

Pre-Feasibility Study

Mango Pulp

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INTRODUCTION:

This pre-feasibility study has been conducted by PAMCO to investigate the possibility of establishing a commercially viable processing unit by the private sector. The aim of this pre-feasibility report is to establish the main parameters for conducting a detailed financial feasibility study with the collaboration of the private sector. PAMCO is soliciting expressions of interest from the private sector for investment in this project. This report provides a basis for the private sector to make serious investigation into setting up the project.

Potential investors are invited by PAMCO to open a dialogue with PAMCO for the preparation of this project feasibility on cost sharing basis. PAMCO is prepared to assist the private sector in various ways, ranging from financial to non-financial support, in line with its Business Engagement Policy.

We welcome inquiries from the private sector. PAMCO is ready to provide any assistance which will enable the private sector to make profitable investments in agribusiness.

BACKGROUND:

Pakistan produces several high value agricultural products with great marketing potential. However, due to their perishability and seasonal production, this potential remains unutilized. Punjab AgriMarketing Company, setup by the Government of Punjab under the Public-Private partnership scheme is developing projects which are designed to remove supply side constraints in the marketing of these commodities while adding value to the basic raw material.

Mango as a fruit has great international acceptability. However, marketing, distribution, and consumption of raw mangoes have several difficulties. Mango pulp/puree/concentrate provides a way out with extremely positive outcome both commercially and financially. Indeed, mango consumption by the food processing industry revolves around the availability of user friendly intermediate products like mango pulp/puree/concentrate.

This pre-feasibility study is designed to capture the five main criteria for successful marketing.

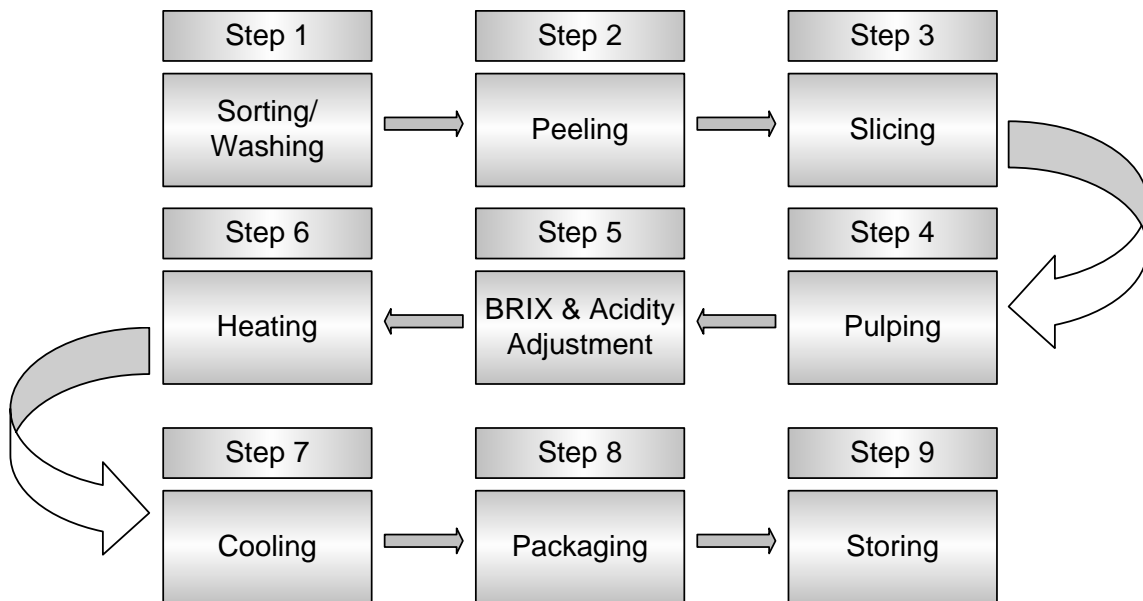
- Price and availability of raw material
- Cost of conversion
- Price competitiveness
- Sources of demand
- Quality and taste

PRODUCTS:

- Major products of processed mangoes include mango pulp/puree (approximately 13-18 Brix) and mango concentrates (roughly 28-32 Brix). The term Brix is used to measure the sugar content of mango pulp.
- These products are used to produce juices, nectars, jams and multi-fruit beverages.
- They are also used as flavoring and ingredients for processed food products such as ice cream, yoghurt and bakery products.

PROCESS:

- Production process involves washing, peeling, slicing, pulp extraction, brix and acidity adjustment, heating, cooling, packaging, and storing.



- It usually takes 2kg fresh mangoes to produce one kilo pulp/puree and 4kg fresh mangoes to produce one kilo concentrate depending upon the raw material quality.
- The average percentage yield of mango pulp from desi mangoes is 45% and 60% recovery ratio from grafted mangoes. There may be slight variations with respect to different varieties of mangoes.
- Some companies mix desi mango pulp with grafted mango pulp (mainly Chaunsa and Sindhri) to produce blended mango pulp based on the client's requirements.

MARKETS:

Export Markets:

- India is the biggest exporter of mango pulp/puree, followed by Mexico and Colombia.
- India controls 63% of the world market and 70% of its exports goes to Middle East, 12 % goes to Europe and North America takes 5%.
- Mexico and Colombia mainly serve the North America market and these countries enjoy comparative advantage of being close to their main market.
- Egypt accounts for around 5.5% of the world supply and it primarily serves the North African and Middle East markets.
- Thailand, Philippines and India serve the South-East Asia market

Source: FOODNEWS

GLOBAL SUPPLY OF MANGO PUREE/CONCENTRATE					
(tonnes)	2003	Net	% of	2008*	Export
	production	exports	world	exports	growth %
India	117,990	97,990	62.68%	137,200	8
Mexico	26,000	15,765	10.08%	19,700	5
Colombia	22,000	11,800	7.55%	14,750	5
Egypt	16,303	8,459	5.41%	8,450	0
Thailand	13,125	7,380	4.72%	7,380	0
Peru	5,700	5,130	3.28%	5,130	0
Philippines	20,000	4,000	2.56%	4,000	0
Pakistan	15,540	3,000	1.92%	3,000	0
Ecuador	3,000	2,320	1.48%	2,900	5
Brazil	8,813	500	0.32%	625	5
Total	248,471	156,344		203,135	

Source: Pranav International *projected

Import Markets:

- The biggest markets for these products are Middle East, South-East Asia and North America.
- Middle East is price conscious market and it chiefly buys Totapuri pulp/puree from India.
- Large numbers of expatriates from South Asia have settled in North America and they are the main consumers of mango products.
- Rotterdam in Holland has emerged as a trading hub for mango pulp/puree in Europe and from where mango pulp/puree is being supplied to many other parts of Europe.

GLOBAL DEMAND FOR MANGO PUREE/CONCENTRATE				
(tonnes)	2003 demand	% of world	Growthrate %	2008* demand
Middle East	69,364	25.1	0	69,400
South-east Asia	56,825	20.56	12	84,520
North America	39,301	14.22	8	55,000
South Asia	38,004	13.75	15	66,500
Africa	30,913	11.19	12	49,500
South America	21,724	7.86	10	32,600
EU	12,975	4.7	5	16,200
Oceania	2,353	0.85	5	3,000
Far East	2,157	0.78	5	2,700
Europe (non-EU)	1,394	0.5	5	1,800
Central America	1,234	0.45	10	1,800
Total	276,310	100	8**	383,020

Source: Pranav International *projected **average

INTERNATIONAL MARKET PRICE:

- Prices for mango pulp are largely determined by supply of raw mangoes and these prices tend to show a cyclical pattern because of unpredictable weather conditions.
- In developing countries like India and Pakistan, it is very difficult to estimate the crop size even a few months before harvest so the price of mango pulp fluctuates from month to month.
- Indian's Alphonso puree is sold at the highest price in the international market but its export is low as compare to Totapuri puree which accounts for more than 70% of its total export.

2004						
Country	Mango Type	Product	Brix	Amount	Freight	Port
Peru	Chato de Ica	frozen puree	15-17 Brix	US\$1050/mt	fca	Europe
Peru	Chato de Ica	frozen puree	15-17 Brix	US\$1000/mt	fot	Rott
India	Alfonso	aseptic puree	16 brix	US\$1550-1580/mt	fot	Rott (Duty Unpaid)
India	Kesar	aseptic puree	16 brix	US\$1250-1275/mt	fot	Rott (Duty Unpaid)
India	Totapuri	aseptic puree	14 brix	US\$850-75/mt	fot	Rott (Duty Unpaid)
India	Totapuri	aseptic conc	28 brix	US\$950-975	fot	Rott (Duty Unpaid)
Brazil	Palmer	aseptic puree	16 brix	US\$850/mt	fot	Rott (Duty Unpaid)
Brazil	Tommy Atkins	aseptic/frozen conc	28-30 brix	US\$800	FOB	
Brazil	Palmer	aseptic/frozen conc	28-30 brix	US\$800/mt	FOB	
Pakistan	Chaunsa	ss puree	22-25 brix	US\$1180/mt 5kg drums	fca	Holland
Pakistan	Daisy	ss puree	15-18 brix	US\$800/mt 5kg drums	fca	Holland
Mexico	Tommy Atkins	frozen puree		US\$1000/mt DDP	fot	Main USA port

Source: http://www.intracen.org/mds/sectors/fruitveg/fj_rep04.pdf (ITC)

2005			
Date	Mango Type	Brix	Price
Feb-05	Alphonso	16-18	US\$1400-1425/ tonne
Feb-05	Totapuri	14	US\$635-650/tonne
Feb-05	Totapuri	28	US\$900-925/tonne
Jul-05	Alphonso	16-18	US\$1270-1300/tonne
Jul-05	Totapuri	14	US\$675-700/tonne
Jul-05	Totapuri	28	US\$980-1050/tonne
Oct-05	Totapuri	14	US\$800-825/tonne
Oct-05	Totapuri	28	US\$1150-1175/tonne

Source: FOODNEWS

COMPETITION:

India:

- India is a major producer of mango pulp/puree and concentrate and it accounts for 63% (97,990 tonnes) of global export of mango pulp in 2003. The main products are Totapuri and Alphonso mango pulp/puree and concentrates.
- Totapuri mango pulp/puree is made from Totapuri mango and price of fruit ranges from INR 2.80/kg to INR 6.00/kg depending upon the crop size. The average fruit price is INR 4.00/kg. In recent years, raw mango prices have gone up because of poor crop due to bad weather.
- Alphonso mango pulp/puree is made from Alphonso mango and price of fruit ranges from INR 14.00/kg to INR 17.00/kg depending upon the crop size.
- Middle East is the main Indian market and it mostly buys Totapuri pulp/puree from India.

Source: FOODNEWS

- The following table shows the mango pulp export from India to different countries. Saudi Arabia is the biggest importer of Indian's mango pulp, followed by Yemen and United Arab Emirate.

QTY :IN MTS. VALUE : IN RS. LAKHS (INDIAN RUPEES)						
Country	2002-03		2003-04		2004-05	
	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
SAUDI ARABIA	32,266.85	9,248.43	31,521.25	7,391.32	29,561.86	8,990.36
YEMEN ARAB REP	13,809.80	2,585.63	9,615.50	1,797.40	14,529.56	3,148.55
U.A.E.	8,594.05	2,772.78	6,912.79	1,733.04	8,227.72	2,516.11
NETHERLANDS	5,807.18	2,640.43	7,228.17	2,803.06	7,188.97	3,474.06
KUWAIT	5,228.28	1,604.11	6,157.82	1,655.26	3,850.45	1,390.75
SUDAN	2,190.18	532.29	2,176.20	511.21	3,025.40	1,001.52
U.K.	2,818.25	1,160.32	2,717.87	935.63	2,843.31	1,250.84
U.S.A.	3,028.38	1,348.58	2,866.69	1,151.02	2,348.87	1,035.51
LEBANON	2,881.30	762.18	2,308.02	467.23	2,243.37	577.11
OMAN	2,301.22	443.92	1,856.80	355.77	1,886.10	541.35
JAPAN	973.80	737.45	848.97	589.39	1,724.34	1,118.57
GERMANY	1,153.37	461.93	551.60	194.27	1,273.00	583.12
FRANCE	1,827.43	970.82	753.60	311.94	1,244.53	676.33
CANADA	1,148.10	565.59	1,113.54	412.12	1,236.34	458.20
OTHERS	12,079.11	3,866.66	12,886.02	3,889.91	9,804.78	3,323.87
TOTAL	96,107.30	29,701.12	89,514.84	24,198.57	90,988.60	30,086.25

Source: DGCIS, Annual Volume (India)

RAW MATERIAL:

World Production:

- World mango production reached 29 million tons in 2004.
- The biggest producers are India, China, Thailand, Mexico and Pakistan.

Mango production						
1,000 short tons						
	2000	2001	2002	2003	2004	% of World (2004)
India	11,574	11,089	11,729	11,883	11,905	40.64%
China	3,539	3,608	3,873	3,936	3,948	13.48%
Thailand	1,801	1,874	1,874	1,874	1,874	6.40%
Mexico	1,719	1,739	1,679	1,657	1,657	5.66%
Pakistan	1,091	1,143	1,141	1,164	1,200	4.10%
Others	7,554	8,072	8,871	9,304	8,708	29.73%
World	27,278	27,525	29,167	29,818	29,292	

Source: <http://usda.mannlib.cornell.edu/reports/erssor/specialty/fts-bb/2005/fts2005.pdf>

Pakistan:

- Pakistan stands fifth among mango growing countries and it produced 1.2 million tons mangoes in 2004.
- Mango is mainly grown in the province of Punjab and Sindh and the major varieties are Langra, Dusehri, Chaunsa, Anwar Ratol and Sindhri.
- Pakistan exported 23 million US dollars worth of fresh mangoes in 2004, mainly to Middle East and European countries.
- The following two tables show monthly average wholesale price of one kilo mango from 2001 to 2004.

	Desi Mango			Grafted Mango		
	Jun	Jul	Aug	Jun	Jul	Aug
2001	10.90	11.56	14.23	19.50	19.37	23.61
2002	11.84	11.83	14.17	20.10	21.95	26.50
2003	11.82	10.19	13.90	20.77	19.52	20.65
2004	11.80	13.10	16.89	22.08	20.86	26.50

Source: <http://punjabqmarket.info/>

- The direct purchase of mangoes from farmers costs less. According to our survey, a local manufacture paid Rs.8/kg for desi mangoes in 2005.

LOCAL MARKET:

- Mango pulp production in Pakistan is estimated to be 12,000 to 15,000 tonnes per year. Many companies in Pakistan are producing mango pulp and some of them are:
 - Shezan International
 - Indus Juices
 - Iftekhar Ahmed & Co.
 - Fresh Juices Limited
 - Golden Juices
 - Shakarganj Food Products
 - CitroPak

- Approximately 90% of the production is consumed locally and the demand of mango pulp in local market is expected to grow from 5% to 10% annually.

- Mango pulp is used to produce juices, nectars, jams and multi-fruit beverages. It is also used as flavoring and ingredients for processed food products such as ice cream and bakery products. Some of the potential local buyers are:
 - Nestle Milkpak Ltd.
 - Benz Industries Limited
 - Mitchell's Fruit Farms Limited
 - Ahmed Foods
 - Shangrila Foods
 - Shezan International
 - National Foods Limited

- In 2001, 2002, 2003 and 2004, mango pulp production and utilization in local market decreased. But in 2005, local industry witnessed 25% growth rate and it is expected to grow from 5% to 10% annually. The demand of mango pulp products in Pakistan is rising due to increasing urbanization, growing per capita income, and increasing two-income families.

- Approximately 10% of mango pulp is exported in the form of mango juice. Currently, very limited amount of mango pulp is exported from Pakistan.

PLANT & EQUIPMENTS:

European Technology:

Machinery & Equipments:

Description	Price (EURO)	Price (Rs)
Washing, sorting, extraction & treatment line	230,000	16,260,000
Sterilization & aseptic filling line	210,000	15,120,000
Cleaning-in-place system	60,000	4,320,000
Spare parts & assistance to start up	70,000	5,040,000
Total Equipments Cost	570,000	41,040,000

Note: 1 EURO = 72 Rs

Capacity:

Line input	2.5 t/h
Line output	Depending on type of raw material

NOTE: The project cost will vary depending upon the selection of machinery and its mix between locally produced plant, European plant and other sources like China.

CONCLUSION:

- In 2005, the approximate price of one kilo mango pulp in the international market was Rs.39 and Rs.84 made from Totapuri and Alphonso mangoes respectively. To produce one kilo mango pulp from local mangoes, the raw material cost will range from Rs.17.6 (8*2.22) for desi mango pulp to Rs.33.4 (20*1.67) for grafted mango pulp. The raw material cost for blended mango pulp will vary between these two numbers depending upon the composition of a final product. This situation presents a good opportunity for local producers to make inroad into Indian dominated export market.
- In recent years, the Indian's raw mango prices have gone up because of poor crop due to bad weather. As a result, the Indian's export of mango pulp has decreased from 97,000 tonnes in 2003 to 90,000 tonnes in 2005.
- According to Pranav International, in the next three years the world demand for mango pulp is projected to grow by 8%. Last year, local industry also witnessed 25% growth rate and it is expected to grow from 5% to 10% annually. Increasing urbanization, growing per capita income, and increasing two-income families are fueling this demand.
- The biggest mango pulp market is Middle East and Pakistan enjoys a comparative advantage against its main competitor of being close to this market.
- Indian's mango pulp of Totapuri (14 Brix) and Alphonso (16 Brix) mangoes have lower sugar contents than Pakistani mango pulp of desi (15-18 Brix) Chaunsa (22-25 Brix).Pakistani mangoes have a natural advantage against Indian's pulp due to higher sugar contents and can fetch higher prices.
- According to our survey, Pakistani Chaunsa mango pulp receives good marks from foreign buyers because of its superior taste but they are not willing to package and market its products due to its supply and quality concerns as it is comparatively a new product being offered.
- Marketing is the main focus Pakistani business should have for successful penetration in the international market. Successful, profitable and self-sustaining fruit-processing industry cannot be based on the occasional marketing campaign. It requires aggressive and steady marketing efforts to establish a presence in the international commodity markets. New suppliers who want to break into the international market have to introduce products that are of good quality, well-packaged and competitively priced.