector include, National Foods Ltd, Mitchell’s Fruit Farms Ltd, Fauji Fresh n Freeze, Shezan International etc.

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of the production unit. Various assumptions relevant to revenue and costs along with the results of the analysis are outlined in this section.

The projected Income Statement, Cash Flow Statement and Balance Sheet are attached as annexures of this document.

All the figures in this financial model have been calculated after carefully taking into account the relevant assumptions and target market.

9.1. Initial Project Cost

Table 5 provides fixed and working capital requirements for establishment and operations of the business.

Table 5: Initial Project Cost estimates

Particulars	Cost (PKR)	Reference
Land	-	9.1.1
Building / Infrastructure	2,924,048	9.1.2
Machinery & equipment	17,005,774	9.1.3
Office equipment	4,199,500	9.1.6
Furniture & fixtures	1,870,000	9.1.7
Office vehicles	2,136,150	9.1.8
Pre-operating costs	1,991,999	9.1.9
Security Against Building	1,215,000	
License	35,000	9.1.10
Total Capital Cost – (A)	**31,377,471**	
Working Capital Requirement		
Consumables inventory	10,880	
Raw material inventory	28,399,683	
Upfront building rent	405,000	
Upfront insurance payment	372,158	
Cash	7,728,288	
Total Working Capital – (B)	**36,916,009**	
Total Project Cost - (A+B)	**68,293,478**	

9.1.1. Land

The production unit will be established in a rented building to avoid the high cost of land. Suitable locations for setting up a manufacturing business like this can be easily available on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed unit has been estimated as 5,400 sq. ft. The breakup of the space requirement is provided in Table 6.

Table 6: Breakup of Space Requirement

Particulars	Area %	Area (sq ft)
Production Area		
Raw Material Receiving Area	9%	500
Production Department	33%	1,800
Finished Goods Store Room	11%	600
Workers' Rest Area and Mess	4%	225
Washrooms	2%	105
Admin Block		
Executive Office	3%	150
Accounts dept.	4%	200
Procurement dept	4%	200
HR and Admin dept	4%	200
Sales and Marketing dept	4%	225
Quality Assurance Lab	4%	240
Conference Room	4%	225
Kitchen	2%	100
Washrooms	2%	105
Parking and Gate area	7%	375
Lawns	3%	150
Total Area	**100%**	**5.160**

9.1.2. Building

There will be no cost of building since the unit will be started in a rented premises. However, there will be a renovation cost; required to make the building usable for the business. The proposed project requires electricity load of 42 KW for which an electricity connection under the General Supply Tariff-Industrial three phase will be required. Building rent of PKR 405,000 per month has been included in the operating cost. Building renovation cost is shown in Table 7.

Table 7: Building Renovation Cost

Cost Item	Unit of Measurement	Total Units	Cost/Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	132	750	98,933
Labor Cost – Paint	Sq. Feet	13,191	15	197,865
Wall Racks	Units	54	20,000	1,080,000
Curtains	Units	20	5,000	100,000
Blinds	Units	10	5,000	50,000
Glass Door and Partitions	Sq. Feet	1,863	750	1,397,250
Total				**2,924,048**

9.1.3. Machinery and Equipment

Table 8 provides details of machinery and equipment for the proposed project.

Table 8: Machinery Cost Details

Machine Name	Machine Capacity	No. of Items	Unit Cost (PKR)	Total Cost (PKR)
Jams and Jellies				
Pulping Machine (3KW)	500 kg/hour	1	1,272,986	1,272,986
Lemon Juice Extrator (5.5KW)	300 kg/hour	1	1,322,583	1,322,583
Jam/Jelly making Auto Cooking Mixer Machine (Pan) (1.5 KW)	400 Liter/hour	1	2,364,116	2,364,116
Apple				
Peeling and Slicing Machine (0.55 KW)	200 kg apples/ hour	1	619,961	619,961
Boiling Pan	600 kg/hour	1	661,291	661,291
Burner		1	57,863	57,863
Carrot				
Carrot Cutting Machine (0.75KW)	600kg/hour	1	181,855	181,855
Boiling Pan	600kg/hour	1	661,291	661,291
Burner		1	57,863	57,863
Peas				
Shelling Machine (2.2 KW)	400 kg/hour	1	661,291	661,291
Boiling Pan	400 ltr/hour	1	578,630	578,630

Burner		1	57,863	57,863
SubTotal (A)				8,439,730
Packing and other Machinery and Equipment (B)	**Table 9**			8,294,544
Lab Equipment and Instruments (C)	**Table 10**			271,500
Total Cost (D=A+B+C)				**17,005,774**

9.1.4. Packing and other Machinery and Equipment

Table 11 shows details of packing and other machinery and equipment cost required for the production unit.

Table 9: Packing and other Machinery and Equipment

Cost Item	Number of Items	Unit Cost (PKR)	Total Cost (PKR)
Fruit Washing machine	1	454,638	454,638
Can/Jar Washing machine	1	743,953	743,953
Autoclave Can Sterilizer - Jars/Cans	1	454,638	454,638
Filling Machine (1.8KW)	1	3,091,537	3,091,537
Automatic cans sealing machine (1.1KW)	1	2,893,149	2,893,149
Labelling Machine	1	578,630	578,630
Carry Plastic Basket	100	750	75,000
Zester	4	750	3,000
Total Cost (PKR)			**8,294,545**

9.1.5. Lab Equipment and Instruments

Table 10 shows details of equipment cost required for the production unit.

Table 10: Lab Equipment and Instruments

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
pH Meter	1	1,500	1,500
Brix Meter	5	2,000	10,000
Moisture Analyzer	1	210,000	210,000

Compound Digital Microscope (Mechanical Stage:130×140mm Moving Range 75mm×45mm)	1	50,000	50,000
Total Cost (PKR)			**271,500**

9.1.6. Office Equipment

Table 11 shows details of equipment cost required for the production unit.

Table 11: Equipment Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Laptops	6	125,000	750,000
Desktop Computers	9	50,000	450,000
Printers	2	50,000	100,000
CCTV Cameras (2 MP)	14	3,500	49,000
DVR	1	15,000	15,000
LED TV	2	25,000	50,000
Air Conditioners	10	200,000	2,000,000
Exhaust Fan	13	5,500	71,500
Pedestal Fan	5	12,500	62,500
Ceiling Fan	11	10,500	115,500
Bracket Fan	9	12,500	112,500
Inverter Fridge/Refrigerator	1	85,000	85,000
Coffee/ Tea maker	1	7,500	7,500
Microwave Oven	1	3,500	3,500
Water Dispenser	3	40,000	120,000
Wi-Fi / Internet Router	1	10,000	10,000
Water Motor (2 HP)	2	40,000	80,000
Whiteboard	1	2,500	2,500
Projector	1	50,000	50,000
Microphones	15	2,000	30,000
Speakers	2	5,000	10,000
VoIP Conference Phone	2	12,500	25,000
Total Cost (PKR)			**4,199,500**

9.1.7. Furniture and Fixture

Table 12 provides details of furniture and fixtures.

Table 12: Furniture & Fixtures Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Office Table	11	30,000	330,000
Executive Table	9	50,000	450,000
Executive Chairs	9	20,000	180,000
Office Chairs	14	12,500	175,000
Sofa Set	3	50,000	150,000
Cabinets	9	15,000	135,000
Table - Conference Room	1	150,000	150,000
Chairs - Conference Room	15	20,000	300,000
Total Cost (PKR)			**1,870,000**

9.1.8. Vehicles

Table 13 provides details of the vehicles required along with their cost for the proposed project.

Table 13: Office Vehicle Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Bike	1	170,000	170,000
Pickup	1	1,945,000	1,945,000
Registration Charges	1%		21,150
Total Cost (PKR)			**2,136,150**

9.1.9. Pre-Operating Costs

Table 14 provides details of estimated pre-operating costs.

Table 14: Pre-Operating Cost Details

Costs Item	Cost (PKR)
Administration expense	1,250,000
Utilities expense	741,999
Total Cost (PKR)	**1,991,999**

9.1.10. Licenses and Permits

For establishing a food items production in Punjab, a license is required from the Punjab Food Authority (PFA). It has categorized the manufacturers of food items into 5 categories from very small units to very large units[7]. Charges considered for proposed production unit are provided in Table 15.

Table 15: Licenses, Permits Cost Details

License / Permit	Cost (PKR)
Medium Manufacturing Unit	35,000
Total Cost (PKR)	**35,000**

The above charges may differ in other provinces or in federal capital area.

9.2. Breakeven Analysis

Table 16 shows calculation of break-even analysis.

Table 16: Breakeven Analysis

Description	First Year Values (PKR)	Ratios
Sales (PKR) – A	460,145,570	100%
Variable Cost (PKR) – B	385,097,155	84%
Contribution (PKR) (A-B) = C	75,048,415	16%
Fixed Cost (PKR) – D	53,374,654	12%
Contribution Margin	16%	
Breakeven		
Breakeven Revenue (PKR)	327,256,889	
Breakeven (Units)	1,562,809	
Breakeven Capacity	46%	

[7] https://www.pfa.gop.pk/food-licensing-categories/

9.3. Revenue Generation

Table 17 provides details for revenue generation of the production during first year of operations.

Table 17: Revenue Details

Products	Units Sold during the Year (Units) (A)	Price Per Unit (PKR) (B)	Total Revenue (PKR) (A*B)
Jam - 250 Gram	96,600	150	14,490,000
Jam - 450 Gram	71,556	250	17,889,000
Jam - 800 Gram	30,187	390	11,772,930
Jelly - 250 Gram	144,900	140	20,286,000
Jelly - 450 Gram	107,333	240	25,759,920
Jelly - 800 Gram	45,281	370	16,753,970
Canned Apple	301,875	290	87,543,750
Canned Carrot	1,006,250	180	181,125,000
Canned Peas	301,875	280	84,525,000
Total (PKR)			**460,145,570**

9.4. Variable Cost Estimate

Variable costs of the project have been provided in Table 18.

Table 18: Variable Cost Estimate

Description of Costs	Amount (PKR)
Material Cost	239,157,585
Packing Cost	101,546,126
Labour	21,888,000
Consumables	65,280
Lab Consumables (***Table 28***)	27,200
Direct Electricity	4,798,108
Gas Cost	11,957,879
Office vehicles running and maintenance expense	782,550
Communications expense (phone, fax, mail, internet, etc.)	948,000
Bad debt expense	460,146
Electicity	2,897,482
Office expenses (stationery and entertainment etc.)	568,800
Total Cost (PKR)	**385,097,156**

Table 19: Raw Material and Packing Cost

Products	Units sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Material Cost (PKR) (C=A*B)	Packing Cost Per Unit (PKR) (D)	Total Packing Cost (PKR) (E=A*D)
Jam					
Jam - 250 Gram	96,600	58.17	5,619,222	33	3,187,800
Jam - 450 Gram	71,556	104.71	7,492,629	40	2,862,240
Jam - 800 Gram	30,187	186.15	5,619,310	51	1,539,537
Jelly					
Jelly - 250 Gram	144,900	41.06	5,949,594	33	4,781,700
Jelly - 450 Gram	107,333	73.91	7,932,982	40	4,293,320
Jelly - 800 Gram	45,281	131.40	5,949,923	51	2,309,331
Canned					
Canned Apple-800 Gram	301,875	207.69	62,696,419	51	15,395,625
Canned Carrot- 800 Gram	1,006,250	89.08	89,636,750	51	51,318,750
Canned Peas- 800 Gram	301,875	159.87	48,260,756	51	15,395,625
Total Cost (PKR)			**239,157,585**		**101,083,928**

Table 20: Raw Material Cost - Jam

Raw material	Unit of Measurement	Production Batch / Hour (Kgs)	Recipe Ratio	R.M Required / Batch (kgs)	R.M Cost / Kg or Ltr (PKR)	R.M Cost / Batch (PKR)	Process Loss (7%) (Kgs)	Output of Finished Good - Jam / Batch (Kgs)	Cost Per Can/ Jar (PKR)		
									Jar-1	Jar-2	Jar-3
		A	*B*	*C=A*B*	*D*	*E=C*D*	*F=A*7 %*	*G=A-F*	*H=E/G* (250/1000)*	*I=E/G* (450/1000)*	*J=E/G* (800/1000)*
Citric acid	Kg		0.60%	1.20	750	900			1.21	2.18	3.87
Citrus pectin	Kg		0.60%	1.20	3,000	3,600			4.84	8.71	15.48
Ascorbic Acid	Kg		0.05%	0.10	1,800	180			0.24	0.44	0.77
Sugar	Kg	200	62.00%	124.00	150	18,600	14	186	25.00	45.00	80.00
Lemon juice	Liter		20.00%	40.00	300	12,000			16.13	29.03	51.61
Lemon shred	Kg		8.75%	17.50		-			-	-	-
Ginger shred	Kg		8.00%	16.00	500	8,000			10.75	19.35	34.41
Total			**100%**	**200.00**		**43,280**			**58.17**	**104.71**	**186.15**
Packing material cost per tin (PKR) **Table 25**, **Table 26**,									32.67	39.92	16.33

Table 27)					
Total Material Cost (PKR)			**90.84**	**144.63**	**202.48**

Table 21: Raw Material Cost – Jelly

Raw material	Unit of Measurement	Production Batch / Hour (Kgs)	Recipe Ratio	R.M Required / Batch (kgs)	R.M Cost / Kg or Ltr (PKR)	R.M Cost / Batch (PKR)	Process Loss (10%) (Kgs)	Output of Finished Good - Jelly / Batch (Kgs)	Cost Per Can/ Jar (PKR)		
									Jar-1	**Jar-2**	**Jar-3**
		A	***B***	***C=A*B***	***D***	***E=C*D***	***F=A*20%***	***G=A-F***	***H=E/G*(250/1000)***	***I=E/G*(450/1000)***	***J=E/G*(800/1000)***
Citric acid	Kg	200	0.60%	1.20	750	900	40	160	1.41	2.53	4.50
Citrus pectin	Kg		0.60%	1.20	3,000	3,600			5.63	10.13	18.00
Ascorbic Acid	Kg		0.05%	0.10	1,800	180			0.28	0.51	0.90
Sugar	Kg		52.00%	104.00	150	15,600			24.38	43.88	78.00

Apple Pulp	Kg		12.00%	24.00	250	6,000			9.38	16.88	30.00
Water	Liter		34.75%	69.50		-			-	-	-
Total			**100%**	**200.00**		**26,280**			**41.06**	**73.91**	**131.40**
Packing material cost per tin (PKR) (**Table 25**, **Table 26**, **Table 27**)									32.67	39.92	16.33
Total Material Cost (PKR)									**73.73**	**113.83**	**147.73**

Table 22: Raw Material Cost – Sliced Apple

Raw material	Unit of Measurement	Production Batch / Hour (Kgs)	Recipe Ratio	R.M Required / Batch (kgs)	R.M Cost / kg	R.M Cost/ Batch (200 Kgs)	Process Loss (10%) (Kgs)	Output of Finished Good - Sliced Apple / Batch (Kgs)	Tin Cans made / Batch	R.M Cost / Can (PKR)
		A	***B***	***C=A*B***	***D***	***E=C*D***	***F=A*10%***	***G=A-F***	***H=G/(800/1000)***	***I=E/H***
Apple-Slices	Kg	200	82.50%	165.00	250	41,250	20	180	225	183.33
Ascorbic Acid (Vitamin C)	Kg		0.07%	0.14	1,800	252				1.12
Sugar	Kg		17.43%	34.86	150	5,229				23.24

Total			**100%**	**200**		**46,731**				**207.69**
Packing material cost per tin (PKR) (**Table 27**)										51.00
Total Material Cost (PKR)										**258.69**

Table 23: Raw Material Cost – Canned Carrots

Raw material		**Production Batch / Hour (Kgs)**	**Recipe Ratio**	**R.M Required / Batch (kgs)**	**R.M Cost / kg**	**R.M Cost/ Batch (400 Kgs)**	**Process Loss (5%) (Kgs)**	**Output of Finished Good - Carrot / Batch (Kgs)**	**Tin Cans made / Batch**	**R.M Cost / Can**
		A	***B***	***C=A*B***	***D***	***E=C*D***	***F=A*10%***	***G=A-F***	***H=G/(800/1000)***	***I=E/H***
Carrots	Kg		95%	380	111	42,222				88.9
Salt	Kg	400	0.45%	2	50	90	20	380	475	0.2
Boiled Water	Liter		4.55%	18		-				-
Total			**100%**	**200**		**42,312**				**89.08**
	Packing material cost per tin (PKR) (Table 27)									51.00
	Total Material Cost (PKR)									**140.08**

Table 24: Raw Material Cost – Canned Peas

Raw material	Unit of Measurement	Production Batch / Hour (Kgs)	Recipe Ratio	R.M Required / Batch (kgs)	R.M Cost / kg	R.M Cost/ Batch (600 Kgs)	Process Loss (5%) (Kgs)	Output of Finished Good - Carrot / Batch (Kgs)	Tin Cans made / Batch	R.M Cost / Can
		A	*B*	*C=A*B*	*D*	*E=C*D*	*F=A*5%*	*G=A-F*	*H=G/(800/1000)*	*I=E/H*
Peas	Kg	200	95%	190	200	38,000	10	190	238	159.66
Salt	Kg		0.50%	1	50	50				0.21
Boiled water	Liter		4.50%	9		-				-
Total			**100%**	**200**		**38,050**				**159.87**
Packing material cost per tin (PKR) (**Table 27**)										51.00
Total Material Cost (PKR)										**210.87**

Table 25: Packing Cost per Jar (250 Gram)

Particulars	Unit of Measurement	Cost / Unit or Kg (PKR)	No. of Jars / Tray	Cost / Jar (PKR)
		A	**B**	
Tin Cans / Jars (250 Gram)	Units	25	12	25.00

Corrugated Trays for Cans/Jars	Units	50		4.17 (A/B)
Labels	Units	1		1.00
Liquid Gum (kgs)	Kg	250		2.50 (A/1000*10)
Total				**32.67**

Table 26: Packing Cost per Jar (450 Gram)

Particulars	Unit of Measurement	Cost / Unit or Kg (PKR)	No. of Jars / Tray	Cost / Jar (PKR)
		A	**B**	
Tin Cans / Jars (450 Gram)	Units	30	12	30.00
Trays for cans	Units	5		4.17(A/B)
Labels	Units	2		2.00
Liquid Gum (kgs)	Kg	250		3.75 (A/1000*15)
Total				**39.92**

Table 27: Packing Cost per Tin Can (800 Gram)

Particulars	Unit of Measurement	Cost / Unit or Kg (PKR)	No. of Jars / Tray	Cost / Jar (PKR)
		A	**B**	

Tin Cans / Jars (450 Gram)	Units	35	6	35.00
Trays for cans	Units	50		8.33 (A/B)
Labels	Units	3		3.00
Liquid Gum (kgs)	Kg	250		5.00 (A/1000*20)
Total				**51.33**

Table 28: Lab Consumables

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Test Tubes	20	110	2,200
Plastic Weighing Dishes	20	25	500
Sanitizers	10	300	3,000
Hygiene chemicals (phenyl)	10	750	7,500
Detergents	10	250	2,500
Insecticides	10	200	2,000
Polythene Gloves	20	75	1,500
Tissue Rolls	10	300	3,000
Laboratory Coat	5	1,000	5,000
Total			**27,200**

Table 29: Labor Cost

Cost Items	No. of Labor	Wages / Person / month (PKR)	Total Wages (PKR)
Production Supervisors/Operator	6	60,000	4,320,000
Skilled Labor	30	40,000	14,400,000
Sub Total (A)			**18,720,000**
Daily Wages-Temporary Labor			
January	9	22,000	198,000
February	9	22,000	198,000
March	9	22,000	198,000
April			-
May			-
June			-
July	9	22,000	198,000
August	9	22,000	198,000
September	27	22,000	594,000
October	27	22,000	594,000
November	36	22,000	792,000
December	9	22,000	198,000
Sub Total (B)			**3,168,000**
Total (A+B)			**21,888,000**

9.5. Fixed Cost Estimate

Table 30 shows the estimated fixed cost of the project.

Table 30: Fixed Cost Estimate

Description of Costs	Amount (PKR)
Administration expense	18,960,000
Administration benefits expense	1,130,400
Building rental expense	4,860,000
Insurance expense	372,158
Professional fees (legal, audit, consultants, etc.)	568,800
Promotional expense	9,202,911
Distribution Cost	13,804,367
Depreciation expense	4,074,118
Amortization of pre-operating costs	398,400
Amortization of legal, licensing, and training costs	3,500
Total	**53,374,654**

9.6. Financial Feasibility Analysis

The financial feasibility analysis provides the information regarding projected Internal Rate of Return (IRR), Net Present Value (NPV) and Payback period of the study, which is shown in Table 31.

Table 31: Financial Feasibility Analysis

Description	Project
IRR	37%
NPV (PKR)	124,237,304
Payback Period (years)	3.54
Projection Years	10
Discount rate used for NPV	15%

9.7. Financial Feasibility Analysis with 50% Debt

The financial feasibility analysis provides the information regarding projected IRR, NPV and payback period of the study on the basis of Debt: Equity Model (50:50), which is shown in Table 32.

Table 32: Financial Feasibility Analysis with 50% Debt

Description	Project
IRR	37%
NPV (PKR)	173,331,323
Payback Period (years)	3.60
Discount rate used for NPV	11%

9.8. Human Resource Requirement

The proposed production unit shall require the workforce as provided in Table 33. Table 34 shows breakup of the required seasonal labor.

Table 33: Human Resource

Personnel	Number of Personnel	Salary per Head	Salary Per Month (PKR)	Annual Salaries (PKR)
Owner	1	150,000	150,000	1,800,000
Manager Production	1	125,000	125,000	1,500,000
Production Supervisors/Operator	6	60,000	360,000	4,320,000
Skilled Labor	30	40,000	1,200,000	14,400,000
Store Incharge	2	45,000	90,000	1,080,000
Store Helper	1	35,000	35,000	420,000
Mechanical Technician	2	45,000	90,000	1,080,000
Procurement Manager	1	75,000	75,000	900,000
Procurement Assistants	1	40,000	40,000	480,000
Accountant	1	75,000	75,000	900,000
Accounts Assistants	2	40,000	80,000	960,000
HR and Admin Manager	1	80,000	80,000	960,000
Assistants HR and Admin	1	45,000	45,000	540,000
Sales and Marketing Manager	1	75,000	75,000	900,000

Assistants Sales and Marketing	2	45,000	90,000	1,080,000
Quality Controller	1	70,000	70,000	840,000
Assistant Quality Controler	1	40,000	40,000	480,000
Security Guard	6	35,000	210,000	2,520,000
Sweeper	2	35,000	70,000	840,000
Driver	1	35,000	35,000	420,000
Cook	1	35,000	35,000	420,000
Office Boy	2	35,000	70,000	840,000
Total	**67**		**3,140,000**	**37,680,000**

Table 34: Seasonal Labor

Month	Total Unskilled Labor	Wages per Month (PKR)	Total Wages Annually (PKR)
January	6	33,000	198,000
February	6	33,000	198,000
March	6	33,000	198,000
April	-	33,000	-
May	-	33,000	-
June	-	33,000	-
July	6	33,000	198,000
August	6	33,000	198,000
September	18	33,000	594,000
October	18	33,000	594,000
November	24	33,000	792,000
December	6	33,000	198,000
Total			**3,168,000**

10. CONTACT DETAILS

The contact details of all the major suppliers of machinery and equipment and raw material are given in Table 35.

Table 35: Contact Details

Name of Supplier	Supply	Contact	Website/ Email
Fruit Tribe	Fruits	0333 4387840	
Star Farm	Fruits	37508011-15	www.starfarm.pk
Zhengzhou Hongle Machinery Equipment Co. Ltd	Food Machinery	0086-037186151367	www.hlmachine001@gmail.com
Wuxi Ai Yi Yi Machinery Equipment Co. Ltd	Cooker	86-15995259329	www.aizhanyi.en.made-in-china.com
Jiangsu Kaiyi Intelligent Technology Co., Ltd.	Cutting Machine	086-51085126689	www.kaae.com
Henan Penghui Machinery And Equipment Co. Ltd.	Shelling Machine	0086-37160214253	www.hnpenghuimachine.com
Changzhou Bojun Packing Machinery Co. Ltd	Filling Machine	86-51982555020	www.bojunpack.en.made-in-china.com
Guangzhou Sanpong Machinery Industrial Co., Ltd.	Can Sealing Machine	86-15112087028	www.sanpongpack.com
Suzhou Luye Packaging Technology Co., Ltd.	Labeling Macine	86-51258536200	www.luyepackaging.com

11. USEFUL LINKS

Table 36: Useful Links

Name of Organization	E-mail Address
Small and Medium Enterprises Development Authority (SMEDA)	www.smeda.org.pk
National Business Development Program (NBDP)	www.nbdp.org.pk
Government of Pakistan	www.pakistan.gov.pk
Ministry of National Health Services Regulations and Coordination	www.nhsrc.gov.pk
Ministry of Federal Education and Professional Training	www.mofept.gov.pk
Government of Punjab	www.punjab.gov.pk
Government of Sindh	sindh.gov.pk/
Government of Balochistan	balochistan.gov.pk/
Government of KPK	kp.gov.pk/
Government of Gilgit Baltistan	gilgitbaltistan.gov.pk/
Government of Azad Jammu & Kashmir	ajk.gov.pk/
Trade Development Authority of Pakistan	www.tdap.gov.pk
Punjab Board of Investment and Trade	www.pbit.gop.pk/
Punjab Small Industries Corporation	www.psic.gop.pk
Sindh Small Industries Corporation	https://ssic.gos.pk
Small Industries Development Board Khyber Pakhtunkhwa	https://small_industries_de.kp.gov.pk
Directorate of Small Industries Balochistan	https://balochistan.gov.pk/departments
Securities and Exchange Commission of Pakistan	www.secp.gov.pk
State Bank of Pakistan	www.sbp.gov.pk
Federal Board of Revenue	www.fbr.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
Pakistan Stock Exchange (PSX)	www.psx.com.pk
Pakistan Food Association	www.facebook.com/pfa.com.pk
Pakistan Standards and Quality Control Authority (PSQCA)	http://www.psqca.com.pk

12. ANNEXURES

12.1. Income Statement

Income Statement	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue										
Jams	44,151,930	52,036,501	61,055,995	71,359,023	83,112,096	91,423,306	100,565,636	110,622,200	121,684,420	133,852,862
Jellies	62,799,890	74,014,512	86,843,612	101,498,067	118,215,870	130,037,457	143,041,203	157,345,323	173,079,856	190,387,841
Canned Apple	87,543,750	103,176,403	121,060,500	141,489,266	164,793,606	181,272,966	199,400,263	219,340,289	241,274,318	265,401,750
Canned Carrot	181,125,000	213,468,750	250,470,000	292,736,813	340,952,288	375,047,516	412,552,268	453,807,495	499,188,244	549,107,069
Canned Peas	84,525,000	99,618,596	116,886,000	136,610,326	159,111,068	175,022,174	192,524,392	211,776,831	232,954,514	256,249,965
	460,145,570	542,314,762	636,316,107	743,693,495	866,184,927	952,803,420	1,048,083,762	1,152,892,138	1,268,181,352	1,394,999,487
Cost of sales										
Material Cost- Jams	18,731,161	22,076,551	25,903,109	30,273,343	35,260,456	38,785,774	42,664,231	46,930,965	51,623,970	56,785,823
Material Cost- Jellies	19,832,499	23,374,646	27,424,851	32,052,677	37,333,507	41,066,464	45,173,401	49,689,560	54,660,012	60,126,199
Material Cost- Canned Apples	62,696,419	73,892,417	86,698,500	101,332,399	118,021,050	129,823,931	142,806,713	157,085,831	172,793,250	190,072,575
Material Cost- Canned Carrot	89,636,750	105,645,469	123,958,500	144,877,719	168,730,875	185,601,375	204,166,688	224,582,063	247,041,563	271,752,188
Material Cost- Canned Peas	48,260,756	56,879,631	66,736,800	78,000,728	90,848,419	99,930,544	109,924,763	120,916,463	133,010,438	146,311,481
Packing Cost- Jars	11,404,170	13,440,636	15,770,354	18,431,568	21,467,366	23,614,103	25,975,513	28,573,064	31,430,371	34,573,408
Packing Cost- Cans	58,991,380	69,525,572	81,576,688	95,342,678	111,046,253	122,150,878	134,365,966	147,802,563	162,582,819	178,841,101
Packing Cost- Other Packing Material	31,150,576	36,718,159	43,082,650	50,352,802	58,646,243	64,510,867	70,961,954	78,058,149	85,863,964	94,450,361
Consumables	65,280	71,808	78,989	86,888	95,576	105,134	115,648	127,212	139,933	153,927
Lab Consumables	27,200	29,920	32,912	36,203	39,824	43,806	48,186	53,005	58,306	64,136
Direct Electricity	4,798,108	5,229,937	5,700,632	6,213,688	6,772,920	7,382,483	8,046,907	8,771,128	9,560,530	10,420,978
Direct Labour	21,888,000	24,011,136	26,340,216	28,895,217	31,698,053	34,772,764	38,145,723	41,845,858	45,904,906	50,357,682
Gas Cost	11,957,879	14,093,436	16,536,088	19,326,843	22,509,715	24,760,404	27,236,790	29,960,244	32,956,462	36,252,413
Office vehicles running and maintenance expense	782,550	861,588	948,608	1,044,417	1,149,903	1,266,044	1,393,914	1,534,699	1,689,704	1,860,364
Total cost of sales	380,222,728	445,850,905	520,788,896	606,267,171	703,620,162	773,814,572	851,026,396	935,930,805	1,029,316,228	1,132,022,635
Gross Profit	79,922,842	96,463,857	115,527,211	137,426,324	162,564,765	178,988,848	197,057,365	216,961,332	238,865,124	262,976,851
General administration & selling expenses										
Administration expense	18,960,000	20,799,120	22,816,635	25,029,848	27,457,743	30,121,145	33,042,896	36,248,056	39,764,118	43,621,237
Administration benefits expense	1,130,400	1,240,049	1,360,334	1,492,286	1,637,038	1,795,830	1,970,026	2,161,118	2,370,747	2,600,709
Building rental expense	4,860,000	5,346,000	5,880,600	6,468,660	7,115,526	7,827,079	8,609,786	9,470,765	10,417,842	11,459,626
Electicity	2,897,482	3,158,255	3,442,498	3,752,323	4,090,032	4,458,135	4,859,367	5,296,710	5,773,414	6,293,021
Communications expense (phone, fax, mail, internet, etc.)	948,000	1,039,956	1,140,832	1,251,492	1,372,887	1,506,057	1,652,145	1,812,403	1,988,206	2,181,062
Office expenses (stationery and entertainment etc.)	568,800	623,974	684,499	750,895	823,732	903,634	991,287	1,087,442	1,192,924	1,308,637
Promotional expense	9,202,911	10,846,295	12,726,322	14,873,870	17,323,699	19,056,068	20,961,675	23,057,843	25,363,627	27,899,990
Distribution Cost	13,804,367	16,269,443	19,089,483	22,310,805	25,985,548	28,584,103	31,442,513	34,586,764	38,045,441	41,849,985
Insurance expense	372,158	316,334	260,510	204,687	148,863	93,039	37,216	694,920	590,682	486,444
Professional fees (legal, audit, consultants, etc.)	568,800	623,974	684,499	750,895	823,732	903,634	991,287	1,087,442	1,192,924	1,308,637
Depreciation expense	4,074,118	4,074,118	4,074,118	4,074,118	4,074,118	4,074,118	2,813,547	7,355,847	7,355,847	7,355,847
Amortization of pre-operating costs	398,400	398,400	398,400	398,400	398,400	-	-	-	-	-
Amortization of legal, licensing, and training costs	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Bad debt expense	460,146	542,315	636,316	743,693	866,185	952,803	1,048,084	1,152,892	1,268,181	1,394,999
Subtotal	58,249,081	65,281,732	73,198,546	82,105,473	92,121,003	100,279,146	108,423,328	124,015,702	135,327,451	147,763,695
Operating Income	21,673,760	31,182,125	42,328,665	55,320,851	70,443,762	78,709,702	88,634,037	92,945,630	103,537,673	115,213,157
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	4,251,443	-	-	
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	1,049,875	-	-	
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	534,038	-	-	
Earnings Before Interest & Taxes	21,673,760	31,182,125	42,328,665	55,320,851	70,443,762	78,709,702	94,469,393	92,945,630	103,537,673	115,213,157
Subtotal	-	-	-	-	-	-	-	-	-	-
Earnings Before Tax	21,673,760	31,182,125	42,328,665	55,320,851	70,443,762	78,709,702	94,469,393	92,945,630	103,537,673	115,213,157
Tax	6,285,390	9,042,816	12,275,313	16,043,047	20,428,691	22,825,813	27,396,124	26,954,233	30,025,925	33,411,815
NET PROFIT/(LOSS) AFTER TAX	**15,388,370**	**22,139,309**	**30,053,352**	**39,277,804**	**50,015,071**	**55,883,888**	**67,073,269**	**65,991,397**	**73,511,748**	**81,801,341**

12.2. Balance Sheet

Balance Sheet

	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	7,735,995	12,908,980	15,065,751	15,225,122	44,205,371	84,654,616	128,541,530	131,468,854	182,019,569	235,688,388	255,788,126
Accounts receivable		37,820,183.84	44,573,816.05	52,299,953.98	61,125,492.73	71,193,281.67	78,312,609.84	86,143,870.83	94,758,257.91	104,234,083.70	114,657,492.07
Finished goods inventory		15,842,780	18,577,127	21,699,558	25,261,625	29,317,566	32,242,339	35,459,505	38,997,196	42,888,263	47,167,705
Consumables Inventory	10,880	13,117	15,814	19,065	22,985	27,711	33,408	40,276	48,557	58,541	-
Packing material inventory	28,391,976	36,407,479	46,476,892	59,100,623	74,891,453	89,629,373	107,269,388	128,379,327	153,645,011	183,883,437	-
Pre-paid building rent	405,000	445,500	490,050	539,055	592,961	652,257	717,482	789,230	868,153	954,969	-
Pre-paid insurance	372,158	316,334	260,510	204,687	148,863	93,039	37,216	694,920	590,682	486,444	-
Total Current Assets	36,916,008	103,754,374	125,459,960	149,088,063	206,248,750	275,567,843	347,153,972	382,975,985	470,927,427	568,194,125	417,613,323
Fixed assets											
Land	-	-	-	-	-	-	-	-	-	-	-
Building Renovation / Infrastructure	2,924,048	2,631,643	2,339,238	2,046,833	1,754,429	1,462,024	1,169,619	877,214	584,810	292,405	-
Machinery & equipment	17,005,774	14,454,908	11,904,041	9,353,175	6,802,309	4,251,443	1,700,577	32,305,039	27,459,283	22,613,527	17,767,772
Furniture & fixtures	1,870,000	1,589,500	1,309,000	1,028,500	748,000	467,500	187,000	3,552,348	3,019,496	2,486,643	1,953,791
Office vehicles	2,136,150	1,815,728	1,495,305	1,174,883	854,460	534,038	213,615	3,254,643	2,766,447	2,278,250	1,790,054
Office equipment	4,199,500	3,569,575	2,939,650	2,309,725	1,679,800	1,049,875	419,950	7,977,585	6,780,948	5,584,310	4,387,672
Security Against Building	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000	1,215,000
Total Fixed Assets	29,350,471	25,276,353	21,202,234	17,128,116	13,053,998	8,979,880	4,905,761	49,181,830	41,825,983	34,470,136	27,114,288
Intangible assets											
Pre-operation costs	1,991,999	1,593,599	1,195,199	796,800	398,400	-	-	-	-	-	-
Legal, licensing, & training costs	35,000	31,500	28,000	24,500	21,000	17,500	14,000	10,500	7,000	3,500	-
Total Intangible Assets	2,026,999	1,625,099	1,223,199	821,300	419,400	17,500	14,000	10,500	7,000	3,500	-
TOTAL ASSETS	**68,293,478**	**130,655,826**	**147,885,394**	**167,037,479**	**219,722,148**	**284,565,223**	**352,073,734**	**432,168,314**	**512,760,409**	**602,667,761**	**444,727,611**
Liabilities & Shareholders' Equity											
Current liabilities											
Accounts payable		54,668,163	64,675,169	76,258,951	89,665,816	104,493,820	116,118,443	129,139,754	143,740,452	160,136,055	148,414,349
Other liabilities											
Total Current Liabilities	-	54,668,163	64,675,169	76,258,951	89,665,816	104,493,820	116,118,443	129,139,754	143,740,452	160,136,055	148,414,349
Shareholders' equity											
Paid-up capital	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478	68,293,478
Retained earnings		7,694,185	14,916,747	22,485,049	61,762,854	111,777,925	167,661,813	234,735,082	300,726,479	374,238,227	228,019,784
Total Equity	68,293,478	75,987,663	83,210,225	90,778,528	130,056,332	180,071,403	235,955,291	303,028,561	369,019,958	442,531,705	296,313,263
TOTAL CAPITAL AND LIABILITIES	**68,293,478**	**130,655,826**	**147,885,394**	**167,037,479**	**219,722,148**	**284,565,223**	**352,073,734**	**432,168,314**	**512,760,409**	**602,667,761**	**444,727,611**

12.3. Cash Flow Statement

Cash Flow Staement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating activities											
Net profit		15,388,370	22,139,309	30,053,352	39,277,804	50,015,071	55,883,888	67,073,269	65,991,397	73,511,748	81,801,341
Add: depreciation expense		4,074,118	4,074,118	4,074,118	4,074,118	4,074,118	4,074,118	2,813,547	7,355,847	7,355,847	7,355,847
amortization of pre-operating costs		398,400	398,400	398,400	398,400	398,400	-	-	-	-	-
amortization of training costs		3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Accounts receivable		(37,820,184)	(6,753,632)	(7,726,138)	(8,825,539)	(10,067,789)	(7,119,328)	(7,831,261)	(8,614,387)	(9,475,826)	(10,423,408)
Finished goods inventory		(15,842,780)	(2,734,347)	(3,122,431)	(3,562,067)	(4,055,941)	(2,924,773)	(3,217,166)	(3,537,691)	(3,891,067)	(4,279,442)
Equipment inventory	(10,880)	(2,237)	(2,697)	(3,251)	(3,920)	(4,726)	(5,697)	(6,869)	(8,281)	(9,983)	58,541
Raw material inventory	(28,391,976)	(8,015,503)	(10,069,413)	(12,623,731)	(15,790,830)	(14,737,920)	(17,640,014)	(21,109,940)	(25,265,684)	(30,238,426)	183,883,437
Pre-paid building rent	(405,000)	(40,500)	(44,550)	(49,005)	(53,906)	(59,296)	(65,226)	(71,748)	(78,923)	(86,815)	954,969
Advance insurance premium	(372,158)	55,824	55,824	55,824	55,824	55,824	55,824	(657,705)	104,238	104,238	486,444
Accounts payable		54,668,163	10,007,006	11,583,783	13,406,865	14,828,004	11,624,623	13,021,311	14,600,698	16,395,604	(11,721,707)
Other liabilities		-	-	-	-	-	-	-	-	-	-
Cash provided by operations	(29,180,014)	12,867,170	17,073,518	22,644,421	28,980,249	40,449,245	43,886,915	50,016,940	50,550,715	53,668,819	248,119,522
Financing activities											
Issuance of shares	68,293,478	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares											
Cash provided by / (used for) financing acti	68,293,478	-	-	-	-	-	-	-	-	-	-
Investing activities											
Capital expenditure	(31,377,470)	-	-	-	-	-	-	(47,089,615)	-	-	-
Acquisitions											
Cash (used for) / provided by investing acti	(31,377,470)	-	-	-	-	-	-	(47,089,615)	-	-	-
NET CASH	**7,735,995**	**12,867,170**	**17,073,518**	**22,644,421**	**28,980,249**	**40,449,245**	**43,886,915**	**2,927,324**	**50,550,715**	**53,668,819**	**248,119,522**

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 37: Operating Cost Assumptions

Description	Details
Operating costs growth rate	8.8%
Distribution & selling expenses	3.0% of revenue
Communication expenses	5.0% of administration expenses
Office expenses (stationery and entertainment etc.)	3.0% of administration expenses
Promotional Expense	2.0% of revenue

13.2. Revenue Assumptions

Table 38: Revenue Assumptions

Description	Details
Sale price growth rate	10 %
Capacity utilization	70%
Capacity utilization growth rate	5%
Maximum capacity	90%

13.3. Financial Assumptions

Table 39: Financial Assumptions

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate	15%

13.4. Debt Related Assumptions

Table 40: Debt Related Assumption

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	11%
Debt Tenure	5 years
Grace Period	1 Year
Interest Rate (KIBOR+3%)	26%

13.5. Cash Flow Assumptions

Table 41: Cash Flow Assumption

Description	Details
Accounts receivable cycle (in days)	30
Accounts payable cycle (in days)	50

Small and Medium Enterprises Development Authority

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4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road, Lahore

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REGIONAL OFFICE PUNJAB	REGIONAL OFFICE SINDH	REGIONAL OFFICE KPK	REGIONAL OFFICE BALOCHISTAN
3rd Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road Lahore, Tel: (042) 111-111-456 Fax: (042) 36304926-7 helpdesk.punjab@smeda.org.pk	5TH Floor, Bahria Complex II, M.T. Khan Road, Karachi. Tel: (021) 111-111-456 Fax: (021) 5610572 helpdesk-khi@smeda.org.pk	Ground Floor State Life Building The Mall, Peshawar. Tel: (091) 9213046-47 Fax: (091) 286908 helpdesk-pew@smeda.org.pk	Bungalow No. 15-A Chaman Housing Scheme Airport Road, Quetta. Tel: (081) 831623, 831702 Fax: (081) 831922 helpdesk-qta@smeda.org.pk