

Pre-Feasibility Study

ANIMAL CASINGS PROCESSING (Sheep and Goat)



Small and Medium Enterprise Development Authority
Government of Pakistan
www.smeda.org.pk

HEAD OFFICE

Waheed Trade Complex, 1st Floor, 36-Commercial Zone, Phase III, Sector XX, Khayaban-e-Iqbal, DHA Lahore
Tel: (042) 111-111-456, Fax: (042) 5896619, 5899756
helpdesk@smeda.org.pk

REGIONAL OFFICE PUNJAB

Waheed Trade Complex,
1st Floor, 36-Commercial Zone,
Phase III, Sector XX,
Khayaban-e-Iqbal, DHA Lahore.
Tel: (042) 111-111-456
Fax: (042) 5896619, 5899756
helpdesk@smeda.org.pk

REGIONAL OFFICE SINDH

5TH Floor, Bahria
Complex II, M.T. Khan Road,
Karachi.
Tel: (021) 111-111-456
Fax: (021) 5610572
helpdesk-khi@smeda.org.pk

REGIONAL OFFICE NWFP

Ground Floor
State Life Building
The Mall, Peshawar.
Tel: (091) 9213046-47
Fax: (091) 286908
helpdesk-pew@smeda.org.pk

REGIONAL OFFICE BALOCHISTAN

Bungalow No. 15-A
Chaman Housing Scheme
Airport Road, Quetta.
Tel: (081) 831623, 831702
Fax: (081) 831922
helpdesk-qta@smeda.org.pk

March, 2002

DISCLAIMER

The purpose and scope of this information memorandum is to introduce the subject matter and provide a general idea and information on the said area. All the material included in this document is based on data/information gathered from various sources and is based on certain assumptions. 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 does not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. Therefore, the content of this memorandum should not be relied upon for making any decision, investment or otherwise. The prospective user of this memorandum is encouraged to carry out his/her own due diligence and gather any information he/she considers necessary for making an informed decision.

The contents of the information memorandum do not bind SMEDA in any legal or other form.

DOCUMENT CONTROL

Document No.	PREF-32
Revision	1
Prepared by	SMEDA Punjab
Approved by	GM-Punjab
Issue Date	March, 2002
Issued by	Library Officer

1 INTRODUCTION

1.1 Project Brief

The scope of the project includes processing of animal casings. Animal Casings are the small intestinal tracts of animals acquired from alimentary tract of sheep and goats. (Note: - The casings of small size animals such as sheep or goat are generally known as "sheep casings", in the international markets, therefore, the word sheep casing will be used in this document as generic word for both goat and sheep casings).

Sheep casings are the small diameter casings used for variety of purposes such as surgical sutures, collagen sheet (used for burn dressing) strings for sports rackets, casing for human food. However, the highest utilization of casings in the world is for making sausages containers. There is huge demand for processed sheep casings in the international markets. The major markets for Pakistani casings include Europe, North America and Japan.

2 OPPORTUNITY RATIONALE

The production of small animal i.e., sheep & goats in the world is limited. This is because many countries in the west prefer meat of large animal i.e., beef, veal and pork. Fish and poultry further substitute the production of small animals in the west. The other major cause of limited production is the consumer preferences towards vegetarian foods. The production of animals for food is also affected due to the restriction on meat consumption because of religious beliefs. The production of sheep and goats in the west is largely done for wool and goat-cheese respectively.

Although, western countries produce great number of large animals but casings of these animals are less preferred than casings of small animals due to the quality and characteristics.

The population of sheep and goats in Pakistan, reported in the year 2000 stood at 2.41 million and 47.5 million respectively. With this size of production Pakistan stands as one of the large players since local consumption of casings is non-existent and all the production is available for exports. Second big advantage for Pakistani exporter is that the raw casings for processing are also readily available from neighboring countries such as Afghanistan and Iran.

The world import of animal casings, which amounts to US\$ 1.6 Billion, represents large market size¹. The exports of casings are done in "Hanks". A "hank" is an international standard of measure of intestines, which is 92 meters long.

2.1 Viable Economic Size & Proposed Capacity

The project is based on the processing facility with capacity to process 500 hanks per shift of 8 hours. At 300 days per annum the total production amounts to 150,000 hanks.

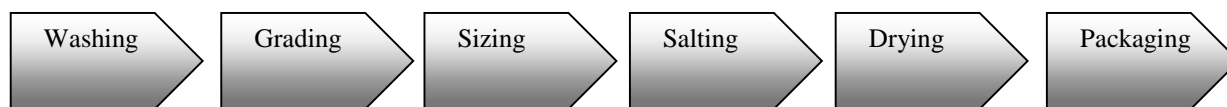
2.2 Total Project Cost:

Rs. 3.338 Million

¹ The SITC (Standard International Trade Classification Code) of animal casings is 2919304, but due to the absence of 7 digit international data, the broader SITC category 29193 is being reported here, which also includes data for animal Guts and Bladders excluding fish. However, the major share of item reported against 29193 SITC category accounts for animal casings.

3 PROCESS FLOW CHART

Figure 3-1: Process Flow of Animal Casings Processing



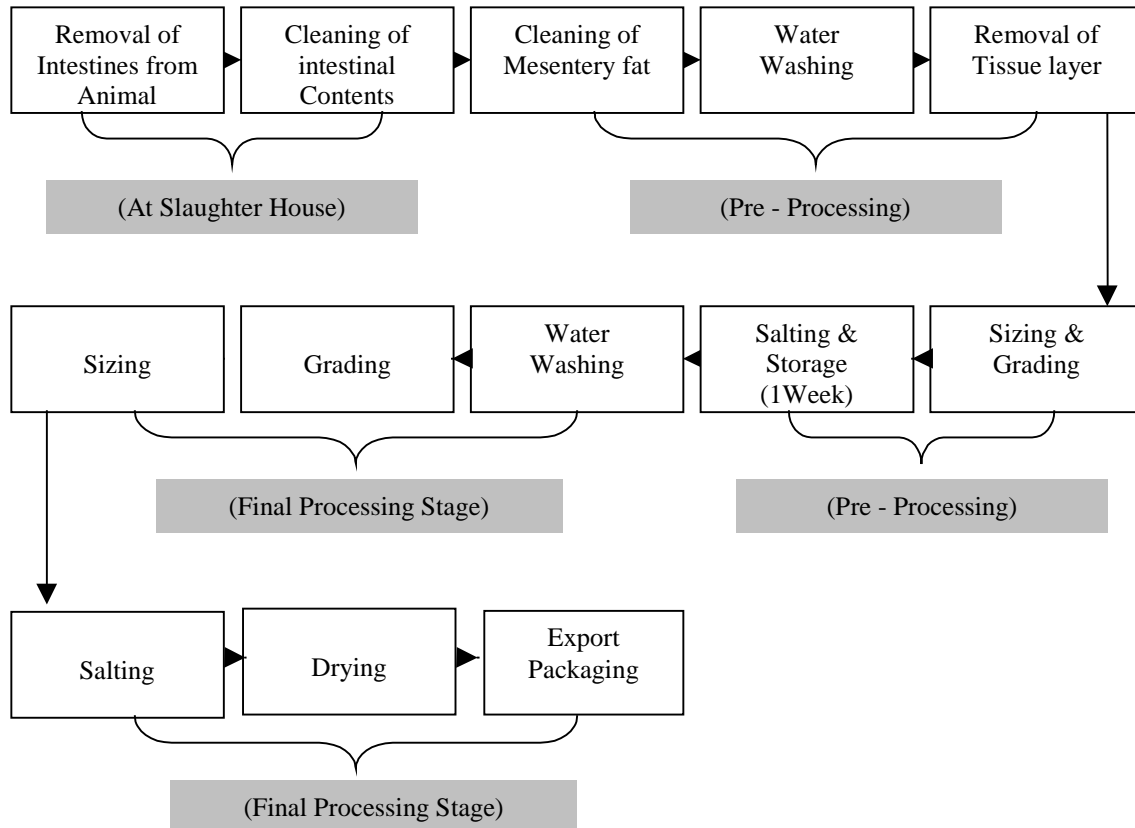
3.1 Total Flow System

Animal intestine received from the slaughterhouse floor is highly contaminated with microbes and other wastes. The cleaning and removal of various internal and external wastes is necessary to convert this product into a useful casing. Following steps are followed by the sheep casings processors:

1. Removing the intestine from the animal.
2. Removing loose mesentery fat.
3. Stripping - squeezing to force out intestinal contents.
4. Washing and cooling with water 50°F.
5. Hand stripping.
6. Brushing to remove fat.
7. Removing of tissue layers with hands & warm water at 115°F.
8. Removing appropriate tissue layers by strippers or hand.
9. Application of Salt
10. Grading into hanks - according to species size & quality.
11. Curing- rubbing with salt: allowed to set for 1 week.
12. Removing from cure and washing to remove salts
13. Grading based on A, B & C quality standard for different export markets.
14. Sizing of intestinal tracts into hanks according to different caliber/diameter.
15. Curing- rechecking, rubbing with fine salt.
16. Drying of salted hanks for removal of excess water and salt.
17. Packing with 40% salt ratio
18. Storing in cold room for export.

The value chain of processing of animal casings in Pakistan can be divided into three major activities. Three different players in Pakistan are performing the major activities in most of the cases. The major stages/activities of processing are mentioned above. The activities numerated above under Sr. no. 1 to 4 are performed at slaughterhouse. The activities from Sr. No. 5 to 11 are performed by independent pre-processors for onward supplies to the exporters for final processing, which starts from activity at Sr.no.12 to 18.

The total flow system of processing animal casings is provided in the following figure:

Figure 3-2: Total Flow System of Processing Animal Casings

The first step in casing preparation is removing the viscera (intestine) and separating it from the internal organs. The viscera is placed on a table and separated from the mesentery fat.

The next step is to remove the intestinal contents. In Pakistan, waste from intestines is usually removed by pulling the casing through the fingers. In either case, a great quantity of water is needed to wash the casings and to keep the operation clean. The casing is soaked for approximately 30 minutes in 100 to 108°F (38 to 42°C) water.

Removal of intestinal content is followed by the separation of inter-mucosal membrane from the casing. This process is accomplished by a hand operation wherein the casing is scrapped with a dull-bladed knife or an oyster shell. Machine can also be used for this purpose. However in both cases huge quantity of water at 108°F (42°C) is required.

Next, the casing goes through a mucosa stripper (mucosa is a membrane), which looks essentially like the manure stripper. Again, 108°F (42°C) water is used to keep the operation sanitary. Due to the relative availability of low cost labor in Pakistan, this operation is accomplished by hand scraping.

Next, the casing goes through a process to remove any string-like material and remaining mucosa. Large quantities of 108°F (42°C) potable water are essential to keep the operation clean. After this process, casings are salted by hand. The salting and shaking of the casing usually are continued until the casings absorbs 40% salt, at which point they are packed into a container.

Hanks are exported in plastic drums. 250 pieces of hanks are generally packed in one plastic drum and the average weight of one packed drum is approximately 40kg.

3.2 Grading Standards

Sheep Casings are measured in Hanks. Total measurement of one Hank is 92 meters. As per international standards, there should not be more than 20 pieces per hank and no piece should be shorter than 2 meters in length. Other grading criteria/standard is the diameter of intestine tube measured into caliber sizes of 16/18mm, 18/20mm, 20/22mm, 22/24mm and 24/26mm.

4 CURRENT INDUSTRY STRUCTURE

4.1 Existing Capacity of Animal Casings' Processing in Pakistan

There are about 40 registered and non-registered animal casings' processing firms/facilities in Pakistan. The registered firms are those which are duly approved with the Ministry of Food Agriculture and Livestock, Government of Pakistan and European Union at Brussels for the processing and export of animal casings. (The registration of firms is mandatory in order to export animal casings to Europe as required by European Union and only those companies could register which fulfils and conform to the quality standards & hygiene protocols laid down by European Union). Following table shows the approximate number of registered and non-registered animal casings' processing facilities in Pakistan.

Table 4-1: Registered and Non-Registered Animal Casings' processing facilities in Pakistan

Item	Total	Registered	Non-Registered
Processing facilities (400 to 2,000 Hanks/Day)			
Lahore	10	9	1
Karachi	12	12	0
Multan	10	6	4
Gujaranwala	3	2	1
Peshawar	2	2	0
Grand Total	37	31	6

4.2 Major Players in Pakistan

Following are the few major players of animal casing processors:

Table 4-2: Major Players of Animal Casing Processors

Name	Location
Co-Co Traders	Lahore
Multan Impex	Multan
Nasrun & Co.	Karachi
M.Saeed, M.Hussain & Co	Karachi
Mesco Traders.	Karachi
Abdul Ghani & Co.	Peshawar
Ali Enterprises	Gujranwala

4.3 Market Supply Chain

The supply chain of finished and processed ready for shipment sheep casings start from the slaughterhouses.

The major stakeholders of the supply chain are:

- Butchers
- Middlemen/Contractors
- Pre-processors
- Main Processors/Exporters

The middlemen/contractors procure intestines (locally called "Rodha") from butchers. These middlemen make long-term contracts of purchase with butchers at city slaughterhouses. Middlemen or his representative daily collect intestinal tracts from the slaughterhouses and do initial processes at the spot. Often the contractors or middlemen perform the pre-processing, however, the expert pre-processors of intestines also operate in the local market. These pre-processors purchase intestines from middlemen or contractors for onward supply to final processors/exporter.

The final processors of animal casings require substantial amount of inventory of finished and pre-processed stocks of casings. The availability (supply) of raw material i.e., animal intestines in the market are not dependent on the market demand as the intestines depends on the number of animals being slaughtered.

4.4 Production of Sheep Casings in Pakistan

According to Agriculture Statistics of Pakistan 1999-2000, the present total population of male, female and young-stock of sheep/goats in Pakistan is 71.5 million numbers. The annual daily slaughtering of sheep and goats all over Pakistan has been reported to total 32.4 million numbers (heads). On average, one intestine of sheep/goat measures to 25 meters long and therefore; it takes approximately 4 to 5 intestines to make a hank. With 32.4 million numbers of sheep and goats slaughtered per annum the total number of hanks available in Pakistan amounts to 6.5 million hanks.

5 MARKETING

Table 5-1: Total World Market Size and Growth

	Value (\$ Billion)	Quantity (000 Mt)	Compounded Annual Growth (1988-1998)
World Export in 1999	1.6	430	1.2%
Pakistan Export in 1999/2000	0.14	718	1%

Source: ITC 1999 & FBS 1999/2000

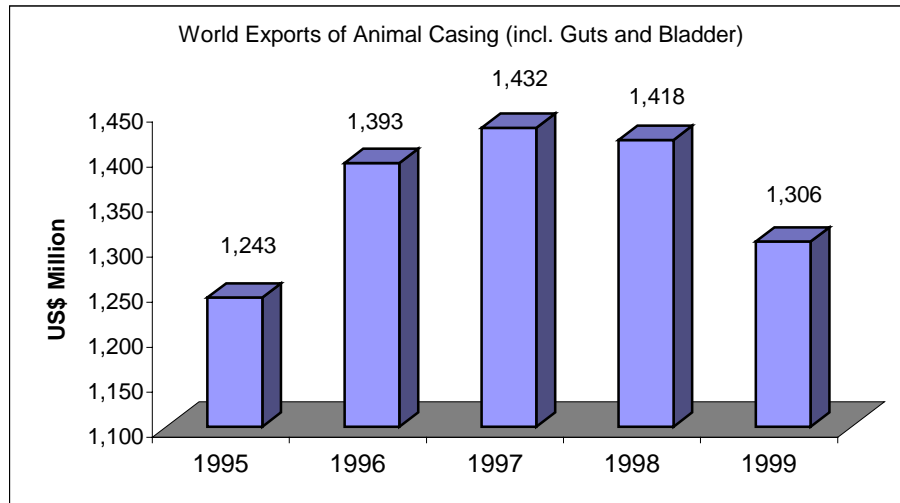
5.1 Major Exporting Countries of Animal Casings

Table 5-2 shows the major animal casings exporting countries. The total exports reported under this category amounted to US\$ 1.3 billion in the year 1999.

Table 5-2: World exports of animal casings (\$ '000')

Country	1995	1996	1997	1998	1999
China	279,329	341,981	369,313	342,801	334,221
Germany	187,155	225,393	234,212	242,329	197,893
USA	49,551	65,974	89,187	111,275	105,093
Netherlands	119,377	124,761	109,670	100,727	90,218
New Zealand	85,948	86,852	84,456	84,947	80,921
France	64,066	61,090	58,822	62,263	58,004
Denmark	65,497	66,055	60,386	64,735	56,533
Brazil	45,538	43,590	43,417	45,505	51,905
Australia	57,657	55,144	50,515	43,745	43,395
Turkey	37,759	40,312	44,084	41,944	40,584
United Kingdom	29,394	29,675	27,207	27,571	24,123
Spain	12,443	16,633	19,180	22,443	22,826
Italy	21,298	24,152	25,657	23,621	21,459
Belgium-Luxembourg	29,839	28,952	29,465	26,851	21,285
Portugal	23,450	26,718	23,771	22,973	20,331
Poland	13,847	15,359	27,653	16,606	14,703
Sweden	9,795	12,288	14,860	14,713	14,057
Uruguay	12,886	15,107	14,717	14,273	13,858
Canada	6,115	7,841	10,169	13,564	13,827
Pakistan	12,608	19,435	14,071	14,115	11,670
Ireland	14,023	14,350	10,895	10,817	9,968
Mexico	9,351	8,579	10,645	13,164	7,512
Austria	4,541	4,710	8,082	6,570	7,100
Croatia	9,903	10,461	9,147	6,304	7,036
Hungary	5,631	5,834	5,199	7,159	5,862

Source: ITC 1999 SITC 29193

Figure 5-1: World export trend of animal casings year 1995-1999

The import of animal casings shows an annual compounded growth rate of 1.2% over the period from 1995 to 1999. China is the largest exporter of animal casings with total export value amounting to US\$ 334 million in the year 1999. The little drop in the world market, as may appear from above Figure 5-1, resulted due to temporary overall drop in the consumption of meat or meat based products over the world because of outbreak of mad-cow disease. However, It is believed that soon the market will retain its lost levels as the outbreak of virus was reported to have been traced in the limited geographic areas which have now been cleaned from BCG virus.

5.2 Target Customers

Germany is the largest importer of animal casing from Pakistan followed by Romania, Spain, Japan, Portugal, Turkey and France. Pakistan exports of animal casings to Spain, Portugal and Romania registered a compounded annual growth of 52%, 13% and 4% respectively during the period 1996/97 to 1999/2000.

The total amount of animal casing exports from Pakistan amounted to 3.5 million hanks in the year 1999/2000, which is 53.8 percent of total available production of Pakistan. Pakistan's total exports of animal casing accounts for 1% of the total world market. Although, it may appear that Pakistan is a small player in the world export market of animal casings but Pakistan's long presence in the world export market and current local production level of animal casings does provide opportunities and potential for growth.

5.3 Registration as Exporter of Animal Casings with European Union (EU)

One of the major requirements for exports is the registration with Animal Quarantine Department of Ministry of Food and Agriculture (Live Stock Division), Government of Pakistan. Holder of this registration is entitled to export animal casings to the European Union countries. The Ministry of Food and Agriculture issues a letter to the Pakistan representative at Brussels to include the registration holders in the list of qualified animal casing exporters from Pakistan. The registration is granted after strict evaluation of the client's available set-up and conformity to the procedures and requirements set out as per the criteria of European Union.

6 RAW MATERIAL & TECHNICAL ASPECTS

Table 6-1: List of Raw & Processing Material

Description	Price (Rs)
Animal Casings (Rodha) average size animal Rodha (each)	15
Pre-Processed Hanks - (avg. price per hank)	
16/18 mm caliber - A Quality	65
16/18 mm caliber - B Quality	40
18/20 mm caliber - A Quality	160
18/20 mm caliber - B Quality	100
20/22 mm caliber - A Quality	450
20/22 mm caliber - B Quality	200
22/24 mm caliber - A Quality	550
22/24 mm caliber - B Quality	300
24/26 mm caliber - A Quality	550
24/26 mm caliber - B Quality	300
Salt "Special Quality" (per Kg)	2.15
Plastic Drum for Packaging (each)	250
Pre-processed Hanks - Avg. purchase rate A-Quality (Rs/Hank)	190
Pre-processed Hanks - Avg. purchase rate B-Quality (Rs/Hank)	107
Purchase price growth rate	2%

6.1 Input Supplies

Two major supplies are required at the Sheep Casing Plant:

1. Khewra / Varsha Salt is used as a major preserving agent. The salt from Khewra and Versha mines, comparatively in purest of its forms has a chemical composition, which maintains the tenderness and texture of casings. Therefore, salts from other sources are not recommended for the processing of sheep casing as it destroys the outer texture of casings. One kg of Khewra or Varsha salt is required during the processing & packaging of one hank. Approximately 750gm of salt are consumed per hank. Price of one bag of salt cost Rs.150 per 70kg bag.
2. Plastic drums are used for the export packaging of Sheep Casing. Maximum of 250 Hanks are packed in a drum. Price of one drum is Rs.250. These drums are easily and readily available in the local markets.

6.2 Quality Measures

Quality of sheep casing depends upon the health of the animal, specie, age of the animal, breed, fodder consumed, conditions under which the animal was raised, portion of the intestinal tract utilized, and how the product is handled and processed after the animal is slaughtered.

Some determinants for evaluating casings include:

1. Cleanliness -- casings should be clean, free from stains, odor, fat particles, parasites, nodules, and ulcers, and should be sound and free from pinholes.
2. Strength -- casings should be strong enough to withstand the pressures that will be put on them in the areas of filling, stuffing, cooking, processing, storage, and consumer cooking. Only the submucosal part of the intestine has the required strength to make this possible.
3. Length -- The number of pieces per hank often varies according to the country in which the casings were collected. The country in which the product is going to be utilized also influences the desirable length. Sheep casings produced in Pakistan are on the average 92 meters in length with the maximum of 20 pieces per hank, and no piece is shorter than 2 meters.
4. Calibration -- Diameter of the desired casing is determined by the country of use and also according to type of filling that is going to be placed in the casing. Modern sausage processing equipment requires, however, that the diameter of the casing be uniform in order to have adequate filling. Sheep casing produced here in Pakistan with diameter of 18 mm or above have a great demand. However, those with small diameters (min 16 mm) are also exported.
5. Curing -- Casings are normally cleaned, then salted, and only in a few cases they are dried. In some cases, they are frozen, but this primarily is utilized for surgical catgut. The curing is accomplished with high quality, fresh, and small particle sized salt grades.
6. Packaging -- The type of packaging is either wooden or plastic containers or tins. Often these containers are lined with plastic bags. Sometimes plastic bags are utilized and protected by sacks. In Pakistan, Sheep casing is generally packed in plastic containers because of the low cost and ease of sanitation.

6.3 Production Ratio & Wastage

The final processors cum exporters purchase animal casings in the form of hanks from pre-processors. The cost of a hank at this stage ranges from Rs.65 to Rs.160 per hank for caliber sizes of 16/18 & 18/20 respectively depending upon the quality (the caliber sizes of 16/18 & 18/20 accounts for 83% of exports). During the whole processing cycle, 80% of the collected intestines acquires the final shape of casings, remaining is wastage and is sold to the manufacturers of sports goods for rackets. Out of the total production of animal casings, 25% is of quality A, 70% is of B and 5% is of C.

7 MANPOWER REQUIREMENT

Table 7-1: Number of People Required

Description/Head	Number	Salary per Person per Month (Rs)
Foreman Processing Section	1	15,000
Cleaning & Grading Staff	6	8,000
Sizing / Calibration Staff	2	8,000
Washing Labour	4	5,000
Packaging Staff	2	4,000
Manager	1	20,000
Sales Officer cum Export Coordinator	1	10,000
Accounts Officer	1	6,000
Guards	1	3,000

The animal casings' processing operations does not require highly specialized operating skills. However, a trained foreman for processing section is required to control any wastage and to assure quality and smooth operations. The larger part of the manpower accounts for unskilled labour. The labour is required for manual washing, grading, sizing, loading and packing jobs etc.

For the administration side, a manager, sales cum export coordinator and accounts officer are required. Generally, the manager supported by sales and export coordinator shall look after all the marketing, sales and overall management.

8 MACHINERY & EQUIPMENT

8.1 Machinery & Equipment

Some machines for cleaning, washing and sizing of animal casings are available in the international markets. However, the use of machines for this project are not recommended because of the following reasons:

- Availability of cheap and highly skilled labor.
- Limited supply of animal intestines, processing of which is manageable and sufficient for readily available low cost labour in Pakistan.

In Pakistan, production of animal casings is a labor-intensive activity. All is done manually and no machine is involved at any stage of production. However, some tools and water supply system are required at the production facility, these include: (following tools can be adequately employed for the processing setup of 400 to 500 hanks per shift)

1. For the cleaning of mesentery fat and other extra tissues layer, a wedge shape knife is required. This knife costs Rs.100 per piece and 4 pieces are enough for proposed production facility.
2. For sizing / calibration, standard steel gauges are used. These gauges are meant for measuring the diameter of the sheep casing. These gauges cost about Rs. 2,000 per piece, and 6 pieces are required for proposed set-up.
3. For measuring length of casing a wooden scale of one meter length is used. These wooden scales cost about Rs.50 per piece and 2 pieces are sufficient for the production of 400 to 5000 Hanks per shift.
4. For reducing the weight of quantity exported, excess amount of water is removed. For this purpose a small spinning water extractor is used. This water extractor cost about Rs. 8,000 each. One water extractor is sufficient to comfortably processes 400 to 500 hanks per shift.
5. For Washing and cleaning, Water supply system is required. Detailed description of the parts of water supply system and allied machinery as follows:

Table 8-1: Detail of Water Supply System and Allied Machinery

Description	Quantity (Numbers)	Value (Rs. Per Piece)
Water Pump (0.5 HP)	1	4,000
Water Tank 500 gallons (fiber Glass)	5	8,000
Water Supply Lines (10 ft lengths)	30	400
Water Nozzles	14	75
Electric Wiring for water pump, generator & extractor	1	5000
Generator set	1	500,000

8.2 Cold Storage

Sheep Casing requires to be stored at temperature of 4°C. This presents the requirement of cold storage both for inputs (pre-processed casings) and finally processed casings ready for export. The setting-up of cold store is not recommend for this size of operation since it will not be viable to operate an independent cold store for the processing facility of 400 to 500 hanks per day. However, the cost

efficient and economic option would be to rent a designated part or portion of an independent cold store under lock & key control

It is estimated that using a portion of cold store on rent will cost Rs. 10,000 per month for rent of the premises under lock & key control. Total overall cost for the storage (processed & raw intestine) of production capacity amounts to Rs. 15,000 per month (inclusive of rent, loading and transportation). Details of costs, as follows:

Average stay of one hank at the cold store	=4 Days
Average current load at any given time	=1600 Hanks
Average storage cost per hank	=0.83 paisas
Other costs (loading /unloading and transportation per hank)	=0.42 paisas

9 LAND & BUILDING

9.1 Total Land Required (Area) & Building Construction Cost

The requirement of building and building construction very much depends on the E.U standards set out for animal casings processing facilities. Following these standards is indeed very important since adherence to the standards which include, such as, hygiene & sanitation protocols, etc., are prerequisites for getting export registration with Ministry of Food, Agriculture and Livestock (MINFAL) Government of Pakistan.

9.1.1 Land & Building

The land area and construction of building is proposed keeping in view the E.U standards and future expansion. It is estimated that the total land of 3,375 Sq.ft is required for smooth operations. The required area for building, as follows:

Table 9-1: Building Covered Area Requirement

Description	Number	Area Dimensions (feet)	Total Area (Sq.ft)
Office	1	15'x20'	300
Processing Hall	1	30'x30'	900
Supplies Room	1	10'x10'	100
Wash Room	2	10'x5'	100
Changing Room	1	10'x10'	100
Total			1500

The construction cost of the building is estimated @ Rs.500/Sq.ft for management office and wash room and @ Rs. 400/Sq.ft for processing hall, supplies room and changing room.

9.1.2 Processing Stations and Area

The construction processing stations required for different activities during the process flow, as follows:

Table 9-2: Processing Station Requirement

Description	Number	Dimensions
Ceramic Top Tables for Washing	3	5'x5'
Ceramic Top Tables for Cleaning	3	5'x5'
Ceramic Top Tables for Packaging	1	5'x10'

The total area of land required for proposed processing facility is 3,375 Sq.ft (15 marlas). The land for processing plant is purchased @ Rs. 50,000/marla. The size of land have been proposed keeping in view the future expansion needs (if any) for example installation of cold storage house, etc.

9.2 Suitable Locations

Within the geographic proximity of slaughterhouse or animal casings pre-processors' cluster. The proposed processing facility can be setup in any commercial or industrial area in the proximity of slaughterhouse, as almost, all of the pre-processors operate near slaughterhouses.

9.3 Infrastructure Requirement

Following essential utilities and infrastructure required for the operations of processing facility:

- Electricity (3 Phase)
- Water connection
- Telephone facility
- Access roads
- Drainage

10 PROJECT ECONOMICS

Table 10-1: Project Cost

Assets	Total Cost	
	Rs.	%
Land	750,000	23%
Building and Civil Works	640,000	19%
Plant and Machinery	582,550	17%
Furniture/ Fixture & Equipment	106,600	3%
Pre-operational Expenses	131,446	4%
Vehicles	80,000	2%
Total Fixed Cost	2,290,596	68%
Working Capital	1,048,397	32%
Total Project Cost	3,338,993	100%

Table 10-2: Financing Plan

Description	Value	%
Equity	1,669,497	50%
Debt	1,669,497	50%

Table 10-3: Project's Economics

Description	
Internal Rate of Return (IRR)	31.17%
Net Present Value (NPV) (Rs)	1,436,985
Break Even percentage	22.53%
Payback (Years)	6.69

11 KEY SUCCESS FACTORS

The commercial viability of the venture totally depends upon the regular and consistent supply of intestines. Although, intestines are available in abundance but regular and consistent supply of high quality intestines is of vital importance. The cost of purchase of intestines/pre-processed hanks involves heavy cash outlays, which would have to be met from working capital. Working capital requirement is controlled from suppliers' credit of 30 days. The second most important aspect is the need for strong linkages with suppliers of pre-processed hanks and strong marketing for exports.

The processing of intestinal hanks in Pakistan is a labour intensive job. Though modern and high-tech machines are available in the international but readily available low cost labour in Pakistan provides a much viable option than to engage machines also because no such obligations or restrictions are enforced by foreign buyers for the mandatory use of machines than hand labour.

12 KEY ASSUMPTIONS

Table 12-1: Machinery Assumptions

Capacity of processing plant (Hanks per Shift)	400 to 500
Waste production (%)	20
Total production per day (Hanks)	3200 - 4000

Table 12-2: Operating Assumptions

Annual Production (Including waste) Hanks	150,000
Hours operational per day	8
Days operational per month	25
Day operational per Annum	300

Table 12-3: Economy Related Assumptions

Electricity growth rate	10%
Wage growth rate	5%

Table 12-4: Cash Flow Assumptions

Accounts receivable cycle (in days)	75
Accounts payable cycle (in days)	30
Raw material inventory (in days)	15

Table: 12-5: Expense Assumptions

Administrative & Factory overhead (% of Sales)	1%
Factory Overhead growth rate	1%
Office expenses (stationery, entertainment etc)(% of Sales)	0.25%
Machine maintenance (% of Sales)	1%
Machine maintenance growth rate	1%
Petrol Oil & Lubrication(% of Sales)	1%
Raw material price growth rate	2%
Insurance rate (% of net fixed assets)	3%
Storage Cost (per month)	Rs 5,000
Cold Storage Rent (per month)	Rs 10,000
Cold storage Rent growth rate	5%
Storage Cost growth rate	1%

Table 12-6: Revenue Assumptions

Production capacity average increase over the seasons	10%
Sale price of processed hanks - avg. export price A-Quality (Rs/hank)	284
Sale price of processed hanks - avg. export price B-Quality (Rs/hank)	167
Sale price of processed hanks - avg. export price C-Quality (Rs/hank)	100
Sale price of waste hanks - avg. price A-Quality (Rs/hank)	85
Sale price of waste hanks - avg. price B-Quality (Rs/hank)	70
Sale price of waste hanks - avg. price C-Quality (Rs/hank)	60
Sales price growth rate	4%
Waste price growth rate	3%
Maximum capacity utilization	100%

Table: 12-7: Financial Assumptions

Project life (years)	10
Debt	50%
Equity	50%
Interest rate on long-term debt	18%
Interest rate on short term debt	16%
Debt tenure (years)	5
Debt payments per year	1
Discount rate (weighted Avg. cost of capital for NPV)	23%
Minimum Cash Balance Required	Rs.300,000

13 FINANCIAL ANALYSIS

13.1 Projected Income Statement

PROJECTED INCOME STATEMENT											in RS
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Sales	25,340,293	27,081,901	28,142,311	29,756,413	30,922,247	32,823,814	34,045,561	35,380,499	36,768,029	38,210,228	
Cost of goods sold											
Raw Material	19,564,500	20,998,653	21,846,999	23,008,343	23,937,880	25,357,522	26,381,966	27,447,797	28,556,688	29,710,378	
Payroll (Production Staff)	1,284,000	1,348,200	1,415,610	1,486,391	1,560,710	1,638,746	1,720,683	1,806,717	1,897,053	1,991,905	
Machine Maintenance	253,403	273,527	284,237	300,540	312,315	331,521	343,860	357,343	371,357	385,923	
Direct Electricity	26,917	29,609	32,570	35,827	39,410	43,351	47,686	52,454	57,700	63,470	
POL	253,403	270,819	281,423	297,564	309,222	328,238	340,456	353,805	367,680	382,102	
Stationery	63,351	67,705	70,356	74,391	77,306	82,060	85,114	88,451	91,920	95,526	
Total	21,445,574	22,988,513	23,931,195	25,203,055	26,236,842	27,781,436	28,919,764	30,106,568	31,342,398	32,629,305	
Gross Profit	3,894,719	4,093,388	4,211,116	4,553,358	4,685,405	5,042,378	5,125,797	5,273,932	5,425,631	5,580,924	
Operating Expenses											
Payroll (Admin)	288,000	302,400	317,520	333,396	350,066	367,569	385,948	405,245	425,507	446,783	
Payroll (Marketing and Sales)	120,000	126,000	132,300	138,915	145,861	153,154	160,811	168,852	177,295	186,159	
Fixed electricity	135,381	148,919	163,811	180,192	198,211	218,032	239,835	263,819	290,201	319,221	
Insurance Expense	70,172	66,633	63,093	59,553	56,013	52,474	48,934	45,394	41,854	38,315	
Administrative Overheads	139,372	150,305	157,611	168,169	176,350	188,903	197,723	207,354	217,457	228,055	
Amortization (Pre-operational Expenses)	13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145	
Rent of Cold Storage Facility	120,000	126,000	132,300	138,915	145,861	153,154	160,811	168,852	177,295	186,159	
Storage Cost (Loading/ Unloading)	60,000	60,600	61,206	61,818	62,436	63,061	63,691	64,328	64,971	65,621	
Depreciation	108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915	
Total	1,054,984	1,102,916	1,149,900	1,203,017	1,256,858	1,318,405	1,379,814	1,445,903	1,516,639	1,592,372	
Operating Profit	2,839,735	2,990,473	3,061,216	3,350,340	3,428,547	3,723,973	3,745,984	3,828,028	3,908,991	3,988,551	
Non-operating Expenses											
Financial Charges on Long-term Loan	111,798	96,171	77,731	55,972	30,297	-	-	-	-	-	
Financial Charges on Running Finance	167,744	380,064	93,726	-	-	-	-	-	-	-	
Total	279,541	476,235	171,457	55,972	30,297	-	-	-	-	-	
Profit Before Tax	2,560,194	2,514,237	2,889,759	3,294,368	3,398,250	3,723,973	3,745,984	3,828,028	3,908,991	3,988,551	
Tax	771,068	754,983	886,416	1,028,029	1,064,387	1,178,390	1,186,094	1,214,810	1,243,147	1,270,993	
Profit After Tax	1,789,126	1,759,254	2,003,344	2,266,339	2,333,862	2,545,582	2,559,889	2,613,218	2,665,844	2,717,558	
Retained Earnings beginning of year	-	1,789,126	3,548,380	5,551,724	7,818,063	10,151,925	12,697,507	15,257,397	17,870,615	20,536,460	
Retained Earnings end of year	1,789,126	3,548,380	5,551,724	7,818,063	10,151,925	12,697,507	15,257,397	17,870,615	20,536,460	23,254,018	

13.2 Projected Cash Flow Statement

PROJECTED CASH FLOW STATEMENT											in Rs
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating activities											
Net profit		1,789,126	1,759,254	2,003,344	2,266,339	2,333,862	2,545,582	2,559,889	2,613,218	2,665,844	2,717,558
Amortization (Pre-operational Expenses)		13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145	13,145
Depreciation		108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915	108,915
Accounts receivable		(6,335,073)	(435,402)	(265,103)	(403,525)	(291,459)	(475,392)	(305,437)	(333,735)	(346,882)	(360,550)
Equipment Spare Parts Inventory		0	0	0	0	0	0	0	0	0	0
Up-Front Insurance payment		(70,172)	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540	3,540
Stocks-RM		(978,225)	0	(71,708)	(42,417)	(58,067)	(46,477)	(70,982)	(51,222)	(53,292)	(57,685)
Accounts payable		0	2,054,273	150,586	89,076	121,941	97,601	149,062	107,567	111,912	116,434
Cash provided by operations		(1,048,397)	(2,366,076)	1,528,330	1,910,499	2,052,287	2,219,128	2,273,870	2,436,396	2,463,704	2,505,550
Financing activities											
Long term debt principal repayment			(86,816)	(102,443)	(120,882)	(142,641)	(168,317)	0	0	0	0
Addition to long term debt		621,099									
Running Finance Repayment			(1,048,397)	(3,801,289)	(2,375,402)	(585,785)	0	0	0	0	0
Issuance of share		1,669,497									
Cash provided by/ (used for) financing activities		2,290,596	(1,135,213)	(3,903,732)	(2,496,284)	(728,426)	(168,317)	0	0	0	0
Total		1,242,199	(3,501,289)	(2,375,402)	(585,785)	1,323,861	2,050,811	2,273,870	2,436,396	2,463,704	2,505,550
Investing activities											
Capital expenditure		(2,290,596)									
Cash provided/used by investing activities		(2,290,596)									
Net Cash		(1,048,397)	(3,501,289)	(2,375,402)	(585,785)	1,323,861	2,050,811	2,273,870	2,436,396	2,463,704	2,505,550
Cash balance brought forward		0	0	300,000	300,000	300,000	1,623,861	3,674,672	5,948,542	8,384,938	10,848,642
Cash Balance		(1,048,397)	(3,501,289)	(2,075,402)	(285,785)	1,623,861	3,674,672	5,948,542	8,384,938	10,848,642	13,354,193
Running Finance		1,048,397	3,801,289	2,375,402	585,785	0	0	0	0	0	0
Cash carried forward		0	300000	300000	300000	1623861	3674672	5948542	8384938	10848642	13354193
											15900253

13.3 Projected Balance Sheet

PROJECTED BALANCE SHEET											in Rs	
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Current Assets												
Cash	0	300,000	300,000	300,000	1,623,861	3,674,672	5,948,542	8,384,938	10,848,642	13,354,193	15,900,253	
Equipment Spare Parts Inventory	0	0	0	0	0	0	0	0	0	0	0	
Up-Front Insurnace payment	70,172	66,633	63,093	59,553	56,013	52,474	48,934	45,394	41,854	38,315	34,775	
Stocks and Inventory	978,225	978,225	1,049,933	1,092,350	1,150,417	1,196,894	1,267,876	1,319,098	1,372,390	1,427,834	1,485,519	
Receivable	0	6,335,073	6,770,475	7,035,578	7,439,103	7,730,562	8,205,954	8,511,390	8,845,125	9,192,007	9,552,557	
Total	1,048,397	7,679,931	8,183,501	8,487,481	10,269,395	12,654,601	15,471,306	18,260,821	21,108,011	24,012,349	26,973,104	
Gross Fixed Assets												
Less: Accumulated depreciation	0	108,915	217,830	326,745	435,660	544,575	653,490	762,405	871,320	980,235	1,089,150	
Net Fixed Assets	2,159,150	2,050,235	1,941,320	1,832,405	1,723,490	1,614,575	1,505,660	1,396,745	1,287,830	1,178,915	1,070,000	
Intangible Assets												
Pre-operational Expenses	131,446	118,301	105,157	92,012	78,868	65,723	52,578	39,434	26,289	13,145	(0)	
Total	131,446	118,301	105,157	92,012	78,868	65,723	52,578	39,434	26,289	13,145	(0)	
Total Assets	3,338,993	9,848,467	10,229,978	10,411,898	12,071,752	14,334,899	17,029,544	19,697,000	22,422,130	25,204,408	28,043,104	
Current Liabilities												
Running Finance	1,048,397	3,801,289	2,375,402	585,785	0	0	0	0	0	0	0	
Accounts payable	0	2,054,273	2,204,859	2,293,935	2,415,876	2,513,477	2,662,540	2,770,106	2,882,019	2,998,452	3,119,590	
Total	1,048,397	5,855,561	4,580,260	2,879,720	2,415,876	2,513,477	2,662,540	2,770,106	2,882,019	2,998,452	3,119,590	
Long-term liabilities												
Long-term Loan	621,099	534,283	431,841	310,958	168,317	(0)	(0)	(0)	(0)	(0)	(0)	
Total	621,099	534,283	431,841	310,958	168,317	(0)	(0)	(0)	(0)	(0)	(0)	
Equity												
Paid-up Capital	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	1,669,497	
Retained Earnings	0	1,789,126	3,548,380	5,551,724	7,818,063	10,151,925	12,697,507	15,257,397	17,870,615	20,536,460	23,254,018	
Total	1,669,497	3,458,622	5,217,877	7,221,220	9,487,559	11,821,422	14,367,004	16,926,893	19,540,112	22,205,956	24,923,515	
Total Liabilities And Equity	3,338,993	9,848,467	10,229,978	10,411,898	12,071,752	14,334,899	17,029,544	19,697,000	22,422,130	25,204,408	28,043,104	