



## Pre-feasibility Study

# Garlic Powder & Paste Production Unit.

December 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, and revenues 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

## Table of Contents

<b>1</b>	<b>DISCLAIMER</b> .....	<b>4</b>
<b>2</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>5</b>
<b>3</b>	<b>INTRODUCTION TO SMEDA</b> .....	<b>5</b>
<b>4</b>	<b>PURPOSE OF THE DOCUMENT</b> .....	<b>6</b>
<b>5</b>	<b>BRIEF DESCRIPTION OF PROJECT &amp; PRODUCT</b> .....	<b>6</b>
5.1	HEALTH BENEFITS .....	8
5.2	SULFUR-CONTAINING COMPOUNDS IN GARLIC.....	8
5.3	DESCRIPTION.....	8
5.4	HOW TO SELECT AND STORE .....	9
5.5	LOCAL INDUSTRY.....	10
5.6	PRODUCTION PROCESS FLOW .....	12
5.7	MANUFACTURING PROCESS:.....	12
	<b>5.7.1 Preparing and Processing Garlic powder</b> .....	<b>12</b>
	<b>Tips:</b> .....	<b>13</b>
5.8	PREPARING AND PROCESSING GARLIC PASTE .....	14
	<b>5.8.1 Steps:</b> .....	<b>14</b>
	<b>Tips:</b> .....	<b>15</b>
5.9	INSTALLED AND OPERATIONAL CAPACITIES .....	16
5.10	CONVERSION RATION FRESH GARLIC TO GARLIC POWDER.....	16
5.11	CONVERSION RATION FRESH GARLIC TO GARLIC PASTE.....	17
<b>6</b>	<b>CRITICAL FACTORS</b> .....	<b>18</b>
<b>7</b>	<b>GEOGRAPHICAL POTENTIAL FOR INVESTMENT</b> .....	<b>18</b>
<b>8</b>	<b>POTENTIAL TARGET CUSTOMERS / MARKETS</b> .....	<b>19</b>
<b>9</b>	<b>PROJECT COST SUMMARY</b> .....	<b>19</b>
9.1	PROJECT ECONOMICS.....	19
	TABLE 2: BREAKEVEN (100% EQUITY BASED).....	19
	PROJECT FINANCING.....	20
9.2	PROJECT COST .....	20
9.3	SPACE REQUIREMENT.....	21
9.4	MACHINERY & EQUIPMENT REQUIREMENT.....	22
9.5	FURNITURE & FIXTURES REQUIREMENT.....	22
9.6	OFFICE EQUIPMENT REQUIREMENT .....	22
9.7	HUMAN RESOURCE REQUIREMENT .....	23
9.8	UTILITIES AND OTHER COSTS .....	23
9.9	REVENUE GENERATION.....	24
<b>10</b>	<b>CONTACT DETAILS</b> .....	<b>24</b>
10.1	MACHINERY SUPPLIERS .....	24
10.2	RAW MATERIAL SUPPLIERS .....	24
10.3	TECHNICAL EXPERTS / CONSULTANTS.....	25
<b>11</b>	<b>USEFUL WEB LINKS</b> .....	<b>25</b>
<b>12</b>	<b>ANNEXURES</b> .....	<b>27</b>
12.1	INCOME STATEMENT .....	27

12.2	BALANCE SHEET .....	28
12.3	CASH FLOW STATEMENT .....	29
<b>13</b>	<b>KEY ASSUMPTIONS.....</b>	<b>30</b>
13.1	OPERATING ASSUMPTIONS .....	30
13.2	PRODUCTION ASSUMPTIONS .....	30
13.3	ECONOMY RELATED ASSUMPTIONS .....	30
13.4	CASH FLOW ASSUMPTIONS.....	30

## 1 DISCLAIMER

This information memorandum is to introduce the subject matter and provide a general idea and information on the said matter. Although, the material included in this document is based on data/information gathered from various reliable sources; however, it is based upon certain assumptions, which may differ from case to case. The information has been provided on as is where is basis without any warranties or assertions as to the correctness or soundness thereof. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA, its employees or agents do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision, including taking professional advice from a qualified consultant/technical expert before taking any decision to act upon the information.

For more information on services offered by SMEDA, please contact our website: [www.smeda.org.pk](http://www.smeda.org.pk)

### ***Document Control***

Document No.	PREF-NO 3
Revision	No.01
Prepared by	SMEDA-Balochistan
Revision Date	December 2023
For information	<a href="mailto:helpdesk.balochistan@smeda.org.pk">helpdesk.balochistan@smeda.org.pk</a>

## 2 EXECUTIVE SUMMARY

A Garlic Powder and Paste Production Unit is proposed for locations including Quetta, Loralai, Mach, Sibi, Harnai, Duki, Qilla Abdullah, Pishin, Karak, Dera Ismail Khan, Kohat, Attock, Hub, Lahore, Faisalabad, Multan, Gujranwala, and others. The products will include Garlic Powder and Garlic Paste, with an installed capacity of 1,044,000 Kgs and initial utilization of 783,000 Kgs (75%).

The Total Cost Estimates for the project is Rs. 400.41 million with a fixed investment of Rs. 46.61 million and working capital of Rs. 354 million. The project has an Internal Rate of Return (IRR) of 47%, Net Present Value (NPV) Rs. 2,756,372,416 and a payback period of 4.67 years. Leveraged financing at 50% with a cost of 28% provides a Net Present Value (NPV) of Rs. 4047368079, IRR of 41%, and a payback period of 5.17 years.

Critical factors for the project's success include the large quantity of garlic production in the country, availability of three varieties mix, hardworking and low-cost labor, increasing trends towards garlic powder and paste, and established world markets with improved technological changes.

Equally important considerations involve emphasizing excellent customer services, acquiring new machinery for increased efficiency and lower maintenance costs, considering refurbished standardized machinery, adapting to rapid changes, and hiring well-trained/experienced staff to enhance facility efficiency.

## 3 INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an 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 'sectoral 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.

## **4 PURPOSE OF THE DOCUMENT**

The main objective of conducting the pre-feasibility study is to assist potential entrepreneurs in identifying investment opportunities. This study serves as a crucial tool for making informed investment decisions by covering essential aspects of project development, startup, production, marketing, finance, and business management.

In the context of the Garlic Powder and Paste Production Unit, this document aims to provide potential investors with a comprehensive overview of the business. Its purpose is to support investors in making crucial investment decisions by offering insights into the project's concept, initiation, production processes, marketing strategies, financial considerations, and overall business management.

The significance of creating pre-feasibility reports becomes even more evident in sectors that lack proper documentation. Through research preceding such reports, valuable insights, including thumb rules, best practices learned through trial and error by existing enterprises, and industry norms, are revealed. These insights become essential guidelines for establishing and successfully managing a business.

To make well-informed investment decisions, it is imperative to not only thoroughly study the entire document but also carefully consider the critical aspects outlined later on, as they form the foundation of any investment decision.

## **5 BRIEF DESCRIPTION OF PROJECT & PRODUCT**

This project envisions the production of Garlic powder and Garlic paste, presenting promising opportunities in household use, restaurants, hotels, and the export market. Particularly in the restaurant industry, where the use of garlic is indispensable for seasoning various dishes, the project offers a time-saving solution for workers who would otherwise spend hours peeling cloves. This time efficiency can be redirected towards more productive tasks.

Garlic (*Allium sativum*), belonging to the onion genus *Allium*, is the second most widely cultivated allium after onion. Recognized worldwide for its value as a spice and popular remedy for ailments, garlic has a history spanning several thousand years. Native to Central Asia and northeastern Iran, it has been a common seasoning globally and was known to ancient Egyptians. In Ancient Rome, it was

extensively used for food, particularly among the less affluent. China dominates global garlic production, supplying about 80% of the world's garlic.

Garlic is widely grown and consumed in Pakistan, with applications in flavoring various dishes. Approximately 50% of fresh garlic output in America is dehydrated and sold to food processors. In Pakistan, the Middle East, and other countries, garlic is extensively used in food preparation, including dishes, curry powders, curried vegetables, meat, and different sauces.

Key garlic-producing countries include China, Turkey, India, Thailand, Korea, Egypt, and Pakistan. The proposed business promises a higher return on investment, anticipating steady growth, particularly for processors with prior experience or education in the relevant field. This pre-feasibility study provides crucial information for starting the production of processed garlic, including garlic powder and paste.

Garlic is known for its rich composition of carbohydrates, protein, and phosphorous. Green garlic, in particular, boasts a high ascorbic acid content. The nutritive composition of both fresh peeled garlic and dehydrated garlic powder is well-documented.

Particular	Fresh peeled garlic cloves	Dehydrated garlic powder
Moisture%	62.8	5.2
Protien%	6.3	17.5
Fat%	0.1	0.6
mineral matter%	1	3.2
Fibre%	0.8	1.9
Carbohydrates%	29	71.4
Calcium%	0.03	0.1
Phosphours%	0.31	0.42
Potassium%	0	1.1
Iron%	0.001	0.004
Niacin%	0	0.7
Sodium%	0	0.01
Vitamin A.I.U.	0	175
Nicotinic acid(mg/100g)	0.4	0
Vitamin C (mg/100g)	13	12
Vitamin B(mg/100g)	0	0.68
Vitamin B2 (mg/100g)	0	0.08

## 5.1 Health Benefits

Garlic stands out as a superb provider of manganese and vitamin B6, offering an abundance of vitamin C and copper, while also delivering selenium, phosphorus, vitamin B1, and calcium. However, the true stars contributing to its overall health benefits are the sulfur compounds found in garlic. These compounds, containing sulfur, offer a range of health advantages across various body systems, including the cardiovascular system, immune system, inflammatory system, digestive system, endocrine system, and detoxification system.

## 5.2 Sulfur-Containing Compounds in Garlic

Examining the six categories of sulfur-containing compounds provides an initial glimpse into the intricate nature of this allium vegetable. Each of these compounds has undergone extensive study regarding potential health benefits. However, it's important to highlight that the majority of these studies have not centered on the presence of compounds in fresh garlic as a food source. Instead, the focus has primarily been on garlic supplements, including oils, tablets, powders, or other extract forms.

## 5.3 Description

Garlic, along with onions, falls under the category of "allium vegetables," both belonging to the *Allium* genus. Interestingly, "Allium" is the Latin term for garlic. Other well-known members of this genus include leeks, chives, scallions, and shallots.

While the classification of garlic in the *Allium* genus is straightforward, its placement in the broader amaryllis family (*Amaryllidaceae*) can be perplexing. This extensive family includes the popular flower of the same name. Garlic, specifically *Allium sativum*, is part of the *Allioideae* subfamily within the amaryllis family. This subfamily also encompasses onions, leeks, chives, scallions, and shallots.

Garlic is uniquely structured in a head, referred to as a "bulb," typically measuring around 2 inches in height and diameter. The bulb is composed of numerous small individual cloves, all enveloped in paper-like sheaths that may be white, off-white, or exhibit a pink/purple hue. Despite the firm texture of garlic cloves, they can be easily cut or crushed. The taste of garlic is unparalleled, delivering a hot pungency to the palate, complemented by a subtle underlying sweetness.

Garlic varieties are commonly categorized into four types.

- Hardneck
- Softneck
- Black

- Creole

Hardneck garlic earns its name due to its tough and woody central stalk. Popular hardneck varieties include Purple Stripe, Rocambole, and Porcelain, with Purple Stripe exhibiting a light purplish or rosy tint on cloves and skins. Hardneck garlic typically packs more "bite" compared to softneck varieties, and they are often classified under *Allium sativum* subspecies *ophioscorodon*.

Softneck garlic varieties, commonly found in grocery stores, are less pungent than hardneck types. Varieties like Formidable, Western Rose, Artichoke, and Silverskin fall into this category, labeled as *Allium sativum* subspecies *sativum*. Softneck garlic is often seen braided in supermarkets.

Creole garlic, sometimes treated as a softneck type, may also be considered a distinct garlic type based on genetic evidence. Recognizable by the rosy/purplish color of the entire bulb, Creole garlic varieties like Burgundy, Ajo Rojo, Cuban Purple, and Creole Red are less common in grocery stores.

Black garlic is created through heat treatment, high humidity, and aging. Over several weeks, the garlic cloves transform into a rich black color. Popular in Korean, Japanese, and Thai cuisine, black garlic is sometimes referred to as "fermented garlic," though this term is controversial as it doesn't involve the addition of microorganisms typically associated with fermentation.

Elephant garlic (*Allium ampeloprasum*) is an intriguing garlic variant closely related to leeks (*Allium porrum*) rather than traditional garlic. Its tall flower stalk and large purplish flower head make it resemble an oversized garlic. Unlike leeks, elephant garlic forms a bulb with large cloves, usually numbering three to four per bulb.

#### 5.4 How to Select and Store

We advocate for the selection of certified organically grown foods, and garlic is no different. Multiple research studies on organic foods collectively indicate that opting for certified organic foods, including garlic, significantly lowers the risk of exposure to contaminants such as pesticides and heavy metals.

To preserve the freshness of fresh garlic, store it in a cool, dark place, either uncovered or loosely covered, away from heat and sunlight. This practice not only helps maintain its optimal freshness but also prevents sprouting, which can diminish its flavor and lead to unnecessary waste. Refrigerating garlic is unnecessary.

Depending upon its age and variety, whole garlic bulbs will keep fresh for about a month if stored properly. Inspect the bulb frequently and remove any cloves that appear to be dried out or moldy. Once you break the head of garlic, it greatly reduces its shelf life to just a few days.

## 5.5 Local Industry

In a significant breakthrough, Pakistani scientists have achieved a milestone in agriculture by introducing the highest-yield garlic variety, 'NARC-G1,' suitable for cultivation in all provinces of the country. This achievement is part of the garlic variety development program initiated under the vegetable crop research program at the National Agricultural Research Centre (NARC).

The 'NARC-G1' garlic variety stands out as the highest-yielding among existing variants in Pakistan, boasting superior quality and an impressive yield of 26 tonnes per hectare. This variety not only has elevated nutrient contents and medicinal value but is also well-suited for applications in the pharmaceutical, food processing industry, and households. The introduction of this variety is anticipated to increase farmers' income, thanks to reduced plant protection costs and higher yield potential, ultimately contributing to a decrease in the import bill.

The presentation of the newly-developed garlic variety took place at a meeting of the variety evaluation committee, comprised of agricultural research scientists from across the country, convened by the Pakistan Agriculture Research Council. The objective was to assess the potential of this groundbreaking variant.

Pakistan's current reliance on garlic imports, driven by high demand and low yield potential of existing varieties, has led to substantial foreign exchange expenditure. The country imports approximately 34,375 tonnes of garlic from China, India, and Chile, amounting to Rs66 million. In contrast, the domestic garlic production stands at 70,925 tonnes, cultivated across 7,882 hectares, with an average yield of 8.99 tonnes per hectare. Khyber-Pakhtunkhwa emerges as the leading garlic-producing province with 32,205 tonnes, followed by Punjab (24,143 tonnes), Balochistan (7,880 tonnes), and Sindh (6,557 tonnes).

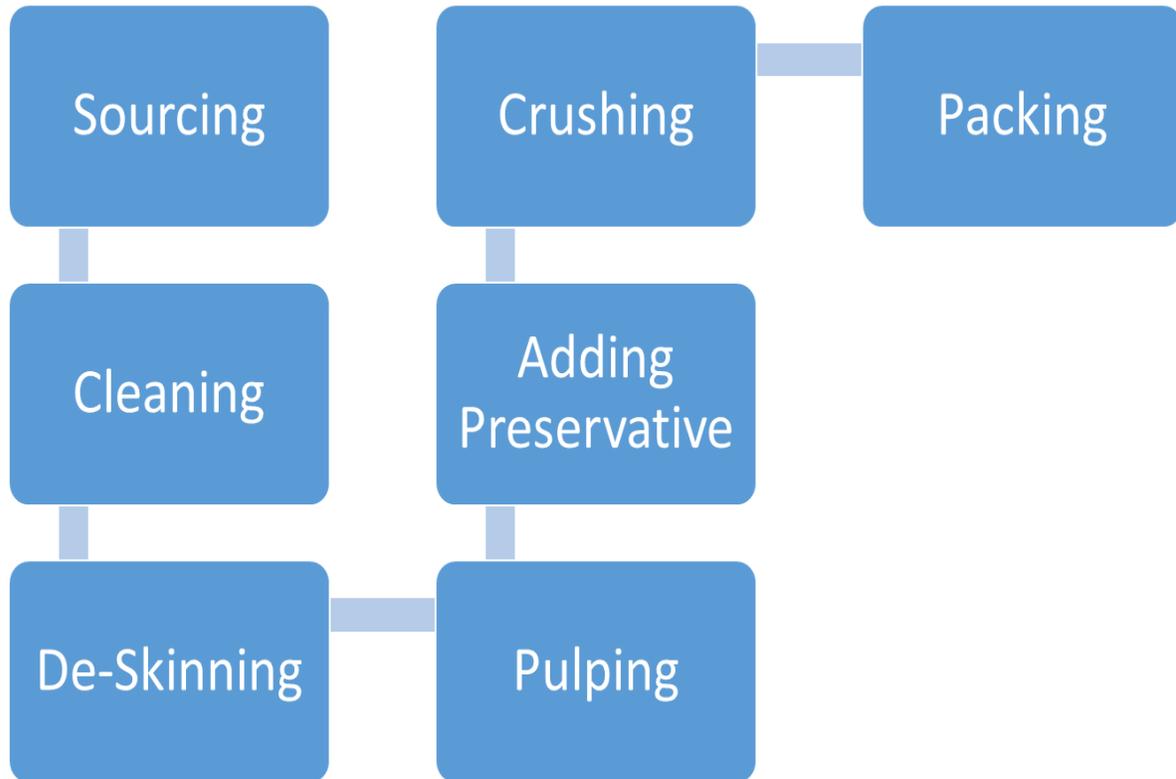
Addressing key parameters outlined in the pre-feasibility study is crucial in further advancing this groundbreaking development.

- **Technology:** This envisioned facility will incorporate state-of-the-art processing and production machinery, encompassing tools such as a Garlic splitter, Garlic peeler, comprehensive compressor for peeling, Disinfection

washing bath, Cooling coil designed for disinfection with hydro cooling, and a Drying line equipped with turbines for peeled garlic cloves, among others.

- **Location:** The unit would be located in or near an area where the raw material is available easily like be located at Quetta, Loralai, Mach, Sibi, Harnai, Qilla Abdullah, Pishin, Karak, Dear Ismail Khan, Kohat, Attock, Hub, Lahore, Faisalabad, Multan, Gujranwala, and Karachi or any other site where raw material can be transported easily.
- **Product:** The unit would produce Garlic Paste and Garlic Powder for commercial and residential uses.
- **Target Market:** In addition to local markets in Karachi, Lahore, Rawalpindi, Quetta, Peshawar, and Islamabad an enormous export market for the Pakistani Garlic Paste and Garlic Powder exists in Middle East, India, Europe and China etc.
- **Employment Generation:** The proposed project will provide direct employment to 11 people. Financial analysis shows the unit shall be profitable from the very first year of operation.

## 5.6 Production Process Flow



## 5.7 Manufacturing Process:

### 5.7.1 *Preparing and Processing Garlic powder*

1. Fresh garlic bulbs
2. Sharp knife or garlic press
3. Dehydrator or oven
4. Food processor or spice grinder
5. Airtight containers for storage

- **Select Fresh Garlic:**

Choose fresh, firm garlic bulbs for the best flavor and quality.

- **Peel the Garlic:**

Peel the garlic cloves from the bulbs. You can use a knife or a garlic press to separate the cloves from the bulb.

- **Mince or Crush the Garlic:**

You can either finely mince the garlic with a knife or use a garlic press to crush it. The goal is to increase the surface area for drying.

- Dehydrate the Garlic:

- **Dehydrator Method:** Arrange the minced or crushed garlic on the dehydrator trays in a single layer. Follow the dehydrator manufacturer's instructions for garlic, typically drying at around 125°F (52°C) for 8-12 hours or until the garlic is completely dry and brittle.
- **Oven Method:** If you don't have a dehydrator, you can use an oven. Spread the garlic on a baking sheet lined with parchment paper and set the oven to its lowest temperature (usually around 170°F or 75°C). Leave the oven door slightly ajar to allow moisture to escape. Check the garlic every hour until it's completely dry.

- **Grind into Powder:**

Once the garlic is dehydrated, allow it to cool. Transfer the dried garlic to a food processor or spice grinder and pulse until you achieve a fine powder. You may need to do this in batches.

- **Sieve (Optional):**

To ensure a smooth powder, you can sift the ground garlic through a fine mesh sieve to remove any larger particles.

- **Store in Airtight Containers:**

Transfer the garlic powder to airtight containers to preserve its flavor and prevent moisture from getting in. Store it in a cool, dark place.

**Tips:**

- Ensure the garlic is completely dry before grinding to avoid clumping.
- Use a dedicated spice grinder or clean your grinder thoroughly after making garlic powder to prevent flavor contamination.
- Adjust the quantities based on your preference and the size of your dehydrator or oven.

## 5.8 Preparing and Processing Garlic Paste

- Ingredients and Materials:
  1. Fresh garlic bulbs
  2. Food processor or blender
  3. Salt (optional)
  4. Olive oil (optional)
  5. Airtight containers for storage

### 5.8.1 Steps:

- **Select Fresh Garlic:**

Choose fresh, firm garlic bulbs for the best flavor.

- **Peel the Garlic:**

Peel the garlic cloves from the bulbs. You can use a knife or simply press down on the cloves with the flat side of a knife to loosen the peel.

- **Mince or Crush the Garlic:**

- **Mincing:** Use a sharp knife to finely chop the garlic cloves.
- **Crushing:** Alternatively, you can use a garlic press to crush the garlic. This will produce a more liquid-like consistency.

- **Add Salt (Optional):**

If desired, add a pinch of salt to the minced or crushed garlic. Salt acts as a preservative and enhances the flavor. It also helps in breaking down the garlic into a smoother paste.

- **Blend into a Paste:**

Transfer the minced or crushed garlic to a food processor or blender. Blend until you achieve a smooth paste. You may need to scrape down the sides of the processor or blender to ensure even blending.

- **Adjust Consistency (Optional):**

- If the paste is too thick, you can add a small amount of olive oil while blending to reach the desired consistency.

- Some recipes may call for adding a bit of water, especially if you want a lighter paste.

- **Store in Airtight Containers:**

Transfer the garlic paste to a clean, airtight container. If you used olive oil, make sure to store it in the refrigerator. Without oil, it can be stored in the refrigerator for a shorter period or frozen for longer storage.

*Tips:*

- Adjust the amount of garlic, salt, and optional ingredients based on your taste preferences.
- Use a clean and dry spoon each time you take out garlic paste to prevent contamination.
- Label the container with the date to keep track of its freshness.

By following these steps, you can easily prepare garlic paste at home. This versatile paste can be used in various dishes to add a rich garlic flavor.

Varieties of garlic bulbs can be obtained from the local market.

**Selection:**

The garlic bulbs should be sorted and selected for the following characteristics like uniform shape and size, full matured with no greenness without sprouts and firm texture. The bulbs should be cleaned to remove dust/earth, chaff, dry stalk and any foreign materials.

**Separation:**

The clean bulbs are separated into cloves and winnowed to remove dust and dirt. The cloves graded for their size. The peels or skin of the garlic is filtered through one compartment, while the peeled garlic cloves leave through another compartment.

**Peeling:**

The outer skin of the cloves are to be removed off by peeler. Whole cloves were used for all the drying operations except freeze-drying.

**Dry centrifugation peeled garlic process**

It is called this because the machines used to peel garlic simulate the operation of a large washing machine.

The main difference is that this machine does it entirely dry, spinning hundreds of rotations per minute, which manages to detach the fragile outer layers of the garlic.

### **Wet centrifugation peeled garlic process**

This process includes water in the centrifugation, which allows the peels or skin of the garlic to detach more easily.

In this type of machine, the garlic is placed in a space where the centrifugation is carried out and water is received from an upper section.

The difference is that in this type of process, the water is drained through a lower compartment, which carries the husks and residues of the garlic with it.

All of the garlic cloves remain in the upper part, waiting to be released through a top hatch once the process is finished.

This method, is equally useful and effective, while its difference lies basically in the use of compressed air on small amounts of garlic cloves.

The machine works in such a way that it receives a portion of garlic and instantly releases compressed air, instantly breaking the peels or skin off of the garlic.

These are expelled through a mesh and are released below, where a garbage container awaits them. This occurs while the garlic cloves follow a linear path after being cleaned, on the same upper mesh.

## **5.9 Installed and Operational Capacities**

The total installed capacity of the project is 1,044,000 Kgs of Garlic Paste and Powder out of which 50% will be garlic paste and 50% will be garlic powder of total production capacity along with assumed operational capacity of 75% during the first year of operations i.e. 783,000 Kgs of Garlic Paste and Powder out of which 391500 kgs of garlic powder and 391500 kg of garlic paste. A gradual increase of 5% in production capacity per annum.

## **5.10 Conversation ration fresh garlic to garlic powder.**

The conversion ratio of making garlic powder from fresh garlic can vary depending on factors such as the size and moisture content of the garlic cloves, as well as the drying method used. However, as a general guideline, you can expect the following conversion ratio:

- **Fresh Garlic to Garlic Powder Ratio:**

Approximately (450 grams) of fresh garlic bulbs will yield roughly 140 grams) of garlic powder.

It's important to note that the drying process removes the moisture content from the fresh garlic, resulting in a reduction in weight. Additionally, the potency and flavor concentration increase during the dehydration process.

Keep in mind that these ratios are approximate, and actual yields may vary based on factors such as the efficiency of drying method and the specific characteristics of the garlic using. Adjustments may be needed based on preferences and the specific conditions of garlic powder production.

### **5.11 Conversion ration fresh garlic to garlic Paste.**

While the conversion ratio of garlic to garlic paste can vary based on factors like the moisture content of the garlic and the desired consistency of the paste, a rough guideline is as follows:

- **Fresh Garlic to Garlic Paste Ratio:**

Approximately 1 kg (1000 grams) of fresh garlic bulbs may yield around 300 to 400 grams of garlic paste.

This is a general estimate, and the actual yield may vary depending on factors such as the size of the garlic cloves and the specific moisture content. The paste will be more concentrated than the fresh garlic due to the removal of moisture during the processing.

Keep in mind that this is an approximation, and it's advisable to start with a smaller batch and adjust based on your preferences and the specific characteristics of the garlic you are using.

## **6 CRITICAL FACTORS**

Garlic Paste and Powder have a wide range of application, not only in Household sector but also in the Hoteling Sector. Certain critical factors involved during the production process of Garlic Paste and Garlic Powder are:

- Identification of small scale, low cost Garlic processing machines/technology for setting up of rural enterprises.
- Arrangement of raw material (Garlic)
- Testing of Garlic processing machines available
- Training of entrepreneurs in Garlic processing for value addition to be deputed
- Problems observed during the operation of Garlic processing machines, if any.
- Communicating the problem for improvement.
- Standardization of the machines for commercial use by the rural entrepreneurs.
- Identification of manufacturer for commercial production of the machine.
- Availability of skilled labor.
- Higher return on investment and a steady growth of business is closely associated with regular training and capacity building of the entrepreneur and employees.
- Prior experience and related / education in the related field of business.

## **7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT**

It is suitable to establish the production unit Quetta, Swat, Hub, Khuzdar, Loralai Bostan, Peshawar, Lahore and Karachi. However, such a unit could be established in other parts of the country provided the main conditions are fulfilled such as availability of Garlic Bulb and man power availability, accessibility to markets, and reasonable demand & usage of Garlic Powder and Garlic Paste.

## 8 POTENTIAL TARGET CUSTOMERS / MARKETS

Due to demand of garlic paste and garlic powder there exist a vast market required. Garlic paste and garlic powder was born from a real market demand. The garlic paste and garlic powder has good market potential. If the product is manufactured and packed in small quantities such as 50 gms and 100 gms packets. The market is widespread especially in rural areas.

Especially in an urban area, people are looking for instant food and ginger paste make it happen all household consume this product. Apart from domestic use garlic paste and powder is used in hotels, restaurants are a major consumer.

The local consumer is the main customer of this business; therefore, it has huge market through Pakistan.

## 9 PROJECT COST SUMMARY

### 9.1 Project Economics

All the figures in this financial model have been calculated for estimated sales of Rs. 8,828,325,000/ in the year one. The capacity utilization during year one is worked out at 75% with 5% increase in subsequent years up to the maximum capacity utilization of 100%.

The following table shows internal rate of return, payback period and net present value of the proposed venture.

**Table 1: Project Economics**

Description	Details
Internal Rate of Return (IRR)	47%
Payback Period (yrs.)	4.67
Net Present Value (Rs.)	2,756,372,416

Calculation of break-even analysis is as follows:

**Table 2: Breakeven (100% Equity Based)**

BREAKEVEN ANALYSIS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Break Even Point (Sales)	1,367,103,260	2,566,375,748	1,861,499,175	1,588,567,960	1,467,786,967	1,429,455,497	1,381,333,225	1,342,273,534	1,328,253,991	1,333,012,531
Break Even Point (Unit)	111147	189681	125076	97034	81506	72161	63393	56000	50378	45962
Margin of Safety	84.5%	77.2%	85.8%	89.6%	91.7%	93.1%	93.9%	94.6%	95.2%	95.6%

### Project Financing

Following table provides details of the equity required and variables related to bank loan;

**Table3: Project Financing**

Description	Details
Total Equity (100%)	Rs. 400,409,891
Internal Rate of Return (IRR)	47%
Payback Period (Yrs.)	4.67
Net Present Value (Rs.)	2,756,372,416

Following table provides details of the equity required and variables related to bank loan;

**Table 4: Project Financing**

Description	Details
Total Equity (50%)	Rs. 200,204,945
Bank Loan (50%)	Rs. 200,204,945
Markup to the Borrower (%age / annum)	28%
Tenure of the Loan (Years)	5.18 Years

### 9.2 Project Cost

Following fixed and working capital requirements have been identified for operations of the proposed business.

**Table 5: Project Cost**

Description	Amount Rs.
<b>Capital Cost</b>	
Land	14,000,000
Building / Infrastructure	15,800,000
Plant and Machinery	15,310,800
Furniture & Fixture	252,000

Office Equipment	305,000
Pre-operating Cost	444,000
<b>Total Capital Cost</b>	<b>46,111,800</b>
<b>Working Capital</b>	
Equipment Spare Parts Inventory	598,125
Raw Material Inventory	352,893,750
Up-front Insurance Payments	306,216
Cash	500,000
<b>Total Working Capital</b>	<b>354,298,091</b>
<b>Total Project Cost</b>	<b>400,409,891</b>

### 9.3 Space Requirement

The space requirement for the proposed **Garlic Paste and Garlic Powder production Unit** is estimated considering various facilities including management office, production hall, storage, open space, etc. Details of space requirement and cost related to land & building is given below;

**Table6: Space Requirement**

Description	Estimated Area (Sq.ft.)	Unit Cost (Rs.)	Total Cost (Rs.)
Management Office	2,000	1,100	2,200,000
Processing Area	5,000	800	4,000,000
Raw Material Shed	5,000	800	4,000,000
Laboratory	1,000	1,100	2,200,000
Drive way / Pavement	10,000	50	500,000
Store	5,000	800	4,000,000
<b>Total</b>	<b>28,000</b>		<b>15,800,000</b>

#### 9.4 Machinery & Equipment Requirement

Plant, machinery and equipment for the proposed project are stated below.

**Table7: Machinery & Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Garlic splitter 450 Kg/hour	1	2,622,600	2,622,600
Garlic peeler 200 Kg/hour	2	423,000	423,000
Complete compressor for peeler	2	296,100	592,200
Disinfection washing bath 450L	1	3,200,000	3,200,000
Cooling coil for disinfection with hydro cooling	1	500,000	500,000
Drying line with turbines for peeled garlic cloves	1	3,350,000	3,350,000
Transformer	1	1,500,000	1,500,000
Generator	1	1,500,000	1,500,000
Tube Well	1	1200,000	1200,000
<b>Total</b>			<b>15,310,800</b>

#### 9.5 Furniture & Fixtures Requirement

Details of the furniture and fixture required for the project are given below;

**Table8: Furniture & Fixture**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Tables	6	15,000	90,000
Executive Chairs	6	15,000	90,000
Visitors Chairs	12	6,000	72,000
<b>Total</b>			<b>252,000</b>

#### 9.6 Office Equipment Requirement

Following office equipment will be required for **Garlic Paste and Garlic Powder production Unit**;

**Table9: Office Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Laptop	2	125,000	250,000
3 in 1 printer + Scanner + Photocopier	1	45,000	45,000
Telephone Sets	2	5,000	10,000
<b>Total</b>			<b>305,000</b>

### 9.7 Human Resource Requirement

In order to run operations of **Garlic Paste and Garlic Powder production Unit** smoothly, details of human resources required along with number of employees and monthly salary are recommended as under;

**Table10: Human Resource Requirement**

Description	No. of Employees	Monthly Salary per person (Rs.)
CEO/ Manager	1	75,000
Supervisor	1	50,000
Accountant cum Receptionist	1	50,000
Salesman	2	32,000
Skilled Worker/ Machine Operator	2	40,000
Loading Worker	1	40,000
Security Guard	2	32,000
Peon	1	32,000
<b>Total</b>	<b>11</b>	

### 9.8 Utilities and other costs

An essential cost to be borne by the project is the cost of electricity, gas and water. The electricity expenses are estimated to be around Rs. 195,228,000 / year. Furthermore, promotional expense being essential for marketing of **Garlic Paste and Garlic Powder production Unit** is estimated as 2% of revenue.

## 9.9 Revenue Generation

Based on the capacity utilization of 75% for Garlic Paste and Garlic Powder Sales out of with 50% will be paste sell and 50% powder sale revenue during the first year of operations is estimated as under;

**Table 11: Revenue Generation – Year 1**

Description	No. of Kgs Produced (No.)	Finished Goods Inventory (No.)	Units available for Sale (No.)	Sale Price / unit (Rs.)	Sales Revenue (Rs.)
Garlic Paste	391,500	32625	358,875	12300	4,414,162,500
Garlic Powder	391,500	32625	358,875	12300	4,414,162,500
<b>Total</b>	<b>783,000</b>	<b>65250</b>	<b>717,750</b>		<b>8,828,325,000</b>

## 10 CONTACT DETAILS

In order to facilitate potential investors, contact details of private sector Service Providers relevant to the proposed project be given.

### 10.1 Machinery Suppliers

Name of Supplier	Address	Phone	Fax	E-mail	Website
Turchmir Engineering (services) Comapny	Nawab Chowk, Bagrian Road, Town ship, Lahore	042-35113377	042-35123388	info@turchmir.pk	www.turchmir.pk

### 10.2 Raw Material Suppliers

Name of Supplier	Address	Phone	Fax	E-mail	Website
Khwaja Spices	Golimar,	0300-2364558			

	Sukkur			
Watan Dealer	People Colony Attock	057-2603333		
Shahmir Marketing	Nazimabad, Karachi	021-4915500		

### 10.3 Technical Experts / Consultants

Name of Expert/ Organization	Address	Phone	Fax	E-mail	Website
Pakistan Agricultural Research Council	G-5, Islamabad	051-90762000	051-9255034		www.parc.gov.pk

## 11 USEFUL WEB LINKS

Small & Medium Enterprises Development Authority (SMEDA)	<a href="http://www.smeda.org.pk">www.smeda.org.pk</a>
Government of Pakistan	<a href="http://www.pakistan.gov.pk">www.pakistan.gov.pk</a>
Ministry of Industries & Production	<a href="http://www.moip.gov.pk">www.moip.gov.pk</a>
Ministry of Education, Training & Standards in Higher Education	<a href="http://moptt.gov.pk">http://moptt.gov.pk</a>
Government of Punjab	<a href="http://www.punjab.gov.pk">www.punjab.gov.pk</a>
Government of Sindh	<a href="http://www.sindh.gov.pk">www.sindh.gov.pk</a>
Government of Khyber Pakhtunkhwa	<a href="http://www.khyberpakhtunkhwa.gov.pk">www.khyberpakhtunkhwa.gov.pk</a>
Government of Balochistan	<a href="http://www.balochistan.gov.pk">www.balochistan.gov.pk</a>
Government of Gilgit Baltistan	<a href="http://www.gilgitbaltistan.gov.pk">www.gilgitbaltistan.gov.pk</a>
Government of Azad Jamu Kashmir	<a href="http://www.ajk.gov.pk">www.ajk.gov.pk</a>
Trade Development Authority of Pakistan (TDAP)	<a href="http://www.tdap.gov.pk">www.tdap.gov.pk</a>
Security Commission of Pakistan (SECP)	<a href="http://www.secp.gov.pk">www.secp.gov.pk</a>
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	<a href="http://www.fpcci.com.pk">www.fpcci.com.pk</a>
State Bank of Pakistan (SBP)	<a href="http://www.sbp.org.pk">www.sbp.org.pk</a>
Punjab Small Industries Corporation	<a href="http://www.psic.gop.pk">www.psic.gop.pk</a>
Sindh Small Industries Corporation	<a href="http://www.ssic.gos.pk">www.ssic.gos.pk</a>
Pakistan Horticulture Development and Export Company	<a href="http://www.phdec.org.pk">www.phdec.org.pk</a>

<b>(PHDEC)</b>	
<b>Punjab Vocational Training Council (PVTC)</b>	<a href="http://www.pvtc.gop.pk">www.pvtc.gop.pk</a>
<b>Technical Education and Vocational Training Authority (TEVTA)</b>	<a href="http://www.tevta.org">www.tevta.org</a>
<b>Pakistan Readymade Garment Technical Training Institute</b>	<a href="http://www.prgmea.org/prgtti/">www.prgmea.org/prgtti/</a>
<b>Pakistan Council of Scientific and Industrial Research (PCSIR).</b>	<a href="http://www.pcsir.gov.pk">http://www.pcsir.gov.pk</a>
<b>Punjab Industrial Estates (PIE)</b>	<a href="http://www.pie.com.pk">www.pie.com.pk</a>
<b>Faisalabad Industrial Estate Development and Management Company (FIEDMC)</b>	<a href="http://www.fiedmc.com.pk">www.fiedmc.com.pk</a>

## 12 ANNEXURES

## 12.1 Income Statement

Calculations											SMEDA
Income Statement											
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Revenue	8,828,325,000	11,241,400,500	13,142,433,150	15,311,258,325	17,782,424,204	20,594,710,674	22,748,969,113	25,023,866,025	27,526,252,627	30,278,877,890	
<b>Cost of sales</b>											
Cost of goods sold 1	4,306,500,000	5,234,355,000	5,841,375,750	6,496,012,688	7,201,509,879	7,961,316,759	8,394,359,093	8,814,077,048	9,254,780,900	9,717,519,945	
Cost of goods sold 2	4,162,950,000	5,059,876,500	5,646,663,225	6,279,478,931	6,961,459,550	7,695,939,533	8,114,547,123	8,520,274,479	8,946,288,203	9,393,602,613	
Operation costs 1 (direct labor)	2,431,000	2,770,097	2,909,498	3,055,808	3,209,384	3,370,596	3,553,934	3,731,630	3,918,212	4,114,122	
Operating costs 2 (machinery maintenance)	7,177,500	8,890,095	10,110,039	11,457,215	12,943,455	14,581,629	15,667,625	16,764,359	17,937,864	19,193,514	
Operating costs 3 (direct electricity)	179,437,500	238,869,375	291,958,406	355,599,586	431,764,055	522,776,875	603,708,860	694,265,189	798,404,967	918,165,712	
Operating costs 4 (direct water)	8,613,000	10,967,220	12,821,886	14,937,813	17,348,707	20,092,401	22,194,116	24,413,528	26,854,881	29,540,369	
Operating costs 5 (direct gas)	7,177,500	9,139,350	10,684,905	12,448,178	14,457,255	16,743,667	18,495,097	20,344,607	22,379,067	24,616,974	
<b>Total cost of sales</b>	<b>8,674,286,500</b>	<b>10,564,867,637</b>	<b>11,816,523,709</b>	<b>13,172,990,218</b>	<b>14,642,692,286</b>	<b>16,234,821,460</b>	<b>17,172,525,847</b>	<b>18,093,870,839</b>	<b>19,070,564,094</b>	<b>20,106,753,250</b>	
<b>Gross Profit</b>	<b>154,038,500</b>	<b>676,532,863</b>	<b>1,325,909,441</b>	<b>2,138,268,107</b>	<b>3,139,731,917</b>	<b>4,359,889,213</b>	<b>5,576,443,266</b>	<b>6,929,995,186</b>	<b>8,455,688,533</b>	<b>10,172,124,640</b>	
<b>General administration &amp; selling expenses</b>											
Administration expense	2,676,000	2,809,800	2,950,290	3,097,805	3,252,695	5,008,129	5,258,535	5,521,462	5,797,535	6,087,412	
Administration benefits expense	80,280	84,294	88,509	92,934	97,581	150,244	157,756	165,644	173,926	182,622	
Land lease rental expense	-	-	-	-	-	-	-	-	-	-	
Building rental expense	-	-	-	-	-	-	-	-	-	-	
Electricity expense	432,000	475,200	522,720	574,992	632,491	695,740	765,314	841,846	926,030	1,018,633	
Water expense	-	-	-	-	-	-	-	-	-	-	
Gas expense	-	-	-	-	-	-	-	-	-	-	
Travelling expense	107,040	112,392	118,012	123,912	130,108	200,325	210,341	220,858	231,901	243,496	
Communications expense (phone, fax, mail, internet, etc.)	160,560	168,588	177,017	185,868	195,162	300,488	315,512	331,288	347,852	365,245	
Office vehicles running expense	-	-	-	-	-	-	-	-	-	-	
Office expenses (stationary, entertainment, janitorial services, etc)	219,432	230,404	241,924	254,020	266,721	410,667	431,200	452,760	475,398	499,168	
Promotional expense	176,566,500	224,828,010	262,848,663	306,225,167	355,648,484	411,894,213	454,979,382	500,477,320	550,525,053	605,577,558	
Insurance expense	306,216	275,594	244,973	214,351	183,730	153,108	122,486	91,865	61,243	30,622	
Professional fees (legal, audit, consultants, etc.)	44,141,625	56,207,003	65,712,166	76,556,292	88,912,121	102,973,553	113,744,846	125,119,330	137,631,263	151,394,389	
Depreciation expense	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	
Amortization of pre-operating costs	88,800	88,800	88,800	88,800	88,800	88,800	88,800	88,800	88,800	88,800	
Amortization of legal, licensing, and training costs	-	-	-	-	-	-	-	-	-	-	
Property tax expense	-	-	-	-	-	-	-	-	-	-	
Bad debt expense	88,283,250	112,414,005	131,424,332	153,112,583	177,824,242	205,947,107	227,489,691	250,238,660	275,262,526	302,788,779	
Miscellaneous expense 1	-	-	-	-	-	-	-	-	-	-	
<b>Subtotal</b>	<b>315,438,483</b>	<b>400,070,870</b>	<b>466,794,185</b>	<b>542,903,504</b>	<b>629,608,914</b>	<b>730,110,354</b>	<b>805,851,844</b>	<b>885,837,813</b>	<b>973,809,508</b>	<b>1,070,564,704</b>	
<b>Operating Income</b>	<b>(161,399,983)</b>	<b>276,461,994</b>	<b>859,115,256</b>	<b>1,595,364,603</b>	<b>2,510,123,003</b>	<b>3,629,778,860</b>	<b>4,770,591,421</b>	<b>6,044,157,372</b>	<b>7,481,879,025</b>	<b>9,101,559,936</b>	
Other income (interest on cash)	25,000	-	-	31,013,014	129,921,661	304,454,594	559,022,583	901,890,546	1,346,171,896	1,985,806,134	
Other income 2	-	-	-	-	-	-	-	-	-	-	
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	-	-	-	-	
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	-	-	-	-	
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	-	-	-	-	
<b>Earnings Before Interest &amp; Taxes</b>	<b>(161,374,983)</b>	<b>276,461,994</b>	<b>859,115,256</b>	<b>1,626,377,617</b>	<b>2,640,044,664</b>	<b>3,934,233,455</b>	<b>5,329,614,004</b>	<b>6,946,047,918</b>	<b>8,828,050,921</b>	<b>11,087,366,069</b>	
Interest on short term debt	52,835,431	95,112,782	55,970,138	13,692,787	-	-	-	-	-	-	
Interest on export refinancing	-	-	-	-	-	-	-	-	-	-	
Interest expense on machinery & equipment lease	-	-	-	-	-	-	-	-	-	-	
Interest expense on office equipment lease	-	-	-	-	-	-	-	-	-	-	
Interest expense on office vehicles lease	-	-	-	-	-	-	-	-	-	-	
Interest expense on long term debt (Project Loan)	-	-	-	-	-	-	-	-	-	-	
Interest expense on long term debt (Working Capital Loan)	-	-	-	-	-	-	-	-	-	-	
<b>Subtotal</b>	<b>52,835,431</b>	<b>95,112,782</b>	<b>55,970,138</b>	<b>13,692,787</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	
<b>Earnings Before Tax</b>	<b>(214,210,414)</b>	<b>181,349,211</b>	<b>803,145,118</b>	<b>1,612,684,830</b>	<b>2,640,044,664</b>	<b>3,934,233,455</b>	<b>5,329,614,004</b>	<b>6,946,047,918</b>	<b>8,828,050,921</b>	<b>11,087,366,069</b>	
Tax	-	-	315,816,406	661,200,780	1,082,418,312	1,613,035,717	2,185,141,742	2,847,879,646	3,619,500,878	4,545,820,088	
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>(214,210,414)</b>	<b>181,349,211</b>	<b>487,328,713</b>	<b>951,484,050</b>	<b>1,557,626,352</b>	<b>2,321,197,738</b>	<b>3,144,472,262</b>	<b>4,098,168,272</b>	<b>5,208,550,043</b>	<b>6,541,545,981</b>	
Balance brought forward	-	(214,210,414)	(32,861,203)	454,467,510	1,405,951,560	2,963,577,912	5,284,775,651	8,429,247,913	12,527,416,185	17,735,966,228	
Total profit available for appropriation	(214,210,414)	(32,861,203)	454,467,510	1,405,951,560	2,963,577,912	5,284,775,651	8,429,247,913	12,527,416,185	17,735,966,228	24,277,512,209	
Dividend	-	-	-	-	-	-	-	-	-	-	
Balance carried forward	(214,210,414)	(32,861,203)	454,467,510	1,405,951,560	2,963,577,912	5,284,775,651	8,429,247,913	12,527,416,185	17,735,966,228	24,277,512,209	

## 12.2 Balance Sheet

Calculations											SMEDA
Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>Assets</b>											
<i>Current assets</i>											
Cash & Bank	500,000	-	-	-	620,260,282	1,978,172,934	4,110,918,956	7,069,532,698	10,968,278,219	15,955,159,699	23,760,962,972
Accounts receivable	-	241,871,918	274,927,747	334,025,118	389,776,596	453,338,117	525,714,176	593,749,038	654,422,399	719,864,639	791,851,103
Finished goods inventory	-	788,571,500	885,015,090	989,561,099	1,102,854,995	1,225,599,795	1,358,562,465	1,431,043,821	1,507,822,570	1,589,213,674	1,675,562,771
Equipment spare part inventory	598,125	777,883	928,860	1,105,263	1,311,071	1,550,855	1,749,676	1,965,761	2,208,533	2,481,287	-
Raw material inventory	352,893,750	458,951,154	548,027,326	652,105,274	773,531,826	915,004,663	1,032,309,026	1,159,799,191	1,303,034,391	1,463,959,139	-
Pre-paid annual land lease	-	-	-	-	-	-	-	-	-	-	-
Pre-paid building rent	-	-	-	-	-	-	-	-	-	-	-
Pre-paid machinery & equipment lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid office equipment lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid office vehicles lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid insurance	306,216	275,594	244,973	214,351	183,730	153,108	122,486	91,865	61,243	30,622	-
<b>Total Current Assets</b>	<b>354,298,091</b>	<b>1,490,448,050</b>	<b>1,709,143,995</b>	<b>1,977,011,106</b>	<b>2,887,918,499</b>	<b>4,573,819,472</b>	<b>7,029,376,787</b>	<b>10,256,182,374</b>	<b>14,435,827,355</b>	<b>19,730,709,059</b>	<b>26,228,376,846</b>
<i>Fixed assets</i>											
Land	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000	14,000,000
Building/Infrastructure	15,800,000	15,010,000	14,220,000	13,430,000	12,640,000	11,850,000	11,060,000	10,270,000	9,480,000	8,690,000	7,900,000
Machinery & equipment	15,310,800	13,779,720	12,248,640	10,717,560	9,186,480	7,655,400	6,124,320	4,593,240	3,062,160	1,531,080	-
Furniture & fixtures	252,000	226,800	201,600	176,400	151,200	126,000	100,800	75,600	50,400	25,200	-
Office vehicles	-	-	-	-	-	-	-	-	-	-	-
Office equipment	305,000	274,500	244,000	213,500	183,000	152,500	122,000	91,500	61,000	30,500	-
<b>Total Fixed Assets</b>	<b>45,667,800</b>	<b>43,291,020</b>	<b>40,914,240</b>	<b>38,537,460</b>	<b>36,160,680</b>	<b>33,783,900</b>	<b>31,407,120</b>	<b>29,030,340</b>	<b>26,653,560</b>	<b>24,276,780</b>	<b>21,900,000</b>
<i>Intangible assets</i>											
Pre-operation costs	444,000	355,200	266,400	177,600	88,800	-	-	-	-	-	-
Legal, licensing, & training costs	-	-	-	-	-	-	-	-	-	-	-
<b>Total Intangible Assets</b>	<b>444,000</b>	<b>355,200</b>	<b>266,400</b>	<b>177,600</b>	<b>88,800</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>400,409,891</b>	<b>1,534,094,270</b>	<b>1,750,324,635</b>	<b>2,015,726,166</b>	<b>2,924,167,979</b>	<b>4,607,603,372</b>	<b>7,060,783,907</b>	<b>10,285,212,714</b>	<b>14,462,480,915</b>	<b>19,754,985,839</b>	<b>26,250,276,846</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Current liabilities</i>											
Accounts payable	-	734,495,058	891,951,598	998,741,881	1,114,667,813	1,240,476,855	1,373,087,394	1,453,671,682	1,533,399,354	1,617,981,977	1,572,354,746
Export re-finance facility	-	-	-	-	-	-	-	-	-	-	-
Short term debt	-	613,399,735	490,824,348	158,968,169	-	-	-	-	-	-	-
Other liabilities	-	-	-	-	-	-	-	-	-	-	-
<b>Total Current Liabilities</b>	<b>-</b>	<b>1,347,894,793</b>	<b>1,382,775,947</b>	<b>1,157,710,050</b>	<b>1,114,667,813</b>	<b>1,240,476,855</b>	<b>1,373,087,394</b>	<b>1,453,671,682</b>	<b>1,533,399,354</b>	<b>1,617,981,977</b>	<b>1,572,354,746</b>
<i>Other liabilities</i>											
Machinery & equipment lease payable	-	-	-	-	-	-	-	-	-	-	-
Office equipment lease payable	-	-	-	-	-	-	-	-	-	-	-
Office vehicle lease payable	-	-	-	-	-	-	-	-	-	-	-
Deferred tax	-	-	-	3,138,714	3,138,714	3,138,714	2,510,971	1,883,228	1,255,486	627,743	0
Long term debt (Project Loan)	-	-	-	-	-	-	-	-	-	-	-
Long term debt (Working Capital Loan)	-	-	-	-	-	-	-	-	-	-	-
<b>Total Long Term Liabilities</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,138,714</b>	<b>3,138,714</b>	<b>3,138,714</b>	<b>2,510,971</b>	<b>1,883,228</b>	<b>1,255,486</b>	<b>627,743</b>	<b>0</b>
<i>Shareholders' equity</i>											
Paid-up capital	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891	400,409,891
Retained earnings	-	(214,210,414)	(32,861,203)	454,467,510	1,405,951,560	2,963,577,912	5,284,775,651	8,429,247,913	12,527,416,185	17,735,966,228	24,277,512,209
<b>Total Equity</b>	<b>400,409,891</b>	<b>186,199,477</b>	<b>367,548,688</b>	<b>854,877,401</b>	<b>1,806,361,451</b>	<b>3,363,987,803</b>	<b>5,685,183,542</b>	<b>8,829,657,804</b>	<b>12,927,826,076</b>	<b>18,136,376,119</b>	<b>24,677,922,100</b>
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>400,409,891</b>	<b>1,534,094,270</b>	<b>1,750,324,635</b>	<b>2,015,726,166</b>	<b>2,924,167,979</b>	<b>4,607,603,372</b>	<b>7,060,783,907</b>	<b>10,285,212,714</b>	<b>14,462,480,915</b>	<b>19,754,985,839</b>	<b>26,250,276,846</b>

## 12.3 Cash Flow Statement

Calculations											SMEDA
Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>Operating activities</b>											
Net profit		(214,210,414)	181,349,211	487,328,713	951,484,050	1,557,626,352	2,321,197,738	3,144,472,262	4,098,168,272	5,208,550,043	6,541,545,981
Add: depreciation expense		2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780	2,376,780
amortization of pre-operating costs		88,800	88,800	88,800	88,800	88,800	-	-	-	-	-
amortization of training costs		-	-	-	-	-	-	-	-	-	-
Deferred income tax		-	-	3,138,714	-	-	(627,743)	(627,743)	(627,743)	(627,743)	(627,743)
Accounts receivable		(241,871,918)	(33,055,829)	(59,097,372)	(55,751,477)	(63,561,521)	(72,376,060)	(68,034,862)	(60,673,361)	(65,442,240)	(71,986,464)
Finished goods inventory		(788,571,500)	(96,443,590)	(104,546,009)	(113,293,896)	(122,744,800)	(132,962,670)	(72,481,355)	(76,778,749)	(81,391,105)	(86,349,096)
Equipment inventory	(598,125)	(179,758)	(150,977)	(176,403)	(205,808)	(239,784)	(198,821)	(216,085)	(242,772)	(272,754)	2,481,287
Raw material inventory	(352,893,750)	(106,057,404)	(89,076,172)	(104,077,948)	(121,426,552)	(141,472,837)	(117,304,363)	(127,490,165)	(143,235,200)	(160,924,747)	1,463,959,139
Pre-paid building rent	-	-	-	-	-	-	-	-	-	-	-
Pre-paid machinery & equipment lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid office equipment lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid office vehicles lease interest	-	-	-	-	-	-	-	-	-	-	-
Advance insurance premium	(306,216)	30,622	30,622	30,622	30,622	30,622	30,622	30,622	30,622	30,622	30,622
Accounts payable		734,495,058	157,456,541	106,790,283	115,925,932	125,809,042	132,610,539	80,584,288	79,727,673	84,582,623	(45,627,232)
Other liabilities	-	-	-	-	-	-	-	-	-	-	-
<b>Cash provided by operations</b>	<b>(353,798,091)</b>	<b>(613,899,735)</b>	<b>122,573,387</b>	<b>331,856,179</b>	<b>779,228,451</b>	<b>1,357,912,652</b>	<b>2,132,746,022</b>	<b>2,958,613,742</b>	<b>3,898,745,521</b>	<b>4,986,881,480</b>	<b>7,805,803,273</b>
<b>Financing activities</b>											
Project Loan - principal repayment	-	-	-	-	-	-	-	-	-	-	-
Working Capital Loan - principal repayment	-	-	-	-	-	-	-	-	-	-	-
Add: land lease expense	-	-	-	-	-	-	-	-	-	-	-
Land lease payment	-	-	-	-	-	-	-	-	-	-	-
Machinery & equipment lease principal repaym	-	-	-	-	-	-	-	-	-	-	-
Office equipment lease principal repayment	-	-	-	-	-	-	-	-	-	-	-
Office vehicles lease principal repayment	-	-	-	-	-	-	-	-	-	-	-
Short term debt principal repayment	-	(613,399,735)	(490,824,348)	(158,968,169)	-	-	-	-	-	-	-
Export re-finance principal repayment	-	-	-	-	-	-	-	-	-	-	-
Additions to export refinancing	-	-	-	-	-	-	-	-	-	-	-
Additions to lease financing	-	-	-	-	-	-	-	-	-	-	-
Additions to Project Loan	-	-	-	-	-	-	-	-	-	-	-
Additions to Working Capital Loan	-	-	-	-	-	-	-	-	-	-	-
Issuance of shares	400,409,891	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares	-	-	-	-	-	-	-	-	-	-	-
<b>Cash provided by / (used for) financing activities</b>	<b>400,409,891</b>	<b>-</b>	<b>(613,399,735)</b>	<b>(490,824,348)</b>	<b>(158,968,169)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Investing activities</b>											
Capital expenditure	(46,111,800)	-	-	-	-	-	-	-	-	-	-
Acquisitions	-	-	-	-	-	-	-	-	-	-	-
<b>Cash (used for) / provided by investing activities</b>	<b>(46,111,800)</b>	<b>-</b>									
<b>NET CASH</b>	<b>500,000</b>	<b>(613,899,735)</b>	<b>(490,824,348)</b>	<b>(158,968,169)</b>	<b>620,260,282</b>	<b>1,357,912,652</b>	<b>2,132,746,022</b>	<b>2,958,613,742</b>	<b>3,898,745,521</b>	<b>4,986,881,480</b>	<b>7,805,803,273</b>
Cash balance brought forward		500,000	-	-	-	620,260,282	1,978,172,934	4,110,918,956	7,069,532,698	10,968,278,219	15,955,159,699
Cash available for appropriation	500,000	(613,399,735)	(490,824,348)	(158,968,169)	620,260,282	1,978,172,934	4,110,918,956	7,069,532,698	10,968,278,219	15,955,159,699	23,760,962,972
Dividend	-	-	-	-	-	-	-	-	-	-	-
Cash balance	500,000	(613,399,735)	(490,824,348)	(158,968,169)	620,260,282	1,978,172,934	4,110,918,956	7,069,532,698	10,968,278,219	15,955,159,699	23,760,962,972
Cash carried forward	500,000	-	-	-	620,260,282	1,978,172,934	4,110,918,956	7,069,532,698	10,968,278,219	15,955,159,699	23,760,962,972

## 13 KEY ASSUMPTIONS

### 13.1 Operating Assumptions

Description	Details
Days operational per month	22.5
Days operational per year	270

### 13.2 Production Assumptions

Description	Details
Maximum Capacity Utilization	100%
Total Production of Kgs per day	3,163
Total Production of Kgs per month	82,255
Total Production of Kgs per year (100%)	1,044,000

### 13.3 Economy Related Assumptions

Description	Details
Electricity price growth rate	10%
Wage growth rate	10%
Sales price growth rate	10%

### 13.4 Cash Flow Assumptions

Description	Details
Accounts Receivable cycle (in days)	10
Accounts payable cycle (in days)	30