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# Pre-Feasibility Study

## POTATO FLAKES MANUFACTURING UNIT



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**Ministry of Industries & Production**  
**Government of Pakistan**  
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## Table of Contents

<b>1</b>	<b>DISCLAIMER</b> .....	<b>3</b>
<b>2</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>4</b>
<b>3</b>	<b>INTRODUCTION TO SMEDA</b> .....	<b>4</b>
<b>4</b>	<b>PURPOSE OF THE DOCUMENT</b> .....	<b>5</b>
<b>5</b>	<b>BRIEF DESCRIPTION OF PROJECT &amp; PRODUCT</b> .....	<b>5</b>
5.1	PRODUCTION PROCESS FLOW.....	6
5.2	INSTALLED AND OPERATIONAL CAPACITIES.....	10
<b>6</b>	<b>CRITICAL FACTORS</b> .....	<b>11</b>
<b>7</b>	<b>GEOGRAPHICAL POTENTIAL FOR INVESTMENT</b> .....	<b>11</b>
<b>8</b>	<b>POTENTIAL TARGET CUSTOMERS / MARKETS</b> .....	<b>12</b>
<b>9</b>	<b>PROJECT COST SUMMARY</b> .....	<b>12</b>
9.1	PROJECT ECONOMICS .....	12
9.2	PROJECT FINANCING .....	13
9.3	PROJECT COST.....	13
9.4	SPACE REQUIREMENT .....	14
9.5	MACHINERY & EQUIPMENT REQUIREMENT .....	14
9.6	FURNITURE & FIXTURES REQUIREMENT .....	16
9.7	OFFICE EQUIPMENT REQUIREMENT .....	17
9.8	OFFICE VEHICLE REQUIREMENT .....	17
9.9	HUMAN RESOURCE REQUIREMENT .....	17
9.10	RAW MATERIAL REQUIREMENT.....	18
9.11	REVENUE GENERATION .....	19
9.12	UTILITIES AND OTHER COSTS.....	19
<b>10</b>	<b>USEFUL WEB LINKS</b> .....	<b>20</b>
<b>11</b>	<b>ANNEXURES</b> .....	<b>21</b>
11.1	INCOME STATEMENT.....	21
11.2	BALANCE SHEET .....	22
11.3	CASH FLOW STATEMENT .....	23
<b>12</b>	<b>KEY ASSUMPTIONS</b> .....	<b>24</b>
12.1	OPERATING COST ASSUMPTIONS .....	24
12.2	PRODUCTION COST ASSUMPTIONS .....	24
12.3	REVENUE ASSUMPTIONS .....	24
12.4	FINANCIAL ASSUMPTIONS .....	25

## 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.

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## 2 EXECUTIVE SUMMARY

Dehydrated Potato Flakes is one of the major value added product of potato, which is most commonly used as mashed potato products and as ingredient in snacks, bakery and other food items. This particular pre-feasibility study provides basic information for setting up dehydrated potato flakes manufacturing unit, which has capacity to produce 1,000 kgs (1 ton) per hour of Potato Flakes.

The unit will produce 4,320 tons of Potato Flakes per annum based on 180 working days (24 hours a day). However, the capacity utilization during the first year of operations is assumed to be 65% i.e. 2,808 tons of Potato Flakes. As per current agricultural practices, Okara is the largest producer of Potatoes not only in Punjab but in Pakistan, hence the proposed unit may be installed near district Okara in Punjab.

The proposed Potato Flakes manufacturing unit entails a total investment of Rs. 369.10 million. This includes capital investment of Rs. 348.38 million and Rs. 20.71 million as initial working capital. The project assumed to be financed through 50% debt and 50% equity. The Net Present Value (NPV) of the project is Rs. 302.55 million with an Internal Rate of Return (IRR) of 30% and a payback period of 3.80 years.

The project will provide employment opportunities to 35 people. Apart from this, additional labor will be hired on daily wages during the peak production season. Higher return on investment and a steady growth of business is expected with the entrepreneur having some prior experience or education in the related field of business.

## 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 '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.

#### **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 **Potato Flakes Manufacturing Unit** by providing them with a general understanding of the business with the intention of supporting potential investors in crucial 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 set-up and its successful management.

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

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

Potatoes are not only used as a vegetable for consumption at home but also at restaurants. Global consumption of potato as a food item has seen a shift from fresh potatoes to value-added products. It is estimated that a little less than 50 percent of potatoes grown worldwide are consumed fresh. The remaining are processed into value added potato food products and food ingredients.

Potato Powder and Flakes are among the most common value added products. Commercial consumption of these products are growing tremendously 'with an annual increase of around 4.26%' all over the world. Though, Pakistan has abundance of unprocessed potatoes, especially in Punjab province, however, due to lack of potato processing units in the country, the local demand is currently

being met through imports. In 2016, Pakistan imported 3,689 tons of Potato Powder and Flakes worth 4.19 million dollars in the same year<sup>1</sup>.

Dehydrated potato flakes are used in retail mashed potato products, as an ingredient in snacks, bakery & confectionary and other food products. Potato Flakes function like fresh potatoes and could be used as a substitute of a potatoes. The most common usage of potato flakes on commercial basis are as follow;

- Used in confectionery and processing industries to make potato snacks, potato chips, mashed potato and potato pie.
- Used as an ingredient in snacks or bakery food items.
- As a replacement for corn-starch or wheat flour: dehydrated potato flour, flakes and granules add volume to soups, stews, sauces, and broths.
- The starch in dehydrated potato products makes them perfect for use as a binding agent in meat, fish or vegetable patties, sausages and cakes.
- In restaurants due to its convenience and cost saving.

Potato dehydrated products are lightweight, easy to transport and require less storage space. “Lady Rosetta, Chipsona, Hermes and Pamela” have proven to be successful varieties as raw material and meet global requirements. It should be noted that these varieties are available and grown in Pakistan. Dry matter levels higher than 20% are ideal for processing flakes and powder and produce increased recovery rates and lower overall production cost. Maximum shelf-life of properly dehydrated and packed products is around 18-24 months.

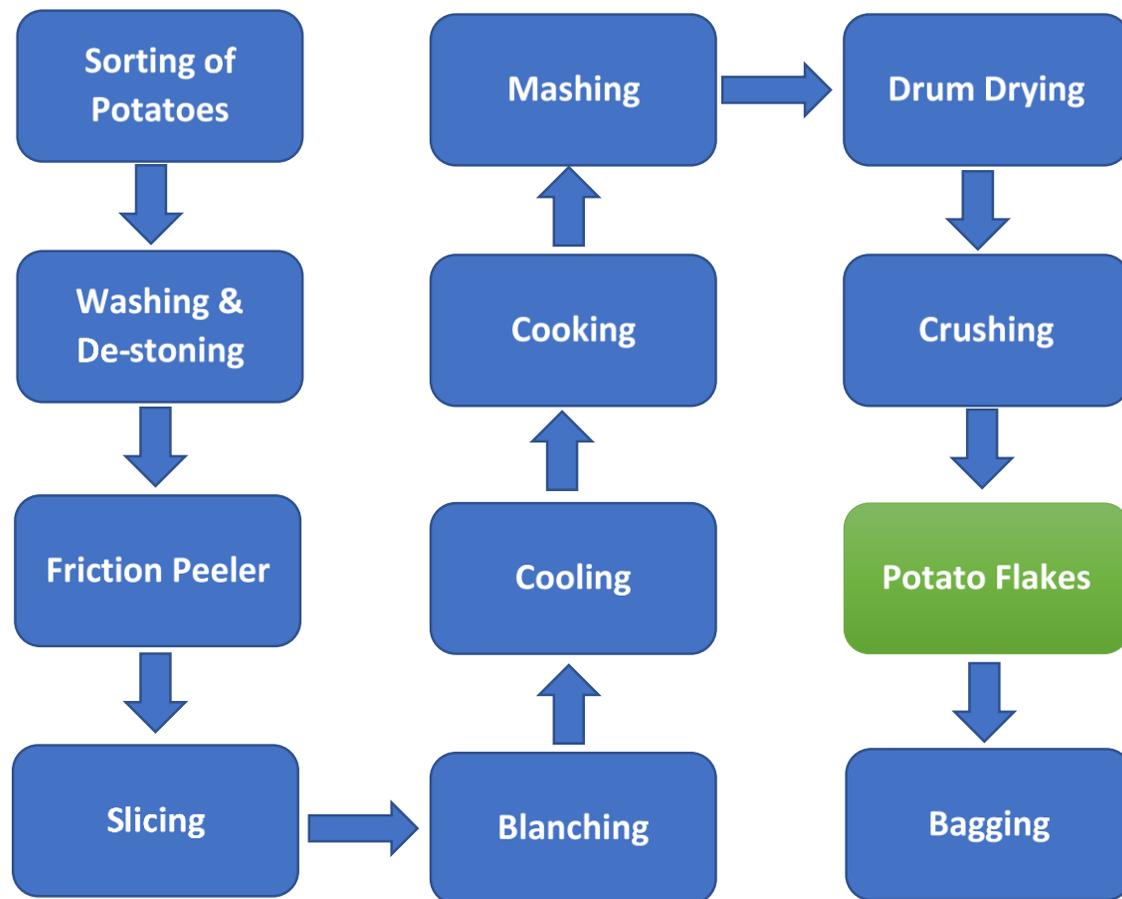
The by-products of this process i.e. peel and cutting losses can be sold to cattle farmers or compost producers to generate additional revenue and off-set the input cost of raw material.

## 5.1 Production Process Flow

Production Process of Potato Flakes is given below in detail;

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<sup>1</sup> Source: Trademap (Product: HS 1105 Flour, meal, powder, flakes, granules and pellets of potatoes)



### I. WASHING & DESTONING

The process starts from intake of raw potatoes. The raw potatoes come via a belt conveyor into the rod de-soiler of the washing plant. The potatoes then arrive into the cyclone de-stoner, where an upward stream makes the potatoes float, while heavy parts such as stones and clods sink. A special stone conveyor seizes these separated heavy parts, lifts them out of the water and drops them in a container.

A flume transports the product with circulation water in a washing machine with two compartments.

1. Separation of circulation water
2. Washing

In the first compartment, the potatoes are separated from circulation water. The potatoes then enter the washing compartment, where a bar-type drum immersing 10 to 15 cm into a water bath with its special internal components thoroughly moves and rubs the potatoes so that even loam comes off easily. The potatoes are then sprayed with water. The washed potatoes are transferred into a hopper for intermediate storage.

## II. FRICTION PEELING

Friction peeler is a dedicated machine to remove the skin of potato, potatoes move up and down in the barrel, which produces relative movement of friction, so as to achieve friction peeled effect. A screw conveyor serves to reclaim the product, evens it and feeds it into the dry de-skinner. In the front part of the skinner, thorough and suitable surfaced rolls remove the loose potato skin. A pump discharges the mushy skin, which is used as high quality animal feed.

A screw conveyor serves to deliver the potatoes through the machine, the speed of which (and consequently the retention time) is variable. A downstream washing machine washes skin residues and dissolved potato cells off the potato surface. From the washer, the peeled and washed potatoes get onto an inspection belt conveyor, where they are sorted by hand and, if necessary, trimmed. Rejected potatoes get into separate containers and are also used as animal feed.

## III. SLICING, BLANCHING & COOLING

An inspection belt conveyor transfers and feeds the peeled potatoes through a distributor into the slicing machines. Here the potatoes are cut into slices to allow easy transfer of heat during the pre-cooking process. The thickness of the cut can be adjusted according to the requirements.

Then the potatoes are pre-cooked in a warm water bath. The pre-cooker is of a steam injection screw type. This is called blanching and it is carried out in order to achieve the following:

1. Helping in gentle gelatinization of the starch (**Starch gelatinization** is a process of breaking down the intermolecular bonds of **starch** molecules in the presence of water and heat, allowing the hydrogen bonding sites (the hydroxyl hydrogen and oxygen) to engage more water. This irreversibly dissolves the **starch** granule in water), without impairing the cell membranes as a result of the large volume.
2. Changing the intercellular cementing substance in such a way that the cells separate more easily after cooking.
3. Preventing the enzymatic discoloration of the product.

A lifting wheel separates the potatoes from the pre-cooking water and feeds them through a flume into a screw-type cooler, where they are cooled in a water bath.

The result of this is the retro-gradation of the starch gelatinized in the pre-cooking stage. Retro-gradation in turn reduces the amylose solubility. Starch retro-gradation is desirable for starchy food products in terms of textural and nutritional properties.

#### **IV. COOKING**

The product is discharged from the wet hopper via a water lock and transferred hydraulically. A vibrating screen separates the potato slices from the conveying water, which flows back through an equalization tank into the hopper. A balance provided in the downstream belt conveyor measures the mass flow rate, which is set by varying the speed of the product feeder. Via a final lock, the belt conveyor feeds the product into a screw type cooker, where it is cooked at atmospheric pressure in steam or vapor.

The cooker used is a screw type unit, injecting steam just above the machine bottom and the screw shaft to provide a uniform temperature in the product and consequently homogeneous cooking. Efficient removal of condensate makes sure that the water content of the cooked product only increases just slightly. The optimum cooking time must be determined empirically and will have been reached when the cell-cementing substances have been weakened to such a degree that the cells separate with no major destruction of their membranes.

#### **V. MASHING & DRYING**

From the screw type cooker the cooked potatoes drop down directly into the mashing screw conveyor, which gently pushes them through a perforated template for mashing. Additives are added and mixed with the mash in a downstream screw conveyor, which feeds it to the drying plant.

A single drum drier is employed to dry the mash. The unit comprises an internal steam heated drying drum, six non-heated surface treated applicator rolls and the necessary bearings. A common chain drives all the applicator rolls. A frequency converter allows the speed, and consequently, the drying time to be varied.

The drying temperature is kept constant indirectly by controlling the pressure inside the drum. In the applicator roll contact zones, potato cells are transferred to the drying drum to which they stick to form a layer, increasing in thickness from one applicator roll to the next. This layer dries completely as the drum rotates and eventually comes off by itself or with the aid of a scraper. The fact that the layer is in intimate contact with the heated surface for the whole process results in a very short drying time, which is a major factor influencing the quality of the dried end product.

Furthermore, the single drum drier acts as a separator. Any non-cooked potato fragments and impurities are not transferred to the drum, but remain in the rotating layer on the applicator rolls. This layer is separated at specific intervals and transferred to the next applicator roll. On the lowermost or last applicator roll, the material is rich in unacceptable waste, which a screw conveyor feeds into a waste container. A fan removes the vapor produced by the drier through a hood and the roof into the open air.

## VI. PULVERIZING / CRUSHING

The pulverizing unit roughly breaks the dried product layer to such a degree that is it suited for pneumatic conveyance. The design of the injector is such that the air stream does not enter in wet and heavy parts, but lets them drop through, into a waste container.

A fluidized-bed breaker gently breaks the material to the required flake size, at a very low percentage of fines and free starch. Under the breaker are two collecting tanks, which are selected alternately. These tanks receive the production of 3 to 4 hours, allowing product samples to be examined during that time.

## VII. PACKAGING & STORAGE

The finished product is fed from the breaker to the silo. Where the product is consumed, or subjected to further processing, within 6 weeks from production as a maximum, initiation may be dispensed with, in case PE-lined multiple Kraft paper bags are used for packing. Flakes can be stored at room temperature in dry conditions.

### 5.2 Installed and Operational Capacities

The proposed Potato Flakes Manufacturing Unit has capacity to produce 4,320 tons of Potato Flakes annually. As the Potatoes are a seasonal commodity, therefore, Plant will be operational for 6 months (January ~ June). One of the reasons to operate this plant in these months is low prices of the Potatoes due to its harvesting season in Punjab.

Capacity utilization during first year of operations is assumed to be 65% with an annual growth rate of 10% up to maximum level of 100% capacity utilization in 5<sup>th</sup> year of operation. This production capacity is estimated to be economically viable and justifies the capital as well as operational costs of the project.

Details of operational and installed capacities are provided in the table below:

**Table 1: Installed and Operational Capacities**

Description	Operational Hours During Season/day	Installed Capacity (Tons/Hour)	Installed Production Capacity (Tons)	Operational Capacity 65% - in tons Year 1
Potato Flakes	24	1.0	4,320	2,808

## 6 CRITICAL FACTORS

Following principles need to be pursued for the best productivity of Potato Flakes:

- Prices of Potatoes are volatile, so due care and diligence should be taken while procuring fresh potatoes. An experienced procurement officer having good knowledge and understanding of potatoes quality and price fluctuation should be permanently hired for the facility.
- Higher recovery ratio of Flakes is from fresh potatoes while stored potatoes give lower recovery ratio.
- Potatoes with high solid contents and low sugar are best to produce dehydrated products. These types of potatoes are widely available in Pakistan.
- Quality raw (potato) material and adaptive research & development is necessary for the project.
- Storage management and quality improvement is needed.
- Policy intervention and government support is required.
- Enhance the skill of the contract farmers, the process relevant staff and management should be ensured.
- Capacity building of the farmers, company staff and the management are lacking as this is a newly ventured sector, infusion of technical services & appropriate know-how are always a catalyst for the better performance.
- Run project on 3 shifts in peak season of potatoes harvesting as the raw material will be available at cheap price and the quality of Potato flakes will be of high standards, while, it will save cost of storage.

## 7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT

The unit can be installed anywhere in Pakistan where the raw material (fresh potatoes) is easily accessible. As per current agricultural practices, Okara is the largest producer of Potatoes not only in Punjab Province but in Pakistan. In 2014-15, Okara district produced 1.4 million tons of Potatoes which is 37% of the production of Punjab and 34% of the Pakistan's total Potato Production.<sup>2</sup> Total

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<sup>2</sup> Agriculture Department Punjab

production of Potatoes in Pakistan during 2014-15 was 4.16 million tons out of which Punjab province is producing 97% of the potatoes production<sup>3</sup>.

Keeping in view the above statistics and availability of raw material (fresh potatoes), the proposed unit will be installed near district Okara in Punjab. Potato Flakes imports may be reduced by installation of such processing units.

## 8 POTENTIAL TARGET CUSTOMERS / MARKETS

As stated above Pakistan is importing large quantities of Potato Flakes and it is estimated that in future this quantity will increase. This kind of unit and the ones similar will help to reduce the import of such products and make Pakistan capable of exporting Potato Flakes to the world.

The potential target market for potato flakes mainly includes;

- Snacks Manufacturer
- Local Restaurants
- Bakery & Confectionery
- Food Processors

Whereas, its by-products i.e. peel and cutting losses can be used in feed mills.

Additionally, the export market for Pakistani processed Potatoes are Middle East, Far East, China, Malaysia, and neighbouring countries.

## 9 PROJECT COST SUMMARY

### 9.1 Project Economics

All the figures in this financial model have been calculated for estimated production of 2,808 tons in the year one. The capacity utilization during year one is worked out at 65% with 10% 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 unit.

**Table 2: Project Economics**

Description	Details
Internal Rate of Return (IRR)	30%
Payback Period (Years)	3.80
Net Present Value	Rs. 302,548,635

<sup>3</sup> Ministry of National Food Security & Research, Government of Pakistan

## 9.2 Project Financing

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

**Table 3: Project Financing**

Description	Details
Total Equity (50%)	Rs. 184,547,895
Bank Loan (50%)	Rs. 184,547,895
Annual Markup to the Borrower– Long Term Loan	12%
Tenure of the Loan (Years)	5

## 9.3 Project Cost

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

**Table 4: Project Cost**

Description	Amount In Rs.
<b>Capital Cost</b>	
Land	12,000,000
Building / Infrastructure	70,559,233
Machinery & Equipment	251,910,942
Furniture & Fixtures	1,041,700
Office Vehicles	2,632,875
Office Equipment	1,430,550
Pre-Operating Costs	8,105,990
Training Costs	700,000
<b>Total Capital Costs</b>	<b>348,381,290</b>
<b>Working Capital</b>	
Equipment Spare Part Inventory	187,200
Raw Material Inventory	19,527,300
Cash	1,000,000
<b>Total Working Capital</b>	<b>20,714,500</b>
<b>Total Investment</b>	<b>369,095,790</b>

## 9.4 Space Requirement

Approximately 1 acres of land would be required for establishment of proposed unit. It is recommended that required land should be procured in the industrial estates of identified city / area. The cost of land is estimated at the rate of Rs. 12 million per acre.

The infrastructural requirements of the project mainly comprise the construction of management building, sorting, processing hall, store and other facilities. The cost of construction of building for the proposed unit is provided in the table below:

**Table 5: Space Requirement**

Description	Area (Sq.ft.)	Unit Cost (Rs.)	Total Cost (Rs.)
Management Office	1,000	2,800	2,800,000
Processing Area	25,667	2,000	51,334,000
Laboratory	500	2,500	1,250,000
Meeting Room	600	3,500	2,100,000
Shed	1,000	800	800,000
Dining/Mess Hall	400	1,800	720,000
Toilets	300	400	120,000
Change Room	200	1,000	200,000
Guard Room	120	1,800	216,000
Pavement / Driveway	5,000	200	1,000,000
Open Grounds	2,000	50	100,000
Raw Material Store	5,000	1,500	7,500,000
External Development			1,000,000
Boundary Wall (Run. Feet)	835	1,700	1,419,233
<b>Total Infrastructure</b>			<b>70,559,233</b>

## 9.5 Machinery & Equipment Requirement

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

**Table 6: Machinery & Equipment Requirement**

Sr. No	Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
<b>1</b>	<b>Steam Peeling System</b>			
1.1	Hoist	1	1,363,929	1,363,929
1.2	Stoner	1	1,435,726	1,435,726
1.3	Washer	1	2,871,345	2,871,345
1.4	Hoist	1	1,579,320	1,579,320

1.5	Automatic Feeder	1	1,974,150	1,974,150
1.6	Peeling and Tank	1	12,024,125	12,024,125
1.7	Hoist	1	879,326	879,326
1.8	Brush Peeling	1	7,896,493	7,896,493
1.9	Sorting Platform	1	1,543,368	1,543,368
<b>2</b>	<b>Pretreatment</b>			
2.1	Hoist	1	933,147	933,147
2.2	Slicer	1	1,579,320	1,579,320
2.3	Rinser	1	2,692,013	2,692,013
2.4	Blancher	1	7,178,630	7,178,630
2.5	Cooler	1	5,742,904	5,742,904
2.6	Hoist	1	1,345,953	1,345,953
2.7	Cooker	1	7,178,630	7,178,630
2.8	Mud Machine	1	825,505	825,505
<b>3</b>	<b>Flakes Drum Dryer</b>			
3.1	Additive Tank	1	807,636	807,636
3.2	Tanks for Mud	1	628,090	628,090
3.3	Pump	2	466,627	933,254
3.4	Drum Dryer	2	29,934,748	59,869,496
3.5	Hood and Fan	2	1,346,060	2,692,120
3.6	Leveling Conveyors	2	1,435,726	2,871,452
3.7	Spent Mud Conveyor	2	1,076,741	2,153,482
3.8	The Drive System	2	3,948,300	7,896,600
3.9	Grinder	1	2,297,183	2,297,183
<b>4</b>	<b>Pulverizer System</b>			
4.1	Suction fan, Pulverizer and Duster	1	5,366,050	5,366,050
4.2	Semi-Automatic Package System	1	2,297,183	2,297,183
<b>5</b>	<b>Control System</b>	1	21,535,783	21,535,783
<b>6</b>	<b>Wires</b>	1	10,767,945	10,767,945
<b>7</b>	<b>Pipe and valves</b>	1	5,383,919	5,383,919
<b>8</b>	<b>Platform</b>	1	3,589,315	3,589,315
	Total (Ex-Shanghai Port)			188,133,392
	Freight for Karachi			107,000
	<b>Total CNF Karachi</b>			<b>188,240,392</b>
	Custom Duty (FoB)		5.0%	9,406,670

Sales Tax (FoB)		17.0%	31,982,677
Additional Sales Tax (FoB)		3.0%	5,644,002
Clearance and Transportation Charges		0.5%	21,535,783
<b>Price of Imported Plant</b>			<b>236,214,942</b>
Supervision in Commissioning & Installing			856,000
<b>Total Imported Machinery Cost</b>			<b>237,070,942</b>
Boiler	1	3,000,000	3,000,000
Generator (250KVA) Turbo Type, , 400 Volts, 50 Cycles, 1500 RPM, Power Factor 0.8	1	5,300,000	5,300,000
<b>Machinery &amp; Equipment Cost</b>			<b>245,370,942</b>
Misc. Equipment (Water Pump, Reverse Osmosis plant, etc.)	1	3,500,000	3,500,000
Fork Lifter 2 ton	1	1,800,000	1,800,000
Laboratory Equipment - Microbiological and Analytical Lab	1	1,000,000	1,000,000
Weighing Scale	2	120,000	240,000
<b>Total Machinery &amp; Equipment Cost</b>			<b>251,910,942</b>

## 9.6 Furniture & Fixtures Requirement

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

**Table 7: Furniture & Fixture Requirement**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
CEO Office Furniture	1	100,000	100,000
Managers Tables along with side tables	3	30,000	90,000
Manager / Officers Chairs	3	8,000	24,000
Visitor Chairs	6	8,000	48,000
Officers Tables along with Chairs	9	20,000	180,000
File Racks	5	15,000	75,000
Sofa Set	4	20,000	80,000
Split Air-conditioner 1.5 Ton	5	70,000	350,000

Misc. & Contingency		10%	94,700
<b>Total Furniture &amp; Fixtures</b>			<b>1,041,700</b>

## 9.7 Office Equipment Requirement

Following office equipment will be required for Potato Flakes Manufacturing Unit;

**Table 8: Office Equipment Requirement**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Laptop	2	100,000	200,000
Computers with LCD	10	60,000	600,000
Printer	2	20,000	40,000
Scanner	2	15,000	30,000
Networking Equipment & Accessories	1	150,000	150,000
Mini Telephone Exchange	1	100,000	100,000
Telephone Sets	5	1,500	7,500
Fax Machine	2	20,000	40,000
Water Dispenser	2	16,500	33,000
Refrigerator	1	50,000	50,000
Electric Water Cooler	2	25,000	50,000
Misc. & Contingency		10%	130,050
<b>Total Office Equipment</b>			<b>1,430,550</b>

## 9.8 Office Vehicle Requirement

Following office vehicles are required for Potato Flakes Manufacturing Unit;

**Table 9: Office Vehicle Requirement**

Description	Quantity	Unit Cost (PKR)	Total Cost (PKR)
1300 CC Car (For CEO)	1	1,650,000	1,650,000
800 CC Carry	1	900,000	900,000
Registration fee		3.25%	82,875
<b>Total Office Vehicles cost</b>			<b>2,632,875</b>

## 9.9 Human Resource Requirement

To run operations of Potato Flakes Manufacturing Unit smoothly, details of human resources required along with number of employees and monthly salary are recommended as under;

**Table 10: Human Resource Requirement**

Description	No. of Employees	Salary Per Month (Rs.)
CEO	1	175,000
Manager Marketing	1	75,000
Assistant Manager – Marketing	1	35,000
Plant Manger	1	80,000
Assistant Plant Manager	1	40,000
Plant Operator	3	22,000
Manager Finance & Admin	1	60,000
Accounts officer	1	20,000
Assistant to Admin & HR	1	20,000
Boiler Operator	3	20,000
Procurement Officer	1	50,000
Quality Control Officer / Food Technologist	1	35,000
Assistant to Quality Assurance Officer	1	16,000
Mechanic	2	18,000
Electrician	2	18,000
Shift Supervisors	3	20,000
Driver	2	15,000
Lifter Operator	1	16,000
Office Boy	2	15,000
Guard	4	18,000
Sweeper	2	15,000
<b>Total</b>	<b>35</b>	

Seasonal labor will be hired on daily wages. In year 1 the seasonal labor cost will be around Rs. 4.21 million with 10% incremental effect each year.

### 9.10 Raw Material Requirement

Fresh potatoes are the main raw material for the proposed business, which will be procured either directly from the farms or from distributors of local vegetable market. Following table provides the details of seasonal requirements of fresh potatoes as a raw material:

**Table 11: Raw Material Requirement – Year 1**

Description	Requirement for Producing 1 kg Flakes	Requirement for Year-1 (Tons)	Cost Per Ton (PKR)	Total Cost (PKR)
Potatoes (Fresh) for Potato Flakes	5.7	16,006	14,000	224,078,400
Freight in for Potato Flakes		16,006	500	8,002,800
Other Material (Mon glyceride, Glycerol mono-Palmitate, antioxidants, sodium salts, SO <sub>2</sub> , etc.)		2,808	800	2,246,400
<b>Total Raw Material Cost</b>				<b>234,327,600</b>

### 9.11 Revenue Generation

Based on the assumed capacity utilization for processing of Potatoes, sales revenue during the first year of operations is estimated as under:

**Table 12: Revenue Generation – Year 1**

Description	Production Capacity Year - 1 (65%) in Tons	Sales Price Per Ton (Rs.)	Revenue (Rs.)
Potato Flakes	2,808	133,750	375,570,000

### 9.12 Utilities and Other Costs

An essential cost to be borne by the project is the cost of electricity, gas and fuel for generator. The utility expenses are estimated to be around Rs. 1.43 million per month. Furthermore, promotional expenses are essential for marketing of this unit, and are estimated as 1% of revenue each year.

## 10 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>
Punjab Vocational Training Council (PVTTC)	<a href="http://www.pvtc.gop.pk">www.pvtc.gop.pk</a>
Technical Education and Vocational Training Authority (TEVTA)	<a href="http://www.tevta.org">www.tevta.org</a>
Punjab Industrial Estates (PIE)	<a href="http://www.pie.com.pk">www.pie.com.pk</a>
Faisalabad Industrial Estate Development and Management Company (FIEDMC)	<a href="http://www.fiedmc.com.pk">www.fiedmc.com.pk</a>
Pakistan Horticulture Development Export Company (PHDEC)	<a href="http://ww.phdec.org">ww.phdec.org</a>
Ministry of National Food Security and Research (MNFSR)	<a href="http://www.mnsfr.gov.pk">www.mnsfr.gov.pk</a>
Pakistan Agriculture Research Council (PARC)	<a href="http://www.parc.gov.pk">www.parc.gov.pk</a>
National Agriculture Research Council (NARC)	<a href="http://www.narc.gov.pk">www.narc.gov.pk</a>
Agriculture University of Faisalabad (UAF)	<a href="http://www.uaf.edu.pk">www.uaf.edu.pk</a>
Agriculture Marketing Information Service	<a href="http://www.amis.pk">www.amis.pk</a>
Ayub Agricultural Research Institute (AARI), Faisalabad	<a href="http://www.aari.punjab.gov.pk">www.aari.punjab.gov.pk</a>

# 11 ANNEXURES

## 11.1 Income Statement

Calculations										SMEDA
Income Statement										Amount in PKR
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	375,570,000	476,685,000	594,267,300	730,599,210	845,956,980	930,552,678	1,023,607,946	1,125,968,740	1,238,565,614	1,362,422,176
<i>Cost of sales</i>										
Fresh Potatoes Cost including Freight in	232,081,200	294,564,600	367,223,868	451,469,344	522,753,977	575,029,374	632,532,312	695,785,543	765,364,097	841,900,507
Other Material (Monoglyceride, Glycerol mono-Palmitate, antioxidants,	2,246,400	2,851,200	3,554,496	4,369,939	5,059,930	5,565,923	6,122,515	6,734,766	7,408,243	8,149,067
Operation costs 1 (direct labor)	5,568,000	6,124,800	6,737,280	7,411,008	8,152,109	8,967,320	9,864,052	10,850,457	11,935,502	13,129,053
Operating costs 2 (machinery maintenance)	561,600	712,800	888,624	1,092,485	1,264,982	1,391,481	1,530,629	1,683,692	1,852,061	2,037,267
Direct electricity including Generator and Boiler expense	16,071,588	20,398,554	25,430,197	31,264,184	36,200,634	39,820,697	43,802,767	48,183,044	53,001,348	58,301,483
Packing Cost	2,808,000	3,564,000	4,443,120	5,462,424	6,324,912	6,957,403	7,653,144	8,418,458	9,260,304	10,186,334
Daily Wages	4,212,000	5,346,000	6,664,680	8,193,636	9,487,368	10,436,105	11,479,715	12,627,687	13,890,455	15,279,501
<b>Total cost of sales</b>	<b>263,548,788</b>	<b>333,561,954</b>	<b>414,942,265</b>	<b>509,263,019</b>	<b>589,243,911</b>	<b>648,168,303</b>	<b>712,985,133</b>	<b>784,283,646</b>	<b>862,712,011</b>	<b>948,983,212</b>
<b>Gross Profit</b>	<b>112,021,212</b>	<b>143,123,046</b>	<b>179,325,035</b>	<b>221,336,191</b>	<b>256,713,069</b>	<b>282,384,375</b>	<b>310,622,813</b>	<b>341,685,094</b>	<b>375,853,604</b>	<b>413,438,964</b>
<i>General administration &amp; selling expenses</i>										
Administration expense	6,936,000	7,629,600	8,392,560	9,231,816	10,154,998	11,170,497	12,287,547	13,516,302	14,867,932	16,354,725
Administration benefits expense	1,734,000	1,907,400	2,098,140	2,307,954	2,538,749	2,792,624	3,071,887	3,379,075	3,716,983	4,088,681
Electricity expense	1,123,200	1,235,520	1,359,072	1,494,979	1,644,477	1,808,925	1,989,817	2,188,799	2,407,679	2,648,447
Water expense	60,000	66,000	72,600	79,860	87,846	96,631	106,294	116,923	128,615	141,477
Travelling expense	1,734,000	1,907,400	2,098,140	2,307,954	2,538,749	2,792,624	3,071,887	3,379,075	3,716,983	4,088,681
Communications expense (phone, fax, mail, internet, etc.)	1,387,200	1,525,920	1,678,512	1,846,363	2,031,000	2,234,099	2,457,509	2,703,260	2,973,586	3,270,945
Office vehicles running expense	1,053,150	1,158,465	1,274,312	1,401,743	1,541,917	1,696,109	1,865,719	2,052,291	2,257,521	2,483,273
Office expenses (stationary, entertainment, janitorial services, etc.)	693,600	762,960	839,256	923,182	1,015,500	1,117,050	1,228,755	1,351,630	1,486,793	1,635,473
Promotional expense	3,755,700	4,766,850	5,942,673	7,305,992	8,459,570	9,305,527	10,236,079	11,259,687	12,385,656	13,624,222
Professional fees (legal, audit, consultants, etc.)	1,877,850	2,383,425	2,971,337	3,652,996	4,229,785	4,652,763	5,118,040	5,629,844	6,192,828	6,812,111
Depreciation expense	29,635,911	29,635,911	29,635,911	29,635,911	29,635,911	30,036,437	30,036,437	30,036,437	30,036,437	30,036,437
Amortization of pre-operating costs	1,621,198	1,621,198	1,621,198	1,621,198	1,621,198	-	-	-	-	-
Amortization of legal, licensing, and training costs	140,000	140,000	140,000	140,000	140,000	-	-	-	-	-
<b>Subtotal</b>	<b>51,751,809</b>	<b>54,740,649</b>	<b>58,123,710</b>	<b>61,949,948</b>	<b>65,639,699</b>	<b>67,703,287</b>	<b>71,469,971</b>	<b>75,613,325</b>	<b>80,171,014</b>	<b>85,184,471</b>
<b>Operating Income</b>	<b>60,269,403</b>	<b>88,382,397</b>	<b>121,201,325</b>	<b>159,386,243</b>	<b>191,073,369</b>	<b>214,681,089</b>	<b>239,152,841</b>	<b>266,071,769</b>	<b>295,682,590</b>	<b>328,254,493</b>
Gain / (loss) on sale of office equipment	-	-	-	-	572,220	-	-	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	1,053,150	-	-	-	-	-
<b>Earnings Before Interest &amp; Taxes</b>	<b>60,269,403</b>	<b>88,382,397</b>	<b>121,201,325</b>	<b>159,386,243</b>	<b>192,698,739</b>	<b>214,681,089</b>	<b>239,152,841</b>	<b>266,071,769</b>	<b>295,682,590</b>	<b>328,254,493</b>
Interest expense on long term debt (Project Loan)	20,902,877	17,612,561	13,927,407	9,800,034	5,177,376	-	-	-	-	-
Interest expense on long term debt (Working Capital Loan)	685,499	-	-	-	-	-	-	-	-	-
<b>Subtotal</b>	<b>21,588,377</b>	<b>17,612,561</b>	<b>13,927,407</b>	<b>9,800,034</b>	<b>5,177,376</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Earnings Before Tax</b>	<b>38,681,026</b>	<b>70,769,836</b>	<b>107,273,918</b>	<b>149,586,209</b>	<b>187,521,363</b>	<b>214,681,089</b>	<b>239,152,841</b>	<b>266,071,769</b>	<b>295,682,590</b>	<b>328,254,493</b>
Tax	12,760,859	23,991,942	36,768,371	51,577,672	64,854,976	74,360,880	82,925,994	92,347,619	102,711,406	114,111,572
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>25,920,168</b>	<b>46,777,894</b>	<b>70,505,547</b>	<b>98,008,537</b>	<b>122,666,387</b>	<b>140,320,208</b>	<b>156,226,848</b>	<b>173,724,151</b>	<b>192,971,184</b>	<b>214,142,921</b>

## 11.2 Balance Sheet

Calculations											SMEDA
Balance Sheet											Amount in PKR
	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	1,000,000	14,224,768	56,388,219	112,342,393	191,091,879	282,570,072	436,805,857	605,491,973	788,003,107	985,319,983	1,376,694,016
Accounts receivable		30,868,767	35,024,178	44,011,738	54,446,569	64,789,980	73,007,246	80,307,971	88,338,768	97,172,645	106,889,909
Equipment spare part inventory	187,200	249,480	326,569	421,563	512,531	591,974	683,730	789,708	912,112	1,053,490	-
Raw material inventory	19,527,300	27,263,115	37,386,818	50,560,174	64,397,695	77,921,211	94,284,665	114,084,445	138,042,178	167,031,036	-
<b>Total Current Assets</b>	<b>20,714,500</b>	<b>72,606,130</b>	<b>129,125,784</b>	<b>207,335,868</b>	<b>310,448,674</b>	<b>425,873,237</b>	<b>604,781,498</b>	<b>800,674,097</b>	<b>1,015,296,166</b>	<b>1,250,577,153</b>	<b>1,483,583,925</b>
<i>Fixed assets</i>											
Land	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000
Building/Infrastructure	70,559,233	67,031,271	63,503,310	59,975,348	56,447,386	52,919,425	49,391,463	45,863,501	42,335,540	38,807,578	35,279,616
Machinery & equipment	251,910,942	226,719,848	201,528,754	176,337,659	151,146,565	125,955,471	100,764,377	75,573,283	50,382,188	25,191,094	(0)
Furniture & fixtures	1,041,700	937,530	833,360	729,190	625,020	520,850	416,680	312,510	208,340	104,170	-
Office vehicles	2,632,875	2,106,300	1,579,725	1,053,150	526,575	4,240,272	3,392,217	2,544,163	1,696,109	848,054	-
Office equipment	1,430,550	1,144,440	858,330	572,220	286,110	1,825,785	1,460,628	1,095,471	730,314	365,157	-
<b>Total Fixed Assets</b>	<b>339,575,300</b>	<b>309,939,389</b>	<b>280,303,478</b>	<b>250,667,567</b>	<b>221,031,657</b>	<b>197,461,802</b>	<b>167,425,365</b>	<b>137,388,928</b>	<b>107,352,491</b>	<b>77,316,054</b>	<b>47,279,616</b>
<i>Intangible assets</i>											
Pre-operation costs	8,105,990	6,484,792	4,863,594	3,242,396	1,621,198	-	-	-	-	-	-
Legal, licensing, & training costs	700,000	560,000	420,000	280,000	140,000	-	-	-	-	-	-
<b>Total Intangible Assets</b>	<b>8,805,990</b>	<b>7,044,792</b>	<b>5,283,594</b>	<b>3,522,396</b>	<b>1,761,198</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>369,095,790</b>	<b>389,590,311</b>	<b>414,712,857</b>	<b>461,525,831</b>	<b>533,241,529</b>	<b>623,335,039</b>	<b>772,206,863</b>	<b>938,063,024</b>	<b>1,122,648,657</b>	<b>1,327,893,207</b>	<b>1,530,863,542</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Current liabilities</i>											
Accounts payable		32,350,906	41,405,177	52,107,377	64,336,684	74,908,612	83,460,227	93,089,541	103,951,022	116,224,388	105,051,802
<b>Total Current Liabilities</b>	<b>-</b>	<b>32,350,906</b>	<b>41,405,177</b>	<b>52,107,377</b>	<b>64,336,684</b>	<b>74,908,612</b>	<b>83,460,227</b>	<b>93,089,541</b>	<b>103,951,022</b>	<b>116,224,388</b>	<b>105,051,802</b>
<i>Other liabilities</i>											
Long term debt (Project Loan)	174,190,645	146,771,342	116,061,723	81,666,950	43,144,804	-	-	-	-	-	-
Long term debt (Working Capital Loan)	10,357,250	-	-	-	-	-	-	-	-	-	-
<b>Total Long Term Liabilities</b>	<b>184,547,895</b>	<b>146,771,342</b>	<b>116,061,723</b>	<b>81,666,950</b>	<b>43,144,804</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<i>Shareholders' equity</i>											
Paid-up capital	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895	184,547,895
Retained earnings		25,920,168	72,698,062	143,203,609	241,212,146	363,878,533	504,198,741	660,425,589	834,149,739	1,027,120,924	1,241,263,845
<b>Total Equity</b>	<b>184,547,895</b>	<b>210,468,063</b>	<b>257,245,957</b>	<b>327,751,504</b>	<b>425,760,041</b>	<b>548,426,428</b>	<b>688,746,636</b>	<b>844,973,484</b>	<b>1,018,697,634</b>	<b>1,211,668,819</b>	<b>1,425,811,740</b>
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>369,095,790</b>	<b>389,590,311</b>	<b>414,712,857</b>	<b>461,525,831</b>	<b>533,241,529</b>	<b>623,335,039</b>	<b>772,206,863</b>	<b>938,063,024</b>	<b>1,122,648,657</b>	<b>1,327,893,207</b>	<b>1,530,863,542</b>

## 11.3 Cash Flow Statement

Calculations											SMEDA
Cash Flow Statement											Amount in PKR
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Operating activities</i>											
Net profit		25,920,168	46,777,894	70,505,547	98,008,537	122,666,387	140,320,208	156,226,848	173,724,151	192,971,184	214,142,921
Add: depreciation expense		29,635,911	29,635,911	29,635,911	29,635,911	29,635,911	30,036,437	30,036,437	30,036,437	30,036,437	30,036,437
amortization of pre-operating costs		1,621,198	1,621,198	1,621,198	1,621,198	1,621,198	-	-	-	-	-
amortization of training costs		140,000	140,000	140,000	140,000	140,000	-	-	-	-	-
Accounts receivable		(30,868,767)	(4,155,411)	(8,987,560)	(10,434,831)	(10,343,412)	(8,217,266)	(7,300,725)	(8,030,797)	(8,833,877)	(9,717,264)
Equipment inventory	(187,200)	(62,280)	(77,089)	(94,993)	(90,969)	(79,442)	(91,756)	(105,978)	(122,405)	(141,377)	1,053,490
Raw material inventory	(19,527,300)	(7,735,815)	(10,123,703)	(13,173,355)	(13,837,521)	(13,523,516)	(16,363,454)	(19,799,780)	(23,957,733)	(28,988,857)	167,031,036
Accounts payable		32,350,906	9,054,270	10,702,200	12,229,307	10,571,928	8,551,615	9,629,314	10,861,482	12,273,366	(11,172,586)
Cash provided by operations	(19,714,500)	51,001,321	72,873,070	90,348,948	117,271,632	140,689,053	154,235,784	168,686,116	182,511,134	197,316,876	391,374,033
<i>Financing activities</i>											
Project Loan - principal repayment		(27,419,303)	(30,709,619)	(34,394,773)	(38,522,146)	(43,144,804)	-	-	-	-	-
Working Capital Loan - principal repayment		(10,357,250)	-	-	-	-	-	-	-	-	-
Additions to Project Loan	174,190,645	-	-	-	-	-	-	-	-	-	-
Additions to Working Capital Loan	10,357,250	-	-	-	-	-	-	-	-	-	-
Issuance of shares	184,547,895	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares											
Cash provided by / (used for) financing activities	369,095,790	(37,776,553)	(30,709,619)	(34,394,773)	(38,522,146)	(43,144,804)	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(348,381,290)	-	-	-	-	(6,066,056)	-	-	-	-	-
Acquisitions											
Cash (used for) / provided by investing activities	(348,381,290)	-	-	-	-	(6,066,056)	-	-	-	-	-
<b>NET CASH</b>	<b>1,000,000</b>	<b>13,224,768</b>	<b>42,163,451</b>	<b>55,954,174</b>	<b>78,749,486</b>	<b>91,478,193</b>	<b>154,235,784</b>	<b>168,686,116</b>	<b>182,511,134</b>	<b>197,316,876</b>	<b>391,374,033</b>

## 12 KEY ASSUMPTIONS

### 12.1 Operating Cost Assumptions

Description	Details
Administration Benefit Expenses	25% of admin. expense
Traveling Expenses	25% of admin. expense
Communication Expenses	20% of admin. expense
Office expenses (stationary, entertainment, janitorial services, etc.)	10% of admin. expense
Promotional expense	1% of revenue
Office Vehicle Running Expenses	40% of the Vehicle Cost
Professional fee (Legal, Audit, etc.)	0.5% of revenue
Operating costs growth rate	10%
Depreciation on Building and Infrastructure	5%
Depreciation on Machinery & Equipment	10%
Depreciation on Furniture and Fixture	10%
Depreciation on Office Equipment	20%
Depreciation on Office Vehicle	20%

### 12.2 Production Cost Assumptions

Description	Details
Cost of Potatoes per Ton	Rs. 14,000
Packing Cost Per Ton <sup>4</sup>	Rs. 800
Other Material (Monoglyceride, Glycerol mono-Palmitate, antioxidants, sodium salts, SO <sub>2</sub> , etc.)	Rs. 800
Cost used in Per Ton Potato Flakes	
Production Cost Growth Rate	10%

### 12.3 Revenue Assumptions

Description	Details
Potato Flakes Sales Price Per Ton	133,750
Growth in Sales Price	10%
Days Operational / Year	180

<sup>4</sup> Inner Liner LDP Bag with Outer PP Bag (Food Grade) will be used as Packing

Hours Operational Per Day	24
Production Capacity in First Year	65%
Percentage Increase in Production Capacity every Year	10%
Maximum Production Capacity	100%

#### 12.4 Financial Assumptions

Description	Details
Total Equity (50%)	Rs. 184,547,895
Bank Loan (50%)	Rs. 184,547,895
Annual Markup to the Borrower– Long Term Loan	12%
Tenure of the Loan (Years)	5
Debt Payments / Year	1