



State of the Sector Report on Philippine Processed Mango 2004

November 2004
Pearl2 Project

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Pearl2 is a project funded by the Canadian International Development Agency, and jointly managed by the British Columbia Innovation Council and the British Columbia Institute of Technology.

Pearl2 is a five-year initiative (2002-2007) designed to support the development of small and medium enterprises throughout the Philippines. It aims to help create meaningful jobs for both men and women through the strengthening of Business Support Organizations (BSOs) and Investment Promotion Agencies (IPAs).

This report uses the definition provided by the Department of Trade and Industry (DTI) for micro, small and medium enterprises. Micro firms are companies with assets totaling below Php 3 million. Small enterprises are those with total assets of from Php 3 million to Php 15 million, while medium enterprises have assets ranging from Php 15 million to Php 100 million.

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Acronyms Used

BAS	Bureau of Agricultural Statistics
BETP	Bureau of Export Trade Promotion
BPI	Bureau of Plant Industry
BSO	Business Support Organization
DA	Department of Agriculture
DA-AMAS	Department of Agriculture Agribusiness and Marketing Assistance Service
DAR	Department of Agrarian Reform
DBP	Development Bank of the Philippines
DTI	Department of Trade and Industry
DOST	Department of Science and Technology
FDC	Food Development Center
GAP	Good Agricultural Practices
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Point Control
LBP	Land Bank of the Philippines
NMRC	National Mango Research Center
PHILFOODEX	Philippine Food Processors and Exporters Organization, Inc.

1 Background

The Pearl2 Project, together with the Department of Trade and Industry (DTI) has identified processed mango as one of the areas earmarked for program assistance under its Sectoral Enhancement component. This study was undertaken to determine the industry's needs and concerns and provide indications for possible areas of intervention to assist the sector. The study also provides data that can be used for assessing the impact of Pearl2's assistance.

Scope

The report covers the mango processors located in Metro Davao, Cebu, and Metro Manila. These are the areas where most active mango processors are located. The report also focuses on small and medium sized mango processors.

Methodology

A consultant was engaged by the Project to gather information and draft this report. Previous reports and studies, by both government and private entities, were reviewed. Primary data was also gathered. An existing survey form was revised and used as a tool to interview mango processors from three major areas, Metro Manila, Metro Cebu and Metro Davao.

Most of the interviewees are members of the Philippine Food Processors and Exporters Organization, Inc. (Philfoodex), which is the lead business support organization (BSO) for the industry under the Pearl2 Project.

For an in-depth analysis of the industry, Pearl2 adapted the value chain model developed by Dr. Michael Porter of the Harvard Business School. (Please see Annex 1 for a background on the Value Chain Analysis.) The value-chain framework allows for the determination of activities, issues, concerns and possible solutions at each step of the business, from raw-material sourcing to production (processing), to marketing and after sales service.

The findings in the study were organized according to the industry's value chain components including issues and concerns for each part of the value chain. Solutions and specific areas of intervention, based on the processors' views and recommendations, were also formulated.

Limitations

The study covers 13 mango processors. Of this number, 11 are members of Philfoodex. This represents about 69% of Philfoodex members who are into mango processing. The 13 total respondents account for 15% of the estimated total 85 mango processors nationwide (see Annex 2 for a list of the major mango processors).

The value chain model used in this study consolidates findings from the different firms. It did not cover any financial or cost information from the companies since these are difficult to obtain and reconcile for an industry-level evaluation. The analysis used is limited to the primary and support activities of the producers and does not consider the value chain of third parties such as suppliers or buyers.

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2 Executive Summary

The Processed Mango industry supplies various products including dried mango, puree, juice, nectar, slices and halves. Processors are continually experimenting and introducing new products from mango such as mango-rind (mango and tamarind), mango leather (dried puree, with the solids discarded) and mango rolls (derivative of mango leather). Most firms in the sector are small- and medium-sized, with a few large companies engaged in the export of fresh mango.

It is difficult to establish the exact number of processors because of the ease by which processors, particularly micro and small enterprises, come and go. Estimates of the number of mango processors in the country are based on Philfoodex data, DTI listings and company listings in recent trade events. There are less than a hundred mango processors all over the country, directly employing less than 5,000 regular workers. This figure triples, however, during the peak mango season when part time labor are employed.

Processed mangoes fetch a high price, and suppliers cater mostly to the high- and mid-market segments. These are normally sold in groceries, supermarkets and specialty stores including “pasalubong” centers.

The world market for mango (fresh and processed) in 2002 was estimated at US\$531 million. The biggest market was the United States, followed by Hong Kong and the Netherlands. Mexico was the world's top exporter, supplying a third of the world's total exports, followed by Brazil, the Netherlands, Peru and the Philippines. Mexico has the edge in being nearest to the major market, but the Philippines may yet become a major player because of the quality of its mangoes, widely acknowledged to be unsurpassed in taste. The lower production costs in Thailand and India, however, pose a serious threat to such a scenario.

Philippine exports of processed mangoes amounted to US\$29.7 million in 2003 and grew by a yearly average of 58.5% from 1999 to 2003. Dried mango and mango puree are the major products exported. The United States was the largest market for dried mangoes, accounting for 40% of total exports. Other major export destinations were Hong Kong, Germany and Singapore. For mango puree and juice, Korea was the top market, followed by Japan and the United States.

A major issue of the industry is the lack of good-quality mangoes at reasonable prices. Processors can be aggressive in their campaign to promote Philippine processed mango, but they are hampered by the inability to produce the necessary volumes if prices of fresh mangoes remain high and quality is poor. A program that includes a campaign for production of good-quality, low-priced mangoes is crucial, as are the development of a database of reliable suppliers and the promotion of contract arrangements with growers.

Processors also have difficulty screening out mangoes with internal defects, and this has adverse effects on their recoveries. There is also a need to benchmark efficiencies and train factory workers toward meeting export standards in order to improve the sector's competitiveness. Other concerns are the lack of funds for equipment and operating expenses, the inability to implement good manufacturing practices (GMPs) and secure HACCP accreditation, mediocre packaging and sometimes incomplete labeling, and the need to identify and tap into more export markets. The sector appears to have fewer concerns in terms of after sales services in the value chain.

The participation of a number of government agencies, as well as private sector – specifically the mango growers – is imperative to improving not only the processing sector but the mango industry as a whole. The industry has strong growth potential but needs to address various concerns especially in the supply of quality fruits.

3 Overview

Product Coverage

Processed mango include intermediate products processed from fresh mangoes. These are dried mangoes, puree, juice, nectar, slices and halves. Dried and puree are the main products. (See Annex 3 for the product classification of processed mango.)

Dried mangoes are prepared from mango slices that are dried to a moisture content of 13% to 16% to give these a soft and pliable texture. Rejects from the sliced form are processed into chips. Dried mango is eaten as a snack food or mixed as ingredient in bakery and confectionary products. Puree is a fine, uniformly textured fluid extracted from the pulp. Mango nectar and juice both come from puree with water and sugar for a ready-to-drink preparation. They are also used as flavoring and ingredients for processed food products such as ice cream and bakery products.

Industry Background

Since the late '70s, processed mango has been produced commercially. Most processors started small and used home-based technologies. They gradually improved quality and packaging, then diversified to other products to suit the needs of their buyers. Except for micro processors, small to large processors maintain their own R&D sections, which double as their quality control units.

Mango is produced mainly for the fresh-fruit market, both export and local consumption. Producers target mainly the fresh-fruit market because this commands better prices than raising the fruit for processing. Food processing in commercial scale is borne out of the need to find higher value for excess production — produce that would have otherwise ended up as waste or would have pulled down prices.

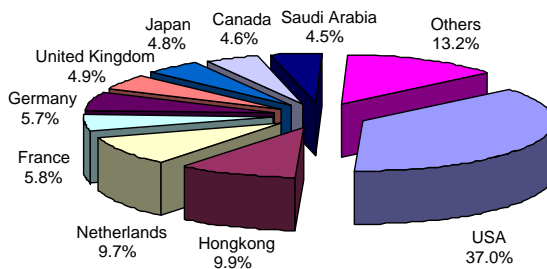
Most processors agree that the major limitation to expansion is the supply of reasonably priced fresh mangoes. The expansion of the processing industry will therefore rely on the availability of affordable fresh mangoes largely dictated by the demand of the fresh fruit export and local markets.

Processing activities are pegged to the mango fruiting season. Processing normally starts in February. This peaks from March to May, then declines beginning June. Some processors in Mindanao continue to process off-season mangoes until July and even up to the last quarter of the year. They have to reckon, however, with the smaller supply of fresh mangoes and the higher prices. Others process fruits such as pineapple, jackfruit, calamansi and soursop during the rest of the year.

World Market for Mango Products

World imports for fresh and dried mango products was estimated at US\$531 million in 2002.* The United States was the largest market, accounting for some US\$196 million, or more than a third of the world total. As illustrated in Chart 1 below, other major buyers were Hong Kong and the Netherlands, importing roughly 10% each of the world total, followed by France, Germany, UK, Japan, Canada and Saudi Arabia.

Chart 1
World Imports of Guavas, Mangoes and Mangosteens
Fresh or Dried, By Country, 2002

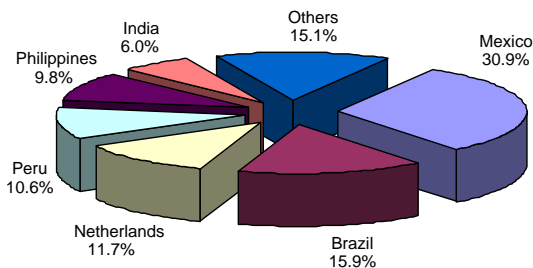


Source of data: Trade Analysis System-International Trade Centre (ITC/UNSD)

Mexico is the world’s largest supplier of mangoes. In 2002, it accounted for a third of the total global trade, followed by Brazil with a 16% share. These countries have the advantage of being nearest to the United States, which is the largest market. The Philippines, as Chart 2 on the next page shows, ranks among the top five exporting countries, supplying close to 10%, following the Netherlands and Peru.

* Available data includes guavas and mangosteens.

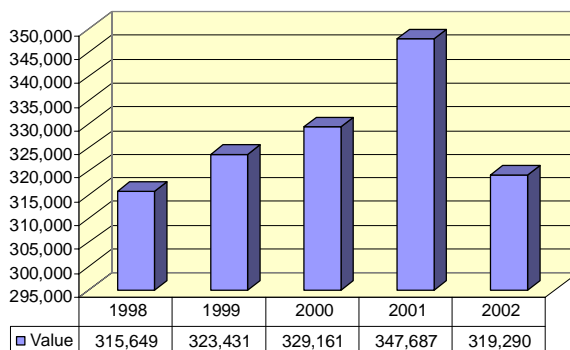
Chart 2
World Exports of Guavas, Mangoes and Mangosteens
Fresh or Dried, By Country, 2002



Source of data: Trade Analysis System-International Trade Centre (ITC/UNSD)

From 1998 to 2000, the growth in the international trade of mangoes, guavas and mangosteens was insignificant at an average of 0.42 % annually. The market performed better the following year, growing by 6%, as Chart 3 below illustrates. However, trade contracted in 2002 by -8%.

Chart 3
World Exports of Guavas, Mangoes and Mangosteens
Fresh or Dried, 1998-2002 (in US\$ '000)

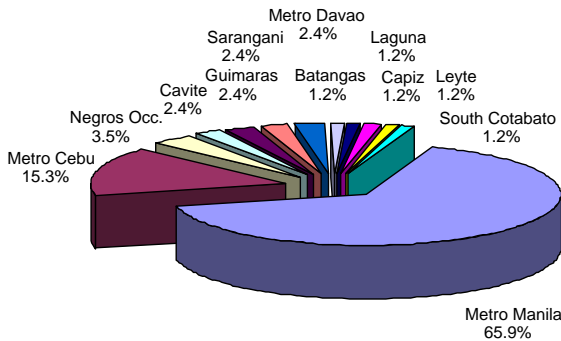


Source of data: Trade Analysis System- International Trade Centre. ITC/UNSD

Industry Coverage

Based on actual count from the listings of the DTI and industry associations, there are about 85 mango-processing firms nationwide. Majority (56 processors, or 66%) produce puree and juice, and are concentrated in Metro Manila. Thirteen firms, mostly processors of dried mango, are in Cebu. Small processors venturing in other mango-based products such as sauces and preserves operate in provinces near Metro Manila and Cebu. Chart 4 below details the distribution of the mango processors in the country by area.

Chart 4
Distribution of Mango Processors by Area
as of June 2004



Source: Department of Trade and Industry, Trade Event Listings, 2003 Sector Report

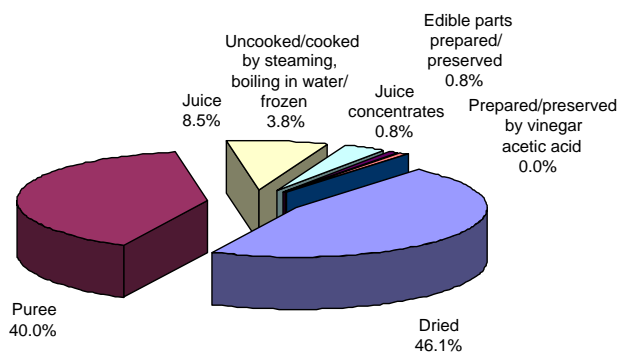
Market Segments

The high price of processed mango limits the market segment to the high and middle brackets. By the nature of the market, processed mangoes are available primarily in groceries, supermarkets and specialty stores.

Export Market

The country's processed mango exports are dominated by dried mangoes and puree, which account for 46% and 40% of the total respectively. As Chart 5 below shows, mango juice contributed a small share of total export value at less than 10%. The remainder is divided among frozen mango, juice concentrates and preserves.

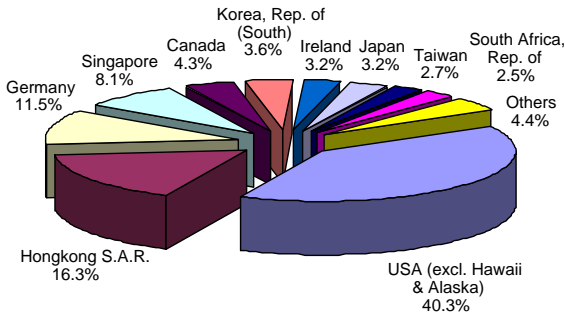
Chart 5
Philippine Exports of Processed Mango by Product, 2003



Source: Bureau of Export Trade Promotion

The United States was the largest market of dried Philippine mango with a 40% share in 2003. Hongkong, the foremost destination in the previous year, was the second biggest, absorbing 16% of the total dried mango exports. Germany and Singapore follow with 11% and 8% respectively. (See Chart 6 on the next page for details.)

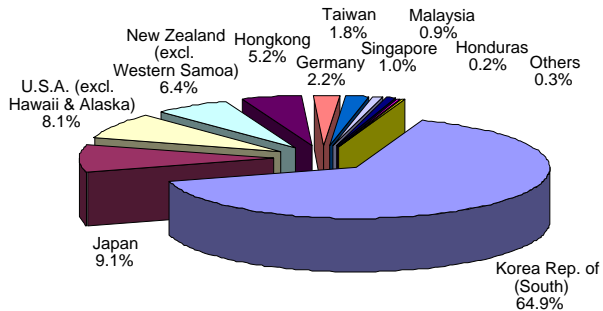
Chart 6
Philippine Exports of Dried Mango by Country, 2003



Source: Bureau of Export Trade Promotion

The single largest market of mango puree was South Korea, which accounted for close to 65% of the total, valued at US\$7.7 million, in 2003. Other markets were Japan, the United States, New Zealand, Hong Kong and Germany, each accounting for less than 10% of the total. (See Chart 7 below.)

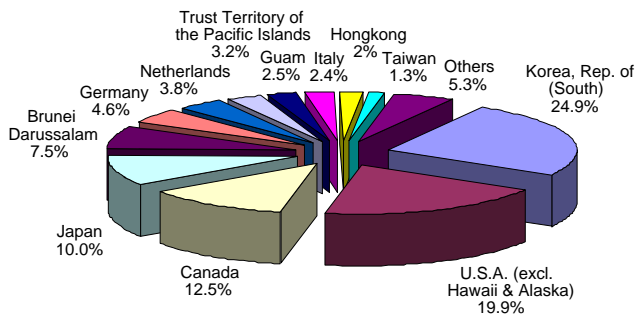
Chart 7
Philippine Exports of Mango Puree by Country, 2003



Source: Bureau of Export Trade Promotion

South Korea and the United States were major markets of mango juice with 25% and 20% shares respectively in 2003. Canada and Japan had 12.5% and 10% of the total juice exports respectively for the same year. (See Chart 8 below for details.)

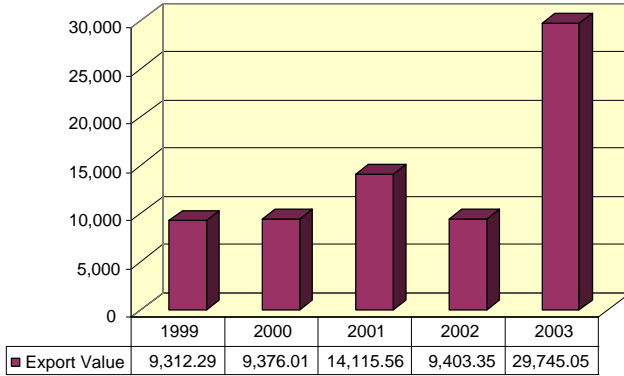
Chart 8
Philippine Exports of Mango Juice by Market, 2003



Source: Bureau of Export Trade Promotion

The growth of processed mango exports in recent years has been erratic with a particularly large increment in 2003, a spike attributed to the aggressive marketing conducted by the processors themselves. This surge in exports during the year pushed the average growth of processed mango exports from 1999 to 2003, to a remarkable 58% yearly. (See Chart 9 on the next page for details.)

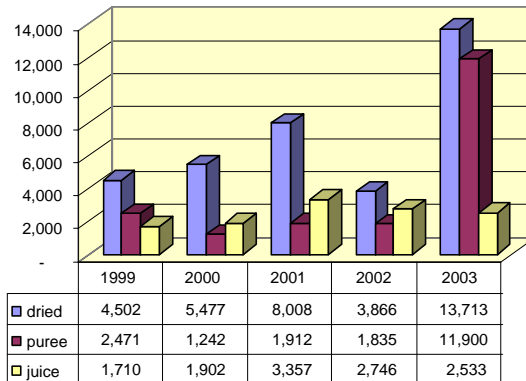
Chart 9
Philippine Exports of Processed Mango, 1999-2003
in US\$'000



Source of basic data: Department of Trade and Industry

Chart 10 below tracks the growth of the major processed mango products exported from 1999 to 2003.

Chart 10
Philippine Exports of Processed Mango: Dried, Puree and Juice, 1999-2003, (in US\$'000)



Source of basic data: Department of Trade and Industry

For further details on the graphs and charts in this section, please see Annex 7.

4 Sectoral Profile

Pearl2 conducted a survey of mango processors to update the profile of the industry. The 11 members of Philfoodex and two non-members that participated in the survey represent 15% of the total number of mango processors in the country. The 11 members of Philfoodex, meanwhile, comprise 69% of the mango processors in the association. A sample of the survey questionnaire is provided in Annex 5.

Responses from the survey participants are summarized in this section. Please note that some questions elicited multiple responses from respondents.

Year of Establishment

Around 45% of the firms were established before 1990; the rest were set up during the 1990s. Thirty-one percent (31%) of the firms are more than 20 years old, having been in operation before 1980. A small proportion (15%) is relatively young and was established only after the year 2000.

Company Size and Setup

Majority of the respondents belong to the small and medium category at 39% and 31% respectively. Together, they account for 70% of the sector. Micro and large enterprises each comprise 15% of the sample. Majority of the firms (46%) are corporations, 38% are sole proprietorships. Cooperatives were also included in the survey and comprised 15% of the sample.

Ownership and Management

Most mango processing firms are either owned or managed by men. Men are the majority (69%) in being the owner, president or chair of the enterprise. Likewise, men (55%) dominated the key management supervisory positions among respondent firms.

Product Lines

Some 15% of the firms in the large and medium category are also in the export of fresh mango. All processors turn out more than one processed mango product. Those based in Cebu and Davao are engaged in the production of dried mango and puree. The Manila-based processors use their puree as a base for producing juices and nectar.

Most firms are engaged in the manufacture of other products besides mango. Around 85% are engaged in the processing of other fruits such as pineapple, papaya, soursop and coconut. Firms with capabilities to dry fruit are invariably engaged in the drying of other fruits; the rest process these into puree and juices.

Facilities

The factories of almost all the firms (92%) are more than 250 square meters in area, with only less than 10% operating from smaller facilities (100-250 sq.m.). Seventeen percent (17%) of the respondents rent their factory space; majority (83%) own their facilities. Slightly more than half (54%) of the respondents are found in residential areas; 46% are in commercial areas.

Employment

The total direct employment of the respondents numbered 525 although three firms did not provide data on workers. During peak season, however, the number of contractual or piece workers hired may triple the size of the regular workforce.

Majority of the employees are in production (77%), while 13% are assigned to quality control and technical functions. The remaining personnel hold administrative and marketing functions at 6% and 4% respectively.

Majority of the workforce are women (56%). Women dominate production and marketing, comprising 55% of the total workers in these areas respectively. More women are also hired for administrative and technical activities at 74% and 73% respectively. Quality control is almost equally divided between men and women.

The average number of workers per respondent firm is 52. Forty percent (40%) of the firms have one to 30 production workers; 30% employ 31 to 60 workers and another 30% have more than 61 workers.

Micro enterprises, which represent 15% of the total interviewed, have no quality control (QC) and technical staff. Forty percent (40%) have one to five QC and technical staff. Twenty percent (20%) have more than six QC and technical staff.

The marketing workforce is generally small. Forty percent (40%) of respondents do not maintain marketing staff. Half of the firms have one to five marketing staff while 10% have more than six. The administrative staff is also generally small. Some 30% have more than six staff performing administrative functions while 40% have one to five administrative employees. Another 30% – the micro enterprises where managers and even some production workers double as marketing and administrative personnel – have no full-time administrative staff.

Subcontractors

None of the mango processors hire subcontractors but majority hire extra labor during peak seasons. As mentioned, the number of production workers may triple depending on the volume being processed.

Sources of Raw Materials

Most firms rely on local materials. The main sources of mangoes are Pangasinan, Zambales, Bulacan, Nueva Ecija, and Batangas in Luzon; Guimaras and Cebu in the Visayas; and Davao City and Davao del Sur in Mindanao. The firms usually set up buying stations during harvest season. Small and micro enterprises buy from wholesalers.

Besides mangoes, firms in the industry also use sugar as one of their main raw materials. Around 38% of the processors import sugar during peak production season because of wider availability and lower prices. The sources of sugar include the Netherlands, Indonesia, Thailand, Singapore and Australia. Packaging is also imported by some firms with about 15% of respondents importing part of their packaging requirements. Taiwan and Korea are the primary sources of packaging material. Preservatives are also used in mango processing and are generally bought in Manila, Cebu and Davao. Around 46% of the respondents do not import any of their raw material needs.

Majority of raw materials are sourced from the open market. Seventy-seven percent (77%) of respondents buy from the open market, with only three processors (23%) having their own sources (own farm or contract arrangements). Costs are the primary consideration in raw materials for more than half (54%) of the respondents; 23% consider quality and availability their foremost concerns in material sourcing.

Mode of Production and Operations

For majority of the firms (77%), materials handling is chiefly manual; for the rest (23%), this is semi-mechanized. Production is semi-mechanized for 54% of the firms, using mainly drying and depulping equipment. Production for the remaining 46% is purely manual.

Quality control is also done manually by 62% of the respondents and semi-mechanized for 38% percent. There are as many firms performing manual packaging as semi-mechanized packaging (46% each), with only 8% having the capability for fully mechanized packaging operations.

Capacity Utilization

Around 23% of the companies reported underutilization of their equipment (from 40% to 80% utilization) at the time of the survey. The main reason for underutilization is the lack of raw materials. Only one firm cited slack sales as the cause for underutilization. The rest of the firms (77%) process other products and have no problem of idle or underused facilities.

Product Development

Sixty-two percent (62%) of respondents rely on internal capabilities for product development; only 15% turn to third parties. About 23% use both internal and external sources.

Majority of the respondents (77%) consider trade fairs as a main source of information for product development. Around 62% depend on the buyer's feedback or information and 31% from the Internet. Other sources of information are non-government organizations and other groups providing technical assistance (15%). Only 8% depend on publications for business-development information.

Around 70% of the firms believe they have enough information for product development and R&D. Majority base their product development on buyers' specifications. More than half reported having problems in conforming to specifications. A common problem is the search for a substitute to the sulfite-based preservative that processors are using.

Quality Control

Majority of the firms (77%) still use outside testing facilities for quality control although these same firms have their own personnel and equipment such as a refractometer for testing brix content and similar inexpensive equipment. All firms agree that while adherence to GMP is important, they lack the technical capability or funding to implement GMP requirements, especially if this involves infrastructure renovation. Most of the firms (77%) believe that raw materials are the main source of QC problems. Fifteen percent (15%) cited human factor as a problem and 8%, substandard or dated equipment.

Market Coverage

Most of the firms (69%) interviewed export their products. Of the exporting firms, most (39% of total respondents) are exporting anywhere from 21% to 80% of their output. Fifteen percent (15%) export 20% or less of total production; another 15% export more than 80% of total output.

The sector eyes mainly the middle to high-end range of the market. Fifty-four percent (54%) of the firms target both high-end and mid-market buyers while 15% eye solely the high-end segment. Around 31% of the respondents consider the mid-range market as their main market. None of the processors are targeting the low end.

Export Markets

The top export destinations are the United States, Canada, European Union countries, Japan and other Asian countries including South Korea, Hong Kong and Singapore. Seventy-eight (78%) of the exporting firms ship to the United States and an equal proportion export to other Asian countries. More than half of the firms export to Japan (56%); 36% export to Canada and Europe.

Competitors

The industry considers Thailand its major competitor, followed by India, China, Malaysia, Vietnam and Indonesia. Thailand, India and Indonesia produce dried and pureed mangoes and are considered more of brand competitors. The industry competitors are China, Malaysia and Vietnam, where processors also produce other processed fruits. All the firms agree that the main edge of these countries over the Philippines is price. However, Philippine processors are confident that their products have a niche as a high-value product superior in terms of taste and quality over those available from other countries. Processors believe the key to improving their competitiveness is by reducing the cost of raw materials, particularly mangoes and sugar.

Local Market

Locally, Manila, Cebu and Davao are the three main demand centers, although processors may be distributing their products to other areas in the country. Seventy-seven percent (77%) of the respondents consider Manila their main market; 62% include Cebu, and 69%, Davao. The total output of two cooperatives and one private firm based in Davao del Sur are distributed in Davao alone. Despite the proliferation of products from competitors overseas, processors, especially those in Cebu, consider other local suppliers as the main competition for the local market.

Sales

Half of the exporters have revenues ranging from US\$50,000 to US\$300,000; around one quarter (26%) post export sales of US\$300,000 to US\$1 million. For an almost equal number of exporters (24%), export revenues exceeded US\$1 million. Eleven percent (11%) of the firms reported high growth in export sales from 2001 to 2003; 22 % reported zero growth; and another 22% reported losses. Forty-five percent (45%) did not report their export revenues for the past three years.

For local sales, 40% of the firms reported revenues of less than Php1 million. Twenty percent (20%) of the firms posted revenues of between Php3 million and Php10 million; another 40% reported revenues of Php10 million to Php100 million. Almost one-fourth (23%) of the sample firms reported high growth from 2001 to 2003 in the local market, while 15% reported no growth for the period. One company (8%) reported losses for the past three years. Seven firms did not report their local revenues.

Market Access

Sixty-two percent (62%) of exporters use their own contacts to get buyer information. More than half (54%) also attend trade fairs and around 15% attend foreign business missions. One-third of the exporters use referrals to expand export business. Locally, almost all (92%) attend trade fairs to promote their products. More than half have brochures and catalogues (54%) and the rest use the Web (15%) or attend business missions (15%) to promote their products.

Finance

For almost all respondents, 50% or more of operational expenses are spent on production. On the average, 67% of mango processors' total expense goes to production costs. Marketing and administrative/overhead costs are 11% and 10% respectively. The firms spend less than 10% on R&D.

Fifty percent (50%) of the firms use their own funds for their operations. One-fourth of the respondents use their own funds combined with a credit line from the bank. An equal number of firms (8% each) use solely a credit line from the bank, or a combination of credit, private lending and other sources to fund their operations.

Source of Assistance

About 31% of respondents received assistance from foreign donors or foreign-assisted projects in the past. The type of assistance obtained varied from technical assistance (from CESO-BAP), market assistance (USAID), grant for equipment (SDC Asia), and low-interest loans (Institute for Community Services and Development).

Thirty-eight percent (38%) of firms received assistance from local agencies in the form of market assistance (DTI), farm-to-market roads (DAR), market research (DTI), waste management training (Clean and Green project of DENR), and GMP training (DTI).

The major areas where assistance are required include:

- skills improvement for workers,
- marketing assistance,
- labeling/packaging improvements,
- HACCP certification,
- setting up of a training and testing center (Cebu)
- new products development
- alternative preservation technologies
- funding for equipment and operating expense, and
- quality improvement and lowering cost of raw materials.

5 Value Chain Analysis

Structure of the Sector

Majority of the processors in the industry are small to medium in size. Production is not generally driven by demand but more by the availability of fresh mangoes for processing. Product specifications are adjusted based on buyers' preferences. Two major products dominate the sector, dried mango and mango puree. Juices and nectar are derivatives of puree. Dried mangoes maybe sliced, diced or chopped.

The primary support sector are the fresh mango growers. Majority of them are informal backyard growers, hence the difficulty in getting supply of mangoes of uniform quality. Consolidation is likewise a primary concern for both farmers and processors. Mangoes may be grown anywhere but the ideal growing condition is one with a distinct dry and wet climate or areas with long dry periods as these bring out the fruit's best flavor.

The supply chain for processed mango consists of the sourcing of mangoes, sugar, preservatives and packaging materials, processing, packing and shipping. The critical points in the chain start with material sourcing, the demand for mangoes of good quality and lower prices being a shared concern of processors. Proper sorting and handling at the inbound portion and during operation are also important to increase recovery rates and achieve best efficiencies.

Product preparation is primarily manual. The basic production equipment include dryers, depulpers, mixing vats, conveyor belts and sealing machines.

Because processors turn out food products, safety and hygiene are also important issues, particularly for the export markets. International markets have stringent requirements including compliance with food safety guidelines, labeling and documentation requirements. Targeted markets for processed mangoes are the mid-range to high-end segments, both for the domestic and international markets. Retail markets include supermarkets, groceries and specialty stores.

Process Flow

As with other fruits, mangoes are processed when the amount of produce cannot be absorbed by the fresh fruit market as a result of excess supply or because the standards of the fresh-fruit market can not be met. Processed products are thus developed. Part of the negotiation between processors and buyers involves product adjustments to suit the buyers' specifications and comply with importing country standards. Other product forms are eventually requested by the buyers in response to the growing market for processed mango.

The value chain of processed mango is the sequence of events from the farm gate to the consolidator, then to the processor, and finally to the consumer. The main input of the industry is fresh mangoes. Other inputs include sugar (which is imported if local supply is short), chemicals (preservatives, food colors) and packaging materials. The main output is dried mangoes and puree. Mango slices in syrup are supplied mainly to institutional buyers such as ice cream makers and fast-food chains; they have no substantial retail market.

The sector's value chain uses intensive labor. Prior to processing, mangoes are washed thoroughly in water treated with 50 to 100 ppm of chlorine solution. For the production of dried mangoes, the fruit is peeled and sliced lengthwise. Syrup is prepared by mixing water, sugar and sodium metabisulfite. The mangoes are then mixed into the syrup and boiled at a certain temperature. As practiced by some processors, the mango slices are soaked for three days. After three days, these are drained from the syrup and dried in mechanical dryers at set temperature and humidity levels, and for a specified duration. The mangoes are then cooled at room temperature or allowed to sweat so that the residual heat dissipates. The sugar solids are removed from the lot, which is thereafter sorted and packed.

In puree production, the mangoes are peeled after thorough washing. The flesh is sliced, cut into small pieces and then fed into a (de)pulper or homogenized in a blender for a smooth consistency. The puree is heated in a stainless steel pot in a citric-acid mixture with constant stirring. Then it is packed in bottles which are subsequently submerged in a water bath for 30 minutes. The bottles are then cooled rapidly to 38 degrees Celsius. The excess water is wiped from the containers and stocked in a cool and dry place.

Production subcontracting is not practiced within the sector although additional labor is employed during harvest season from March to June. Processors of puree have been known to purchase puree from other suppliers in order to fill orders. At the final stage, the products are packaged and distributed to the market.

The Process Flow diagram in Annex 4 indicates the vertical links between fresh fruit suppliers and processors. Some processors have ventured into their own production of mango or contract-to-buy arrangements to ensure supply of their raw materials. Most, however, set up their own buying stations and packing houses.

The most critical parts of the value chain for the industry are the inbound logistics (particularly raw material sourcing), operations, and marketing and sales. Raw material sourcing is a concern because of the seasonality of the fruit. The industry's major issues include finding alternative preservation technologies acceptable in the destination countries as well as the search for additional markets, both for the mango-based products and the others processed from other fruits.

The Value Chain diagram on the next page, developed based on research and interviews with key industry players, encapsulates all the industry's activities.

Key Findings

The common concern among processors is that there are not enough mangoes they can use available at affordable prices. Although supplies may be enough during peak season, the quality of the fruit may not be good enough for processing.

The Processed Mango Sector Value Chain Diagram

FIRM INFRASTRUCTURE	General Management, Finance (Cash flow, Equipment purchases), Accounting, Labor Management, Quality Control, Client Management and Government Affair				
HUMAN RESOURCE MANAGEMENT	<ul style="list-style-type: none"> In-house training of workers, fruit handling, sorting, disinfection, sanitation 	<ul style="list-style-type: none"> Productivity enhancement seminars Recruitment of piece workers Establishment of standards 	<ul style="list-style-type: none"> Training for food safety regulations, product documentation In-house training for inspection and quality control 	<ul style="list-style-type: none"> Recruitment of sales force 	<ul style="list-style-type: none"> Training for managing customers' complaints and requests
TECHNOLOGY DEVELOPMENT	<ul style="list-style-type: none"> Buying schemes, purchasing practice Semi-processing by suppliers Improvement in packaging, transportation 	<ul style="list-style-type: none"> GMP implementation HACCP accreditation Product differentiation (other products) and optimization Waste management 	<ul style="list-style-type: none"> System to monitor shipments, invoices and documentation of products Improvement of packaging 	<ul style="list-style-type: none"> Packaging, design improvement for retail and institutional buyers In-house market and product research, journals, seminars, Web browsing, business contacts Government assistance through promotion by trade attaches 	<ul style="list-style-type: none"> Storage, stacking in shelves Merchandising
PROCUREMENT	<ul style="list-style-type: none"> Supplier information systems: volume, quality, price, logistics Qualifying new suppliers Buying station setup during peak supply season Transportation 	<ul style="list-style-type: none"> Product movement Identification and purchase of new equipment, utensils 	<ul style="list-style-type: none"> Transportation services, shipping lines Freight forwarding 	<ul style="list-style-type: none"> Trade fair participation (ingress, egress) 	
	<ul style="list-style-type: none"> Own production, contract arrangement Open market sourcing Handling, transport Materials handling (receiving, inspection, storing) Inventory control 	<ul style="list-style-type: none"> Product development, improvement Processing of products delivered Monitoring of production Packaging, labeling 	<ul style="list-style-type: none"> Inspection of condition of finished goods Documentation of products for shipment or delivery Export documentation Shipment 	<ul style="list-style-type: none"> Promotional activities: advertising, brochures, attendance of trade events, Website dev't, replies to Internet inquiries Niche marketing and product differentiation 	<ul style="list-style-type: none"> Acceptance of returned items Replacement of unsaleable items
	INBOUND LOGISTICS	OPERATIONS	OUTBOUND LOGISTICS	MARKETING & SALES	SERVICES

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Note: please see Annex 1 for a brief explanation of the value chain analysis.

Other than the quality, price is a concern for both the supplier and processor. Mangoes are raised primarily for the fresh fruit market because of the better prices this offers. Processors will buy only at a much lower price.

The mangoes for processing are those that cannot be sold on the fresh fruit market because of excess supply or because of the poor external qualities of the fruit. The availability and affordability of raw materials for processed mango production, therefore, depend on the swing of demand, both local and international, of the fresh-fruit market. The prices will be much softer in such times of excess supply or when demand from the fresh-fruit market has been saturated. This situation, while beneficial for the processor, is a disincentive for the farmer to invest in increased production and quality improvements.

Another common problem among processors is the inability to distinguish mangoes with internal defects such as darkened flesh, white particles ("riceness") and acrid taste. The occurrence of these defects has reduced recoveries and increased costs among processors. The sector likewise faces a need to benchmark and improve the efficiencies of their factory workers. Product standards need to be set and monitored for compliance.

Other than the shortage of mango supply, one of the factors that inhibits processors from expanding is the lack of financing to purchase new equipment that will expand or upgrade production or introduce new products. Established processors with secure markets and mango supply cite this problem. They consider assistance in the preparation of business plans and other bank

requirements a need. Other processors also experience cash flow problems, especially during the peak mango season when processing operations are 24 hours a day. Mango buying may be hampered due to lack of funds.

Processors are unsure if they are implementing GMP correctly. Other than the technical uncertainty, processors lack funds to fully implement GMP which is a prerequisite for HACCP accreditation. HACCP has become a major concern among processors because of a requirement that will soon be imposed by the European Union and the United States that processed products should have passed new safety and hygiene standards. Processors are looking specifically for an alternative to sulfite-based preservatives.

The current label designs of locally made mango products are generally uninteresting and unappealing, in contrast to the sophisticated, attractive packaging of consumer products in the United States. The labels on processed mango products were created without the benefit of a carefully thought out marketing strategy that zooms in on a specific market segment. The present packaging of processed mango products, for example, could be improved with the use of re-sealable packages and thicker plastic. Other packaging designs should be made available so handling the product will be easier for consumers.

The key findings on the value chain analysis of the mango processing sector are presented in the next few pages.

Processed Mango Value Chain Table

INBOUND LOGISTICS		
Findings/Observations	Concerns	Recommendations
Human Resource Management		
Inexperienced workers, especially piece workers hired during peak mango season, may not have the expertise in classifying and handling fruits.	Poor-quality mangoes get mixed with good quality mangoes. Poor handling damages mangoes. Both lead to poor recoveries.	Through the association, processors should develop and conduct training among plant workers on sorting and handling. Experienced sorters could be hired to conduct the training.
Technology Development		
Peak processing activities are from February until July. Processors either process other fruits or undertake equipment repair and maintenance during the lean season.	The supply of fresh mango is inadequate due to poor quality and high price. Processors therefore cannot commit to additional markets.	Coordinate with the private sector (through the mango growers' associations or agencies assisting associations such as DA, DAR and foreign-assisted projects) to promote good agricultural practices for higher yields and quality.
Prices of fresh mangoes are high (>PhP25/kilo) during off-season production.	Processors produce at low margins or break-even levels just to satisfy market commitments.	Coordinate with producers' groups to improve production, thereby lowering costs. Increase production in areas such as Mindanao where mangoes can be grown year-round.
The present inspection system does not filter out mangoes with darkened flesh, white particles ("riceness") and sour taste.	Mangoes with internal defects cannot be processed, thereby decreasing recoveries and increasing costs.	Other than standards on external defects, processors should collaborate with the Bureau of Plant Industry to develop tests for detecting internal defects.
Good agriculture practices are not observed by farmers such as harvesting mature mangoes.	Incidence of rejects increases when good agriculture practices are not followed.	Improve quality of mangoes through the use of IPB- recommended varieties and the Good Agricultural Practices (GAPs) being pursued by the DA.

INBOUND LOGISTICS (con't)		
Findings/Observations	Concerns	Recommendations
Technology Development (con't)		
Only the large processors can set up operations in Mindanao. Small and medium processors are unable to.	SMEs cannot take advantage of the year-round supply of mangoes in major supply areas such as Mindanao.	Determine the feasibility of semi- processing by Mindanao-based groups for shipment to the processors in the Visayas or Manila. Semi-processing will include peeling and slicing for dried mangoes, and peeling and depulping (separation from seeds) for purees. Shipping should be with appropriate packaging and temperature control.
Production costs for processed mango remain high. The value added (better taste, texture and appearance) may be insufficient to compensate for the high costs.	High raw material costs escalate overall production costs, thus reducing the industry's competitiveness with countries such as Thailand and India.	Improve competitiveness by reducing production cost of raw materials. Develop and implement an information campaign with farmers groups for more efficient production of fresh mangoes.
Procurement		
The higher costs incurred from processing bigger volumes during peak seasons lead to cash flow problems.	Processors are unable to take advantage of the opportunity to increase production volume during the peak season.	Disseminate information on government financial institutions that provide funds for short-term loans.
Good mangoes grow only under specific agroclimatic conditions (distinct dry periods). Specific varieties should be cultivated for the sweetness desired (13-18o brix).	Poor-quality mangoes from areas not ideal for mango production are mixed with good-quality mangoes at the buying station and at receiving areas of the plant.	Information systems on reliable input suppliers should be developed. These should include location, volume, availability, price indication and logistics requirements. Contract-to-buy arrangements with pre-agreed buying prices could be initiated with these growers to ensure supply of good-quality mangoes.

INBOUND LOGISTICS (con't)		
Findings/Observations	Concerns	Recommendations
Main Activities		
Processors usually set up buying stations or buy direct from wholesale markets.	The common sourcing practices result in overhandling of the fruits, which reduces recoveries at the plant site.	Improve vertical linkages between suppliers and processors. Promote direct transactions or contract-to-buy arrangements, which reduce handling of fruits from farm to factory.
Growers apply fertilizers and pesticides indiscriminately for higher yields of good mangoes.	Developed countries with strict health standards such as the United States and Japan will not allow the entry of contaminated products.	Work out marketing agreements between processors with organic markets and farmers or farmers' groups willing to adopt organic production or to reduce the use of chemicals.
OPERATIONS		
Findings	Concerns	Recommendations
Procurement		
Companies lack financing to purchase equipment.	Processors are unable to increase production due to lack of machinery.	Provide special credit windows to processors with proven track record in exports to enable them to purchase equipment and maintain optimal level of operations during peak seasons.
Technology Development		
Processors are looking for alternative preservation technologies required by importing countries.	Importing countries such as Japan and the US may not accept sulfite- based products.	Provide appropriate or alternative technologies that comply with international safety standards. Food technologists or agencies (such as the Food Development Center or DOST) may be commissioned to undertake research or provide training if such technology already exists.
Plant wastes are not disposed of properly.	Higher volumes of mango processed will increase the waste generated as well.	Waste management systems should be developed for processed mango. Philfoodex could initiate the propagation of proper waste disposal and recycling techniques with assistance from DOST.

OPERATIONS (con't)		
Findings/Observations	Concerns	Recommendations
Technology Development (con't)		
Some processors cannot measure the efficiency of their workers. No production standards that can guide processors to become cost- competitive have been developed.	Production costs are therefore unnecessarily higher.	Processors, through Philfoodex and appropriate government agencies such as DTI, should engage in benchmarking for product and skills standards. Processors should also be taught to monitor workers' efficiencies.
Most processors have a working knowledge of Good Manufacturing Practices (GMP) but have difficulty implementing these.	GMP is required for HACCP accreditation, which will soon be a mandatory requirement of importing countries.	Secure the services of FDC or the private sector to provide technical assistance to SMEs on GMP implementation. GFIs should be tapped for funds for technical assistance and infrastructure improvement.
OUTBOUND LOGISTICS		
Findings	Concerns	Recommendations
Technology Development		
Problems in export documentation and non-compliance with export requirements such as food safety standards are common.	Failure to comply with importing countries' documentation and safety requirements means inclusion in the detention list or the blacklisting of the product and supplier.	With the assistance of DA Agribusiness and Marketing Assistance Service (DA-AMAS), BETP and FDC, Philfoodex should continually provide information on the export and documentation requirements of importing countries.
Export destinations have specific labeling requirements such as nutrition facts, expiry dates, halal certification, etc.	Products are rejected.	Provide information on essential labeling requirements with the assistance of DTI and FDC.

MARKETING AND SALES		
Findings	Concerns	Recommendatons
Technology Development		
Processors with other product lines have additional sources of income and are able to increase recoveries, and reduce waste and cost.	There is no information on other potential mango products and their markets that processors could use.	Conduct a market study that would initiate the development of a database on potential products and their markets. This project could be a collaboration among DOST, DTI and Philfoodex. DOST and Philfoodex will be sources of new products and DTI could assist in identifying the markets for these. The database should be housed at DTI and Philfoodex.
Packaging and labels should be improved.	Current packaging and labels are unattractive to buyers.	Improve packaging such as the use of re-sealable bags and more appealing labels. Commission consultants to assist processors in developing packaging and labels.
Agricultural trade attaches have provided assistance by introducing new products in their host countries or providing trade information to exporters.	Agriculture trade attaches have been promoting mostly fresh mangoes. There are costs involved in market promotions.	Coordinate with agricultural trade attaches in US, Europe, Japan, China and Australia through the DA-AMAS for the identification and promotion of Philfoodex members' products to specific buyers.

Needs Assessment

From a value chain analysis of the processed mango sector, the most pressing issues and needs of the sector were determined. A summary of these are given below:

Inbound Logistics

- An information campaign by Philfoodex and concerned government agencies on the need for good agriculture practices to reduce cost and come up with good quality mangoes has to be promoted among farmers' groups.
- A program to improve the yields of existing trees and to expand production areas should be intensified in "off-season" production areas such as Mindanao.
- Contract arrangements with farmer groups have to be pursued to ensure supply of good quality mangoes and avoid overhandling of fruits.
- Processors with markets for organic processed products should enter into contract arrangements with farmers' groups for the organic production of mangoes.

- A continuous training program has to be developed for factory workers during the inbound phase – receiving (sorting and handling) - as well as peeling, slicing, packing and the other critical steps in mango processing.
- There is a need to develop a screening protocol to filter out mangoes with internal defects.
- An information system that provides reliable information on sources of mangoes should be developed.
- A study into the feasibility of semi-processing at the supply site in order to reduce logistics costs and increase recovery rates should be initiated.

Operations

- Special credit windows are needed for processors for equipment and operating expenses.
- Alternative technologies in food preservation preferred or required by importing countries should be promoted and provided to processors.
- Product and production standards should be benchmarked among processors and set as industry standards.
- Continuous training should be conducted among factory workers to ensure production standards and efficiencies are met.
- There is a need to train processors in monitoring their workers' efficiency and output.
- Processors need technical and funding assistance to facilitate GMP implementation and compliance with safety standards, including infrastructure renovation.
- There is a need to tailor-fit a waste management system to factories of processed mangoes because of the distinct characteristics of the waste from mango processing, which attracts pests.

- Processors need to be provided with information on food safety standards in general, and those regulations specific to the importing countries.

Outbound Logistics

- Packaging and labeling of processed products should be improved for the export market.
- Proper documentation of exports should be instituted and maintained to ensure compliance with importers' requirements.

Marketing and Sales

- A marketing and promotions program need to be established using the country's agricultural attachés for the identification of specific buyers and the promotion of processed products.
- A market study should is needed for identifying new processed mango products and potential or suitable markets.

Areas for Intervention

Based on an analysis of the needs of the industry, several measures to assist the mango processing sector are recommended. These are briefly described in this section.

1. Develop and Implement a Comprehensive Mango Sourcing Program.

The increase in 2003 of processed mango exports shows the capability of mango processors to absorb higher volumes than they are currently managing. A common concern, however, is the inability to purchase good-quality, affordable mangoes. A Mango Sourcing Program with the following features is proposed:

- a.) Campaign for the production of low-cost but good-quality mangoes.
- b.) Develop a database for raw material sourcing.
- c.) Facilitate contract arrangements between local farmers and processors.

Information Campaign

An information dissemination program should be worked out by Philfoodex with the Department of Agriculture (DA) (through NAFC or BPI) and the mango farmers' organizations. It is important for the farmers to know that the processing sector is a partner and a ready market for their excess production.

Farmers should be made to realize the need to lower production costs through good agricultural practices and rigorous efforts to reduce input costs. Good agricultural practices include conducting soil tests to determine exact fertilizer requirements, the cultivation of recommended varieties, the reduction of pesticides through bagging and other practices already proven and recommended by the DA. One way of reducing input costs is by the bulk purchase of fertilizers and other inputs through the assistance of government agencies such as the Department of Trade and Industry.

Database for Raw Material Sourcing

A database to pinpoint reliable sources of good-quality mangoes is lacking. Such a database should include suppliers' information, including location, volume, availability, and logistics requirements. This should also include areas ideal for production of mango (at the municipal level). Immediately, the database will help processors avoid buying poor-quality mangoes. It will also be useful for potential investors (processors included) in identifying suitable sites for mango growing.

This undertaking may be initiated by the association with the regional offices of the DA as these have the capability to update and store suppliers' information on account of their access to Bureau of Agricultural Statistics data. Initial data buildup may be conducted with the DA, DAR, and the Local Government Units identified as ideal mango-growing areas, farmers' organizations and foreign-assisted projects such as the Growth with Equity in Mindanao, DAR ADB Agrarian Reform Communities Project, etc.

Contract Arrangements between Local Farmers and Processors

Contract arrangement is an option that might prove beneficial to both processor and farmer. Processors may also opt to finance and contract out certain phases of mango production, i.e., flower induction, fertilization, pest control, harvesting and post-harvesting. Farmers could be paid through sharing arrangements on the harvest or at pre-agreed prices. This has been practiced by one of the processors which so far has not encountered problems in securing its raw material requirements.

Processors could also enter into contract arrangements for organically grown mangoes, albeit at a premium. Contract arrangements between processors and farmers' groups will also reduce the stress and damage to the mangoes during sorting and multiple handling. Depending on the specifics of this contract arrangements, processors may harvest, sort, pack and ship out the mangoes straight to their plants.

A preliminary study can be undertaken to determine possible contract-arrangement options.

2. Collaborate with Government to Standardize Mango Screening Procedures.

A common problem among processors is the inability to differentiate between good-quality mangoes and those with internal defects such as darkened flesh, white particles ("riceness") and acidity. Although some of the problems may be traced to improper growing practices such as harvesting before maturity (earlier than 100 days from flower induction) that accounts for the acrid taste, some tests may be developed, if these are not yet in

place, by the BPI or the National Mango Research Center in Guimaras for the easier and more accurate detection of these defects. The tests, once established, should be demonstrated to processors for implementation.

This technology could be propagated among processors through the Philfoodex or the the regional offices of the DTI.

3. Collaborate with Government to Benchmark Production Processes and Initiate a Workers' Improvement Program.

Present standards set by processors for the detection of external defects and achieving best work efficiencies should be benchmarked as industry standards. An example is the recovery rate in the processing of puree, which varies from 25 to 45% in Davao City and 50 to 70% in Cebu (FRLD, 1994). As in all benchmarking activities, processors should be able to measure the work efficiencies of their workers and compare these against competitors or industry standards. The following are the recommended steps:

- a.) The association, with DTI, should identify the specific procedures or production activities (such as sorting, peeling, slicing packing) to be measured.
- b.) The association should embark on an information campaign to educate processors of these work standards.
- c.) Along with DTI, the association could develop a training module that includes a needs assessment (based on set work standards), and thereafter implement this module.

4. Determine the Feasibility of Semi-Processing Mangoes at Supply Sites.

Processors realize the benefits in setting up processing operations in major supply areas such as Mindanao. Among the advantages of this are lower logistics costs and lesser rejects, as a result of minimized handling of the fruit. However, small and medium processors, and even large processors, are unable to set up operations in these areas because of the costs involved. The feasibility of this idea should be further studied, especially in light of the optimum conditions for mango growing found in Mindanao.

The semi-processing operations pondered by some in the sector include the conduct of the first steps in mango processing. For dried mango production, this includes sorting, peeling, slicing, packing, storage and shipping operations. For puree production, semi-processing may take the form of sorting, peeling, depulping (separation of the fluid from the fiber and seeds), packing, storage and shipping operations. Storage and shipping should be done with the appropriate materials and equipment. Temperate control and food safety are critical. At each step, costs have to be determined, which will be the basis for the “semi-processing” and storage fees to be charged.

The feasibility study could include a simulation of the process to determine costs and critical points of the exercise. A consultant should be hired to develop the proposal and supervise the simulation of the semi-processing, storage and shipment activities. The consultant’s scope of work should include the preparation of an operations manual.

If semi-processing is found feasible, processors, particularly those in the Visayas and Luzon, should be encouraged through the DTI regional offices to explore semi-processing at supply sites. Initially, Mindanao processors may be tapped to be the partners in such a venture.

5. Evaluate Existing Loan Products, Assist in Loan Applications, and Propose New Credit Windows for Capital and Operating Expenses of Processors

Inadequate funds are a major concern among established processors seeking to redesign factories, purchase equipment and additional raw materials. However, the government has existing credit windows that processors could use. Philfoodex should be in the lead to identify these loan products, provide assistance to members with loan applications, and propose new windows as needed for capital and operating expenses.

Government Financing Institutions such as the Development Bank of the Philippines (DBP), Land Bank of the Philippines (LBP), NLSF, Philippine Export-Import Credit Agency, Quedancor and SBGFC have collaborated to buttress the SME Unified Lending Opportunities for National Growth or SULONG. This unified lending program simplifies and standardizes lending procedures and guidelines for participating GFIs, thereby accelerating loan availments. A program to assess how mango processors can make use of loans under this program needs to be maintained.

The SULONG program is in addition to the existing financial services of the participating GFIs. The DBP currently provides short-term loans to entrepreneurs. Quedancor and Land Bank offer short-term loans to cover agribusiness activities. These are usually for traditional crops such as rice, corn and coconut, but may extend

to high-value crops such as mango. Again, these various lending programs need to be carefully evaluated as to how they can meet the needs of mango processors for financing. The association must make representations to the banking institutions for the requirements of its members. It should be trained in preparing business plans or feasibility studies as part of its service to member firms. Based on its study of existing loan programs, Philfoodex can identify areas where improvements in lending requirements, facilities and administration can be made. This can also serve as the basis for proposing more innovative and responsive credit windows for mango processors.

6. Provide Assistance in Identifying Appropriate Packaging and Attractive Label Designs.

Especially for the export markets, packaging and labeling should be further improved. The need for improved packaging applies as well in the promotion of new products to consumers. Processors agree that assistance is necessary in releasing more attractive labels, especially for their new products. In the case of one processor-exporter, sales and orders multiplied because its products, sporting fancier labeling, stood out in the shelves of one supermarket chain in the United States.

Hiring preference should be given to consultants in packaging and labeling that are knowledgeable in the preferences of importing countries. Local institutions such as the FDC or DOST for packaging materials and the Design Center of the Philippines for label design could also provide the necessary assistance. Consumer studies may also be undertaken to obtain inputs from the market on the types and design of product packaging suitable for a certain target market.

7. Design and Implement with Government a Quality Assurance Program for Mango Processors/Exporters.

A common concern of processors is the acceptability of their products to their intended overseas markets. A Quality Assurance Program should be initiated with the FDC and DOST to ensure that output meets quality standards. The program should include the following:

- a.) GMP Implementation and HACCP accreditation
- b.) Identification and explanation of other countries' food safety regulations
- c.) Application of preservation technologies acceptable to other countries
- d.) Proper disposal of plant waste

GMP Implementation and HACCP Accreditation

Processors need to implement GMP before they can be HACCP accredited. HACCP will be required by importing countries to ensure food products pass food safety and food has been processed under sanitary conditions. GMP implementation and HACCP accreditation entails cost which most processors cannot afford.

FDC should be tapped to render processors technical assistance to be able to implement GMP. For infrastructure and equipment requirements, processors may avail of existing credit windows of GFIs and special funding projects such as the SULONG program oriented to SMEs.

Identification of other countries' food safety regulations

Importing countries such as the United States has the Code of Federal Regulation which sets guidelines for processors on the food safety and labeling requirements expected of processed food, whether this is originating from United States or another country. Processors need such information on the standards of importing countries so that their products are allowed entry into the target destination. The failure to comply with these standards could cause one's inclusion in the importing country's detention list, aside from the costly retrieval of the disapproved shipment.

Philfoodex should negotiate with the FDC, DA-AMAS and BETP for institutional arrangements in data sourcing from countries that processors are intend to penetrate. Member processors could approach Philfoodex or the DTI regional offices with their inquiries. Philfoodex could then coordinate with the concerned agencies to find the information. Once the data is received, the members are informed by Philfoodex directly or through the regional offices of DTI.

Application of preservation technologies acceptable to other countries

Sodium bisulfate, a commonly used preservative, has been banned in some countries due to the risk of side effects, particularly to asthmatics. An alternative preservative that processors can use, with no adverse effect on the quality of the processed product, should be found. DOST should explore the technologies for sulfate-free processing that could be promoted to mango processors. Philfoodex should initiate such a campaign with DOST and organize training in new technologies for processors. A suitable timetable should be prepared for developing alternative preservation methods so that the industry can easily meet evolving requirements of buyers abroad.

Proper disposal of plant waste

A waste management system should be developed also as a part of a program to generate alternative livelihood opportunities from mango waste, particularly the production of organic fertilizer. Proper waste management is also a GMP requirement for HACCP accreditation.

The sweetness and aroma of mango waste, particularly the peel, drippings and seeds, continually attract pests. Processors should practice waste management disposal that does not harm the environment or the community where the factory is located. The FDC or DOST could be tapped to assist in popularizing environmentally and socially responsible waste disposal technologies as a possible source of additional income. A proper awareness and education program on good waste management may also be undertaken to facilitate implementation.

8. Develop and Implement a Market Expansion Program for Processed Mango.

As a premium, high-grade product, the Philippine mango, both fresh and processed, has a niche. To expand markets, a program with the following components is recommended:

- a.) Institutionalize marketing assistance with agricultural attaches.
- b.) Conduct market study for new products.
- c.) Build a products and buyers database.
- d.) Conduct business missions overseas.

On numerous occasions, agriculture trade attaches have assisted in introducing fresh mango to their host countries. The trade information provided by these attaches has facilitated the mango exporters' compliance with the requirements of the export market. These attaches can be tapped to provide a similar form of assistance for processed mango products.

A market-inventory project between Philfoodex and the DA Agribusiness and Marketing Assistance Service (AMAS) should be institutionalized to be able to pinpoint specific buyers of processed mango-based products and promote these. The costs of such assistance, including the cost of regular shipments of samples to the attaches, could be shared.

The second component involves the conduct of a market study to identify potential mango products and their targeted buyers. Processors are diversifying into other mango products such as slices, bits and nectar, a move that has helped them cope with higher costs and provide them with a competitive edge. More products mean optimum utilization of the fruit, and subsequently, additional income sources. With such product diversification, the industry could also minimize the waste it generates. The study could be a collaboration between Philfoodex, DTI and DOST. DOST and Philfoodex will be sources of new products, while DTI could assist in identifying markets.

The products and market database will be an offshoot of the market study that will be housed at Philfoodex and at DTI regional offices. A system for continuous research, screening and updating of information should be adopted. The database should be accessible to processors for a minimal cost and may even be designed as a self-sustaining facility.

Business and selling missions could be conducted on a cost-sharing basis. Philfoodex should coordinate with DTI to identify major trade events overseas. Selling missions are an example of cost-sharing schemes where a funding agency usually subsidizes the participation and logistics fee (freight for materials) and the producer shoulders the rest of expenses incurred.

Annexes

Annex 1:

The Value Chain Analysis

The Value Chain Concept

Value chain analysis is a method of identifying and understanding the various activities of an organization that provide value to its products or services and the linkages among such activities. It is used to determine which aspects of a firm's operation can be enhanced, and where to reduce costs, optimize resource use, or even reconfigure the entire chain of operations for better performance. The end result of this effort is increased product or service value, lower costs of operation, or both.

A value chain covers two sets of activities. The first refers to the primary activities of a firm and consists of inbound logistics, operations, outbound logistics, marketing and sales, and service. These are the activities that organizations engage in to produce a product or service.

The second set covers support activities that indirectly contribute to the firm's operations. These include the organization's infrastructure, human resource management, technology development and procurement.

All these activities are interconnected and work in a process that can be structured into a value chain diagram. A firm's value chain can also be linked with external chains such as those of its suppliers or buyers.

Value Chain Analysis in Sectoral Enhancement

An adaptation of the generic value chain described in Michael Porter's book *Competitive Advantage* was used to analyze the structure and performance of industries or sectors covered in Pearl2's Sectoral Enhancement program. Originally, the value chain was designed for company-level evaluation. For the Pearl2 project, however, it is used to develop a framework for understanding how a particular industry operates, with the objective of determining the needs of that sector. On the basis of such a needs assessment, it is possible to identify areas where appropriate assistance can be provided.

Basically, work with all the sectors covered by the program included: (i) designing the value chain diagram, (ii) developing a table, (iii) describing the main components of the value chain, and (iv) analyzing the flow of the chain to identify issues and problems and possible courses of action. Such an assessment brings to the surface the needs of the sector for closer evaluation. The value chain analysis focused primarily on producers which are members of the Busi-

ness Support Organization identified for the sector. The analyses are not by any means comprehensive and do not involve any cost estimates for the chain or a comparison of the value chain of a similar industry or with similar features in other countries or regions. Due to time and resource constraints, no references were made to external value chains.

Michael E. Porter, "Chapter 2: The Value Chain and Competitive Advantage," in *Competitive Advantage* (New York: Simon & Schuster, 1985), p. 33-61.

Annex 2: Listing of Mango Processors

Metro Cebu and other areas in the Visayas

AEO International Food Corporation

- *dried mango, "tamango" (Tamarind-Mango), puree, nectar*

Biasong, Talisay, Cebu

tel: 272-6217, -6218, 273-2258

email: aeointel@cnms.net

Elizabeth Ong

A&P Food Corp.

Sector 5, Kanluman St., Mandaue City

tel: 422-1070

Winston Sia

Balls Food Products, Inc.

- *dried mango, mango juice, puree and concentrate*

Canduman, Mandaue; and

M.L. Building, Cebu Port Central Avenue, Cebu City

tel: 346-6314, 253-1308

Perry Ong, GM

Camiluz Enterprises Inc. (Guadalupe Dried)

- *dried mango, puree*

787 Happy Valley Road, Cebu City

tel: 254-1572 (3)

Camilo Go Siong, President & GM

Cebu Grace Food Products

- *dried mango*

38 Jose Abad Santos Street, Villa Aurora, Mabolo, Cebu City

tel: 231-3950

Cathrine Lopez, Manager

Cebu Legacy Marketing Corp.

- *fresh, frozen and dried mango*

Pilit, Cabancalan, Mandaue City; and

Unit 304, Moraga Mansion, Plaza Moraga, Binondo, Manila

tel: (Cebu) +32 346-2965 (9), -0225, -2768 (9), -0028, -0236;

(Manila) +2 241-4608 (9), -4598, -2569

email: celegacy@epic.net

Jaime Chua, GM

Peter Chua

Inday's Dried Mango

- *dried mango, juices*

Quezon Street, Cabang-calan, Mandaue City
tel: 346-3020
Vicente Tan, Manager

Jojo's Food Products

- *dried and pickled mango, mango chips (Jojo's)*

72 Plaridel Street (POB 924), Cebu City
tel: 346-9572, -3286, -4054, -2207
email: jfp@cnms.net
Roman Tan, President
Eugene Co, Export Manager

Keyholdings Company, Inc.

- *dried mango, mango puree*

283 A. S. Fortuna Street, Bakilid, Mandaue
tel: 805-1124, 3464272
email: keymart@philexport.com
Erwin Key

Profood International, Inc.

- *assorted dried fruits, purees, nectar and juices*

Gochan Compound, Mabolo, Highway, Maguikay, Mandaue City
tel: 346-0775, -1998; -7732 (6), -7737, -1228
email: profood@cebu.pworld.net
Justin Uy, President
Jerry Uy, Export Manager

R&M Preserves

- *fruit preserves, purees, juices, dried mango*

441-1B V. Rama Avenue, Guadalupe, Cebu City
tel: (Cebu) +32 254-5738, -3425, -5767, -5777
email: rmmango@cebu.ph.inter.net
Erwin Richard Siao, President
Sandra Siao, Vice-President

7D Food International, Inc.

- *dried mango, juices, puree*

Sacres Road, A.S. Fortuna Street, Mandaue City
tel: 346-1221, -1769, -0082
email: svendfoods@hotmail.com
Francisco David, President
Danilo David

Young's Int'l Traders

- *dried mango, juices*

40-B Sindulan Street, Mabolo, Cebu City
tel: 253-2365, 346-2612
Fred Tudtud, Manager

Lola Concordia

• *mango chips, juices, bars, jams, and purees*

840 Padre Burgos Street, Bato 6525, Leyte

tel: (Leyte) +53 336-2249; (Manila) +2 724-8689

Albert Maboloc

Angelika Kuizon

Mommy Goose International Inc.

• *pickled green mango*

Plaridel Street, Roxas City 5800

tel: +36 621-5087

Debrah Fuentes

Reliance Core Co. Inc.

• *mango jam*

Hacienda Candelaria, San Enrique, Negros Occidental

tel: +34 460-3186

Ciriano Sia Jr.

Savor de Silay Gourmet Selection

• *mango salsa*

Dr. Jose Locsin Street, Silay City, Negros Occidental

tel: +34 495-2615

Doreen Pena

T-flavors Food Processor

• *mango chutney*

44 Pleasantville, Subdivision Road, Bacolod City

tel: +34 433-1712

Teofila Navarro

Metro Davao and Southern Mindanao

KF Foods

• *mango preserves*

Kablon Farms, Tupi, South Cotabato

tel: +83 228-8508

Ernesto Pantua Jr.

Philippines Fruits International Corp. (under Profoods)

• *mango puree*

Curvada Lizada, Toril, Davao City

tel: 291-3951, -3997 (8), 0917 323 5610

email: pfic@skynet.net

Elbert U. Young, Plant Manager

RML Food Products

- *mango jam, puree*

4th Street, Soriano Subdivision, City Heights, Gen. Santos City

tel: +83 552-3898

Milagros Lozano

REMA Food Products

Block II, Lot 9, Susana Homes 2, Nursery Road, Lagao, Gen. Santos City

tel: 0920 732 9629

Emma Herceda

South Davao Development Corp. (SODACO)

- *tropical fruit preserves (SunGee)*

Dacon Complex, Ecoland Subdivision, Matina, Davao City

tel: (Davao) +82 291-0862, -0096, -0862; (Manila) +2 831-5443, -5936

email: sfc_dvo@interasia.com.ph

Ma. Christina Ramos, Plant Manager

Metro Manila and nearby provinces

A&P Foods Corp.

- *fruit puree, drink concentrates, mango fruit bar (Mango Tango, Mango Town)*

33 Washington Street, San Juan

tel: +2 722-4278, -1613, -4647

email: anpfoods@hotmail.com

Vanison Co

American Packaging Corp.

- *gelatin in various flavors (WOW, Juice C)*

Luzon House, Severino Subdivision, Km. 18, SSH, Sucat, Parañaque

tel: 824-3691, -4697, -5285

email: luzongrp@mozcom.com

Barrio Fiesta Mfg Corp.

- *fruit juice concentrate (Barrio Fiesta)*

13 Judge Juan Luna Street, San Francisco Del Monte, Quezon City

tel: 372-6377, -6378, -6406

email: barrio@compass.com.ph

Cathay Pacific Multi Commodities Corporation

- *tropical fruit preserves; fresh, frozen and dried fruit*

17 Clemente Street, San Agustin, Novaliches, Quezon City

tel: 936-7239 (41), 930-6001 (5), 936-7245 (8); 939-5828

email: cpmulti@philonline.com.ph and export@philonline.com

Philip Young

Central Macaroni Co., Inc.

- *fruit juices and concentrates, purees, nectars, jams and jellies*

5 Mariano Marcos Street, San Juan

tel: +2 724-4955; 725-1519,-0592

email: cenmaco@nsclub.net

Vincent Kawsek

Columbus Foods Inc.

- *fruit juices and concentrates (Plus Juice Drinks)*

48 Amang Rodriguez Avenue, Mangahan, Pasig City

tel: 655-9204; 633-4171, 634-1232

Dalisay Sweets

preserved fruits, purees

18 de Jesus Street, San Francisco del Monte, Quezon City

tel: 373-1617 (8)

email: dsisales@mozcom.com

Cesar N. Falcatan

Del Monte Philippines, Inc.

- *fruit juices, fruit cocktail*

28/F, City Tower Building, Paseo de Roxas Avenue, Makati City

tel: 810-7501 (6), 848-0320

Destilleria Limtuaco & Company, Inc.

1830 E. delos Santos Avenue, Quezon City 1106

tel: +2 361-7491 to 98

Manggo Sanchez

Dole Philippines

- *fruit juices*

14/F, BA Lepanto Building, 8747 Paseo de Roxas Avenue, Makati City

tel: 810-2601; 812-7111; 816-6483

email: lbelarmino@doleasia.com

Epoch Tropical Fruits Manufacturing Corporation

- *dried mango (Flying Dolphin)*

7258 J. Victor Street, Pio del Pilar, Makati City

tel: 893-9982; 893-9689, 840-5195

email: sekino@super.net.ph

Ecclesiastes Eleven Int'l Corp, Inc.

- *fruit preserves, frozen fruit*

304 Building III, Celery Road, FTI Complex, Taguig

tel: 838-4702, -4553, -4752

Erma Industries, Inc.

- *tropical fruits preserves*

115 North Bay Boulevard, Navotas

tel: 282-6545, -6543; 281-3515 email: erma@mnl.vlink.net

Farm Treasures Corp.
1st Reyville, Bacoor, Cavite
tel: +46 970-7033
Ching Geronimo

F & M Foods
• *tropical fruit preserves (Kayumanggi)*
225 Rizal Avenue, Alaminos, Laguna
tel: (Manila) +2 510-0275; (Laguna) +93 562-0613; 562-5980; 551-4914
email: kayumanggi@msc.net.ph
Tommy Flores

FCG Trading Phils., Inc.
• *tropical bottled fruit preserves*
9 Guirayan Street, Araneta Subdivision, Quezon City
tel: 715-7753, -1154, -1165

Finest Food Products
• *tropical fruit juice*
Unit 101, 10/F, Philam Bank Tower, El Cano Street, San Nicolas, Binondo, Manila
tel: 241-7290 (3), -7285; 241-8351; 293-2319
email: hanybrand@finestfood.com

Fitrite Incorporated
• *tropical fruit preserves*
145 Gen. Evangelista Extension, Kalookan City
tel: 364-5920; 363-5061, 361-4472; 361-7338

Florence Foods Corp.
• *tropical fruit preserves*
1051 North Bay Boulevard, Navotas
tel: 281-3147; 282-4183; 281-3147; 281-2840
email: Florence@mozcom.com

Fortress Food Manufacturing Corp.
• *mango concentrate, puree*
35 Sto. Nino Street, Ma. Corazon Subdivision, Cupang, Antipolo City
tel: +2 2500879
Rene Hernandez

Fruit Asia, Inc.
• *fruits and fruit puree*
5/F, ENZO Building, 399 Sen. Gil Puyat Avenue, Makati City
tel: 896-8997, -8982
email: fruitasia@enzo.com.ph
Lelette Cabrera

Gracias Food Corp.

- *mango roll*

MSD Building, DOST Compound, Bicutan, Taguig

tel: +2 8212525

Antonio S. Arevalo

Golden Hands Mfg. Corporation

- *mango and guyabano fruit juices*

Building 12, Santos Industrial Compound, 60 Leono Street, Malabon

tel: 282-5286, 281-4114, -3787

email: ghmc@info.com.ph

Eliza Paylago

Gordon Marketing, Inc.

- *assorted dried fruits (mango, papaya, pineapple)*

Lot 71-B, DBP Avenue, FTI Complex, Taguig

tel: 838-4927, 838-4598

email: grdnphils@vasia.com

Zenaida Gordon

Harman Foods Corporation

- *aseptic and frozen mango puree, juices in doy packs, canned nectars, purees, juices (Zesto)*

46-A. Bonifacio Avenue, Quezon City

tel: 740-2094 (8), 366-5600 (4), 740-2158, 361-4662, 366-9192 (3)

email: gsyao@attglobal.net

Jeffrey S. Yao

Hi-Las Marketing Corp.

- *fresh, frozen, and dried mango, frozen mango halves, frozen mango puree, sweetened puree*

KKK Processing Plant Building, CRB Road, FTI Complex, Taguig

tel: 838-4940 (2)

email: hilasmc@info.com.ph

Roberto C. Amores

Jonas International Philippines, Inc.

- *assorted fruit preserves*

17 Clemente Street, San Agustin, Novaliches, Quezon City

tel: 936-7239 (41), -7245, 939-3643

email: jipi@philonline.com.ph

Kraft General Foods (Philis), Inc.

- *juices (Tang)*

8378 Dr. A. Santos Avenue, Sucat, Parañaque City

tel: 826-5546 (9), 827-1713

email: uskfldnb@ibmmail.com

Karexx Int'l, Inc.

- *tropical fruit preserves*

2 Silver Road, CIS Compound, Gen. Luis Street, Barrio Kaybiga,
Kalookan City

tel: 939-6076; -7194; 938-9168

email: amtkrxx@info.com.ph

Kian Sun International Corporation

- *dried mango, mango cubes, puree*

2508 Jollibee Plaza, Emerald Avenue, Ortigas Center, Pasig City

tel: +2 637-2929 to 33

Vincent Tsai

KLT Fruits, Inc.

- *mango purees in aseptic packs and fruit juices*

FCIE Special EPZA, Langkaan, Dasmariñas, Cavite

tel: 402-1170, -1166

Michael Lao Tian Ben

Lorenzana Food Corp.

- *tropical fruit preserves*

551 M. Naval Street, Navotas

tel: 282-4506; 282-4502, 281-6902

email: george@aim.edu.ph

Mabuhay 2000 Enterprises, Inc.

Bay 4, MDC Road, SCPI Warehouse, Veterans Center, Taguig

tel: +2 838-9032

Kim Lapus

McGar Food Company, Inc.

- *mango chutney, nectar and jelly*

4075 Magsaysay Boulevard, Sta. Mesa, Manila

tel: 714-3436

Catalina Quimbo

Marsman Drsydale Foods Corp.

- *dried fruits, mango nectar, mango confectioneries (Drsydale)*

Phil Far East Argo Compound, Rambutan Road, FTI Complex, Taguig

tel: 823-6886 (91), -1948

email: mbs@skyinet.net.ph

Eligio Torado

Monarissa's Home Cooking

- *spicy burong mangga*

1841 Dr. A. Vasquez Street, Malate 1004, Manila

tel: +2 522-1924

Amelia B. Castillo

Narigin Food Corp.

- *tropical fruit preserves (Jeena)*

602 Robert Street, Bankers II, Quirino Highway, Kalookan City

tel: 928-9510, -9510; 939-1510

email: julietnavarrete@usa.net

Nature's Delight

- *mango nectar*

6409 Camia corner Gumamela Streets, Makati City

tel: 818-7831, -0853, -5937, -5960, -8627

Kim Sin Ongkauko

Newton Food Products, Inc.

- *tropical bottled fruit preserves*

84 Ramon Delfin Street, Marulas, Valenzuela

tel: 291-6793(6), -6792

Nutri-Licious Foods Corp.

- *fruit juice and concentrates, puree (Nutri-Licious)*

7 Macario Flores corner Almeda Streets, Pateros

tel: 641-6941 (3), -6361

email: sales@nutri-licious.com.ph

Willy Liwanag

Oceanic Export (Manila), Inc.

- *assorted fruit preserves, purees and concentrates*

2164 Leon Guinto Street, Malate, Manila

tel: 524-5941, 522-4575, 525-7420

email: ocm@firstmanila.com

Michael San Luis

Orient Foods Industries, Inc.

- *dried fruits*

Julio Sy

19/F, Citibank Tower, Paseo de Roxas Avenue, Makati City

Merville Industrial Complex, Km. 14, Merville Access Road,

Paranaque ??

tel: 848-1021 (7), -1474, -1006 813-5395

email: taocom@jdbnet.com

Par Excellence Trading

- *preserved products*

6 Eddie Flor Street, P. Aguila Subdivision, Cutawest, Batangas City

tel: 980-1974, 402-2254

Planters Crop Export Marketing Inc.

- *juice concentrates (Planters Crop Fruities)*

109 Esteban Street, Legaspi Village, Makati City

tel: 894-0466, 816-4388

Pure & Rich Food Int'l, Inc.

- *fruit cubes, puree and concentrates*
- 2/F, CSP Building, 173 EDSA, Mandaluyong City
tel: 725-5656, 723-5846
email: purerich@skyinet.net
URL: www.purerichfood.com
Liz Mijares

Pick Fresh/Food Development & Training Systems

- *fruit juices*
- Room 110, Alumni Center, U.P. Campus, Diliman, Quezon City
tel: +2 9206873
Divina Sonido

Queen Food Mfg. Corp.

- *assorted sweet preserves (Queen)*
- 862 Interior Gonzales Street, Concepcion, Marikina
tel: 942-1452, -1437; 943-5547, 941-0476
email: qsmc@i-next.com
Rene Esteban

Robsen's Inc.

- *fruit pulp puree (Robsen's Puree)*
- 130 Speaker Perez Street, Quezon City
tel: +44 676-1540, -1629

Reyson's Food Processing

- *assorted fruit preserves (Tita Ely)*
- Room 501-A, Webjet Building 64 Quezon Avenue, Quezon City
tel: 712-5314; 413-4688, 712-5314
email: reysonsfod@pacific.net.ph

San Carlos Fruit Corp.

- *fruit puree, concentrates*
- Unit 1405, West Tower, PSE Center, Ortigas Center, Pasig City
tel: 635-9228, 637-3412
Abe Adecalsada

Seachamp International Export Corp

- *tokoyaki, konomiyaki, ami-ebi, purple yam and frozen mango*
- Building 2, Skydragon Compound, Domestic Terminal Road, Pasay City
tel: 833-1614; 831-6331; 834-0903, 833-9362
email: seachamp@info.com.ph

See's International Food Mfg. Corp.

- *dehydrated fruits, mango nectar*
- 66 Imperial Street, Cubao, Quezon City
tel: 438-5837; 912-2777, -2786
email: rubensee@skyinet.net
Ruben See

Sugarland Multifoods Corp./Sugarland International Products

- *powdered juice, ice cold mix drinks (Jelly Ace, Eight O'clock)*
- 102 Buendia Avenue corner Roxas Boulevard, Pasay City
tel: 831-1889, -2087, 833-3044; 551-0537
email: weens@excite.com
Weena Marasigan

Summer Fruit Inc.

- *dried mango, mango nectar*
- Marsman Building, Sen. Gil Puyat Avenue corner Washington Street, Makati City
tel: 812-6575, 817-7031 (40)
Ronnie P. German

Taiyu Food Products Corp.

- *assorted fruit juices (Fruit C)*
- 40-C Sta. Catalina Street, Sta. Mesa Heights, Quezon City
tel: 741-2131, -2135; 412-9437 (9), 732-1692
email: taiyu@i-manila.net.ph
Paul Ang

TSB Enterprises

- *mango puree*
- 148 Pingkian Street, Philand Subdivision, Pasong Tamo, Quezon City
tel: 932-8064 (7), 931-9744
email: tsb@pworld.net.ph
Bernie de Guzman

T'boli Agro-Industrial Dev't, Inc.

- *mango puree, canned juices, dehydrated fruit products*
- 2603 A&B, West Tower, PSE Center, Exchange Road, Ortigas Center, Pasig City
tel: 635-5037 (8), -5028
Senen Bacani

Tropicool Products, Inc.

- *fresh, processed fruit drinks (Bub Juice Drinks)*
- 2/F, CSP Building, 73 EDSA, Mandaluyong City
tel: 724-9080, 723-5846
email: purerich@skyinet.net

Trade Expositions Center, Inc.

• *dried mango, juices*

Room 503, Ma. Natividad Building, 470 T.M. Kalaw Street, Ermita,
Manila

tel: +2 525-9959

Gail Perez

V8 Commercial Company, Inc.

Suie 1805, Atlanta Centre, 31 Anapolis Street, Greenhills, San Juan,
Metro Manila

tel: +2 7249395

Rachel Chuongco

Annex 3: Processed Mango Classification

*By Harmonized System (HS) and
Philippine Standard of Community Classification (PSCC)*

HS CODE	PSCC	DESCRIPTION
Dried, Glazed, Crystallized Fruits		
08045000	0579706	Mangoes, dried
20060000	0621006	Mangoes, drained, glaze or crystallized
Jams, Jellies, Marmalades and Prepared/Preserved Fruit		
20019000	0567103	Mangoes, prepared or preserved by vinegar or acetic acid
08129000	0582103	Mango, in brine, sulphur water or in other temporary preservative solutions, but unsuitable in the state of consumption
08119000	0583901	Mango, uncooked or cooked by steaming or boiling in water, frozen whether or not containing added sugar or sweetening matter, n.e.s.
20089900	0589605	Mangoes/edible parts thereof, prepared/preserved, n.e.s.
Juices, Purees and Concentrates		
	0581006	Mango puree
20098000	0599501	Mango juice concentrates
20098000	0599501	Mango juice other than concentrates

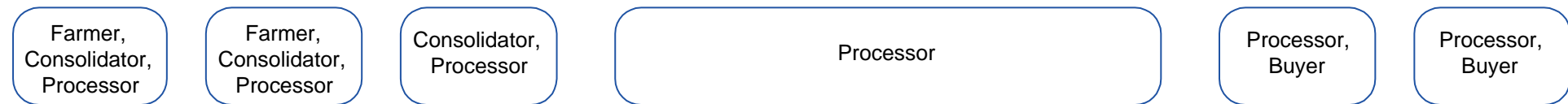
Source: Department of Trade and Industry

Annex 4: General Process Flow

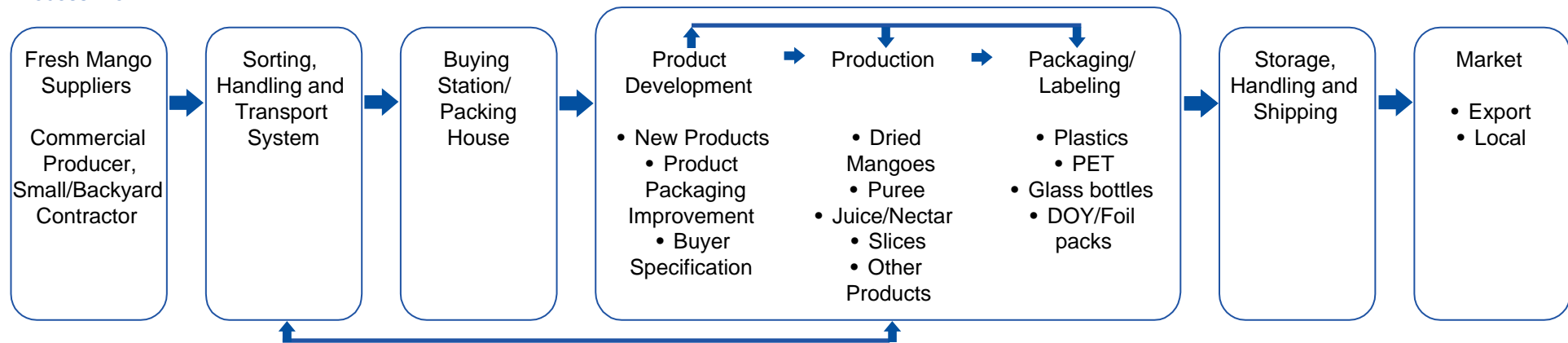
Value Chain



Players



Process Flow



Annex 5: Company Profile Survey Form

General Information		Control No. _____
Company: _____		
Telephone Nos. _____		
Telefax:	E-mail address:	Website:
Office Address:		
Factory Address:		
Date Established:		
Company Size: (pls. check appropriate box)	<input type="checkbox"/> Micro (assets below Php 3M) <input type="checkbox"/> Small (assets from Php 3M to 15M) <input type="checkbox"/> Medium (assets from Php 15M to 100M)	
Company Setup: (pls. check appropriate box)	<input type="checkbox"/> Sole proprietorship <input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Cooperative <input type="checkbox"/> Other (pls. specify) _____	
Ownership		
For sole proprietorship		
Name of owner:	_____	Gender: _____
For corporations		
Name of chairperson:	_____	Gender: _____
Board of Directors	No. of female members:	_____
	No. of male members:	_____
	Total no. of members:	_____

Management				
Name of President:			Gender:	
_____			_____	
Other management positions (pls. indicate position and number of managers by gender)				
Position	Male	Female	Total	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	
Business Premises				
Size in sq. m. (pls. check)	Ownership: (pls. check)	Venue: (pls. check)		
_____ Less than 100	_____ Owned	_____ Residence		
_____ 100 to 250	_____ Rented	_____ Commercial		
_____ Over 250				
Products				
Product Lines			% of total sales	
_____			_____	
_____			_____	
_____			_____	
_____			_____	
_____			_____	
Employment (in-house employees)				
Type of work	Male	Female	Total	
Production, supervisory	_____	_____	_____	
Production, workers	_____	_____	_____	
Quality control staff	_____	_____	_____	
Technical/ R & D	_____	_____	_____	
Marketing	_____	_____	_____	
Office/administrative	_____	_____	_____	
Total	_____	_____	_____	
Average wage rate of workers	_____	_____	_____	
Subcontractors				
Does your company subcontract work? (pls. check)	_____	Yes	_____	No
If yes, what percentage of work is subcontracted?	_____			%

Subcontractors (con't)			
If yes, reasons for subcontracting (pls. check appropriate item):			
• To address need for additional capacity vis-à-vis in-house capacity/ services	<input type="checkbox"/>	Pre-production	<input type="checkbox"/> Finishing
	<input type="checkbox"/>	Production	<input type="checkbox"/> Others
• In-house set-up is limited, as such always requires out-sourcing of services	<input type="checkbox"/>	Pre-production	<input type="checkbox"/> Finishing
	<input type="checkbox"/>	Production	<input type="checkbox"/> Others
If yes, number of subcontractors/companies used in a year:			<input type="text"/>
If yes, average number of workers of subcontractors:			<input type="text"/>
If yes, is majority of subcontractors male or female?	<input type="checkbox"/>	Male	<input type="checkbox"/> Female
	<input type="checkbox"/>	Not sure	
Geographic location of subcontractors: (pls. check)	<input type="checkbox"/>	Within province	<input type="checkbox"/> Within island group
	<input type="checkbox"/>	Within region	<input type="checkbox"/> Nationwide
Support provided to subcontractors (pls. rank order of importance with 1 being most important)	<input type="checkbox"/>	Credit/financing	<input type="checkbox"/> Skills training
	<input type="checkbox"/>	Equipment/tools	<input type="checkbox"/> Others (pls. specify)
	<input type="checkbox"/>	Product development	
Common problems with subcontractors (pls. rank in order of importance with 1 being most important)	<input type="checkbox"/>	Quality of work	<input type="checkbox"/> Reliability
	<input type="checkbox"/>	Delivery date	<input type="checkbox"/> Others (pls. specify)

Raw Materials Used (include Packaging)		
Major raw materials/ packaging materials	Local or Imported	Location of Supplier
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Proportion of local and imported materials used (%)	Local: _____ Imported: _____	
Mode of raw material procurement (pls. check)	Open market: _____ Own source: _____ Others (pls. specify)	
Problems with raw materials (pls. rank according to degree of importance, with 1 indicating foremost problem)		
_____ Quality	_____ Availability	Others (pls. specify)
_____ Delivery	_____ Price	
What form of assistance could be provided to address these problems?		
Production		
Mode of Production (pls. check appropriate item)		
Activity	Manual	Semi- mechanized
		Fully mechanized
Materials handling		
Production		
Quality control		
Packaging		
Rated Capacity: Pls. state unit of measure used (ex. pieces, pairs or grams) and indicate period (per year or day)		
Quantity	Unit/Period	Utilization Rate (%)
_____	_____	_____
If underutilized (below 100%), pls. rank the reasons, with 1 being the foremost reason		
_____ Lack of raw materials	_____ Equipment limitation	
_____ Manpower limitations	_____ Space limitations	
Others (pls. specify)		

Production (con't)			
Quality Control System (pls. check)	_____	Use outside testing facilities	
	_____	Follow standard procedures (GMP, HACCP)	
	_____	Use internal resources/equipment	
	_____	Have specifically assigned personnel	
Quality Control Problems (pls. check)	_____	Raw materials/supplies	
	_____	Production process	
	_____	Others (pls. specify)	
Product Development			
Source of product dev't (pls. check)	_____	Internal capabilities	_____ External parties
	_____	Buyers	_____ Internet
Sources of information for product development (pls. check)	_____	Trade fairs	_____ Designers
	_____	Publications	Others (pls. specify)
Is your present information enough for product development?	_____	Yes	_____ No
Do you have internal R&D facilities?	_____	Yes	_____ No
Do you design concepts based on buyers' specifications?	_____	Yes	_____ No
Do you have problems conforming to specs (ex., use of disallowed preservatives)?	_____	Yes	_____ No
Market			
Proportion of market sales (%)		Exports	_____ %
		Local sales	_____ %
		Region/Country	% of total exports
		United States	_____ %
		Canada	_____ %
		Europe	_____ %
		Middle East	_____ %
		Japan	_____ %
		Australia	_____ %
		Other Asia	_____ %
		Others (pls. specify)	_____ %
		Region/City	% of local sales
		Metro Manila	_____ %
		Cebu	_____ %
		Davao	_____ %
		Others (pls. specify)	_____ %

Market (con't)						
Market Segments Targeted (pls. check)	<input type="checkbox"/>	High end	<input type="checkbox"/>	Middle	<input type="checkbox"/>	Low end
	<input type="checkbox"/>	Own contacts	<input type="checkbox"/>	Trade fairs		
Sources of foreign buyers (if applicable, pls. check appropriate items)	<input type="checkbox"/>	Business missions	<input type="checkbox"/>	Referrals		
	Others: (pls. specify)					

	<input type="checkbox"/>	Brochures/ catalogs	<input type="checkbox"/>	Website/ Internet		
Trade Promotion Activities (pls. check appropriate items)	<input type="checkbox"/>	Trade fairs	<input type="checkbox"/>	Business missions		
	Others: (pls. specify)					
What countries are you targeting for your expansion?						
Competitors (pls. indicate countries that compete with your products and their main strength as competitors)	Country	Strength as competitor				
	_____	_____				
	_____	_____				
	_____	_____				
	_____	_____				
	_____	_____				
How do you think can the threat of competition be minimized?						

Sales						
Exports (please indicate the range by checking in the appropriate area)	2001	2002	2003			
Under US\$ 50,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 50,001 to US\$ 100,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 100,001 to US\$ 300,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 300,001 to US\$ 500,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 500,001 to US\$ 1,000,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 1,000,001 to US\$ 3,000,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
US\$ 3,000,001 to US\$ 5,000,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Over US\$ 5,000,000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Sales (con't)			
Local Sales (please indicate the range by checking in the appropriate area)	2001	2002	2003
Under PhP1 million	___	___	___
More than PhP1 million to PhP3 million	___	___	___
More than PhP3 million to PhP5 million	___	___	___
More than PhP5 million to PhP10 million	___	___	___
More than PhP10 million to PhP15 million	___	___	___
More than PhP15 million to PhP20 million	___	___	___
More than PhP20 million to PhP25 million	___	___	___
More than PhP25 million to PhP30 million	___	___	___
More than PhP30 million to PhP50 million	___	___	___
More than PhP50 million to PhP70 million	___	___	___
More than PhP70 million to PhP100 million	___	___	___
More than PhP100 million to PhP200 million	___	___	___
More than PhP200 million	___	___	___
Distribution			
	___ Direct selling	___ Own store	
Distribution Channels (pls. indicate your major marketing and distribution channels)	___ Groceries	___ Traders	
	___ Supermarkets	Others (pls. specify)	
	___ Product specs/quality not acceptable to buyers		
Marketing Problems encountered (pls. check)	___ Packaging not suitable		
	___ Prices not competitive		
	Others (pls. specify)		
How do you think can these be problems be solved?			
Finance			
	Expense		
Budget Allocation (in %)	Administrative and overhead		___
	Research and development		___
	Marketing		___
	Production		___
	Others		___

Sources of Funds for Production	<input type="checkbox"/> Own funds	<input type="checkbox"/> Private lenders	
	<input type="checkbox"/> Credit line with bank	Others (pls. specify)	_____

Have you received any assistance from any donor group?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, pls. specify the donor group and year assistance was received	Donor Group	Type of Assistance (grant, technical, marketing, others)	Year
Have you received any assistance from any government agency?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, pls. specify the agency and year assistance was received	Government Agency	Type of Assistance (grant, technical, marketing, others)	Year
What other assistance from a donor or government agency would help you expand your operation? Pls. specify.			
What would you consider as the top three (3) problems that would prevent expansion of your operation? How would you solve these problems?			
What in your opinion are the top three (3) concerns of the industry? How do you think can these be addressed?			

Person interviewed:

Position/Designation:

Interviewed by:

Date:

Thank you for your cooperation, please be assured that your responses will be kept in strictest confidence.

Annex 6: Data Sources

- Agribusiness and Marketing Assistance Service (DA-AMAS). 2003 Mango Road Map. DA-AMAS, Elliptical Road, Quezon City.
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- Bureau of Agricultural Statistics. 2004. Performance of Philippine Agriculture. URL: www.census.gov.ph
- Bureau of Export Trade and Promotions (BETP). 2004. Top Philippine Merchandise Export Market for Various Mango Products. BETP Files, Department of Trade and Industry, Makati City.
- Chan, 2003 Report on the State of the Processed Mango SubSector. CIDA Pearl2 Project. Makati City.
- Foundation for Resource Linkage and Development, Inc. The Mango Marketing System in Major Production and Demand Areas in the Philippines. October 1994. FRLD, FTI Complex, Taguig, Metro Manila.
- Philippine Genetics, Inc. 2002. Strategic Action Plan: Volumes 1 and 2. Department of Agriculture-National Agriculture and Fishery Council, Elliptical Road , Quezon City.
- Salacup, 2004. "Overview of the Mango Industry." A paper presented at the Mango Marketing Conference, Grand Men Seng Hotel, Davao City.
- Trade Analysis System. 2002. World Imports and Exports: Guava, Mangoes, Mangosteen, Dried and Fresh. ITC/UNSD. BETP files, Department of Trade and Industry, Makati City.

Annex 7: Data Tables

Table 1
World Imports of Guavas, Mangoes, and Mangosteen
Fresh or Dried, By Country, 2002
(in US\$ '000)

Country	Value (in US\$ '000)	Share to Total (%)
USA	196,319	37.0
Hongkong S.A.R.	52,480	9.8
Netherlands	51,669	9.7
France	30,603	5.7
Germany	30,041	5.6
United Kingdom	26,123	4.9
Japan	25,606	4.8
Canada	24,408	4.5
Saudi Arabia	23,846	4.4
Others	70,121	13.2
Total	531,226	100.0

Source of data: Trade Analysis System-International Trade Centre (ITC/UNSD)

Table 2
World Exports of Guavas, Mangoes and Mangosteen
Fresh Or Dried, By Country, 2002
(in US\$ '000)

Country	Value (in US\$ '000)	Share to Total (%)
Mexico	98,776	30.9
Brazil	50,849	15.9
Netherlands	37,212	11.6
Peru	33,715	10.5
Philippines	31,227	9.7
India	19,274	6.0
Others	48,237	15.1
Total	319,290	100.0

Source of data: Trade Analysis System-International Trade Centre (ITC/UNSD)

Table 3
World Exports of Guavas, Mangoes and Mangosteens
Fresh or Dried, 1998-2002
(in US\$ '000)

Year	Value (in US\$ '000)	Growth Rate (%)
1998	315,649	-
1999	323,431	2.5
2000	329,161	1.8
2001	347,687	5.6
2002	319,290	-8.2
Average Growth (%)		0.4

Source of data: Trade Analysis System-International Trade Centre (ITC/UNSD)

Table 4
Distribution of Mango Processors, By Area
as of June 2004

Area	No. of Firms	Percentage Share (%)
Metro Manila	56	65.8
Batangas	1	1.1
Laguna	1	1.1
Cavite	2	2.3
Metro Cebu	13	15.2
Guimaras	2	2.3
Negros Occidental	3	3.5
Capiz	1	1.1
Leyte	1	1.1
South Cotabato	1	1.1
Sarangani	2	2.3
Metro Davao	2	2.3
Total	85	100.0

Source: Department of Trade and Industry, Trade Event Listings, 2003 Sector Report

Table 5
Philippine Exports of Processed Mango by Product , 2003
(in US\$'000)

Product	Export Value	Percentage Share (%)
Dried	13,713.13	46.1
Puree	11,899.80	40.0
Juice	2,533.47	8.5
Uncooked; cooked by steaming or boiling in water; frozen	1,122.64	3.7
Juice concentrates	248.40	0.8
Edible parts prepared or preserved	227.78	0.7
Prepared or preserved by vinegar/acetic acid	0.87	0.03
Total	29,746.09	100.0

Source: Bureau of Export Trade Promotion

Table 6
Philippine Exports of Dried Mango by Market, 2003
(in US\$ '000)

Country	Export Value	Percentage Share (%)
USA (excl. Hawaii and Alaska)	5,521.00	40.2
Hongkong S.A.R.	2,231.26	16.2
Germany	1,574.70	11.4
Singapore	1,107.55	8.0
Canada	591.04	4.3
Korea, Rep. of (South)	497.85	3.6
Ireland	441.60	3.2
Japan	440.39	3.2
Taiwan	368.23	2.6
South Africa	338.88	2.4
Others	600.66	4.3
Total	13,713.16	100.0

Source: Bureau of Export Trade Promotion

Table 7
Philippine Exports of Mango Puree by Market, 2003
(in US\$'000)

Country	Export Value	Percentage Share (%)
Korea, Rep. of (South)	7,718.39	64.8
Japan	1,085.69	9.1
USA (excl. Hawaii and Alaska)	969.30	8.1
New Zealand (excl. Western Samoa)	767.11	6.4
Hongkong S.A.R.	615.46	5.2
Germany	258.11	2.2
Taiwan	210.53	1.8
Singapore	118.11	1.0
Malaysia	105.57	0.9
Honduras	19.03	0.2
Others	32.52	0.3
Total	11,899.82	100.0

Source: Bureau of Export Trade Promotion

Table 8
Philippine Exports of Mango Juice by Market, 2003
(in US\$'000)

Country	Export Value	Percentage Share (%)
Korea, Rep. of (South)	631.82	24.9
U.S.A. (excl. Hawaii and Alaska)	503.71	19.9
Canada	317.61	12.5
Japan	252.39	9.9
Brunei Darussalam	191.05	7.5
Germany	115.66	4.6
Netherlands	95.98	3.8
Trust Territory of the Pacific Islands	80.05	3.2
Guam	62.92	2.5
Italy	61.04	2.4
Hongkong S.A.R.	53.39	2.1
Taiwan	33.31	1.3
Others	134.57	5.3
Total	2,533.50	100.0

Source: Bureau of Export Trade Promotion

Table 9
Philippine Exports of Processed Mango, 1999-2003
(in US\$'000)

Year	Export Value	Growth Rate (%)
1999	9,312.29	-
2000	9,376.01	0.7
2001	14,115.56	50.5
2002	9,403.35	(33.3)
2003	29,745.05	216.3
Average Growth (%)		58.5

Source of basic data: Department of Trade and Industry

Table 10
Philippine Exports of Dried Mango, 1999-2003
(in US\$'000)

Year	Export Value	Growth Rate (%)
1999	4,502	-
2000	5,477	21.7
2001	8,008	46.2
2002	3,866	-51.7
2003	13,713	254.7
Average Growth (%)		67.7

Source of basic data: Department of Trade and Industry

Table 11
Philippine Exports of Mango Puree, 1999-2003
(in US\$'000)

Year	Export Value	Growth Rate (%)
1999	2,471	-
2000	1,242	-49.7
2001	1,912	53.9
2002	1,835	-4.0
2003	11,900	548.5
Average Growth (%)		0.1

Source of basic data: Department of Trade and Industry

Table 12
Philippine Exports of Mango Juice, 1999-2003
(in US\$'000)

Year	Export Value	Growth Rate (%)
1999	1,710	-
2000	1,902	11.2
2001	3,357	76.5
2002	2,746	-18.2
2003	2,533	-7.8
Average Growth (%)		15.4

Source of basic data: Department of Trade and Industry

Table 13
Philippine Exports of Processed Mango, by Country 2003
(in US\$)

Country	Value	Percentage Share
Korea, Rep. of (South)	9,350,692	31.9
U.S.A.	7,253,196	24.7
Hongkong S.A.R.	2,985,214	10.2
Germany	2,292,523	7.8
Japan	2,059,008	7.0
Singapore	1,232,661	4.2
Canada	918,889	3.1
New Zealand	774,744	2.6
Taiwan	612,062	2.1
Ireland	442,220	1.5
Others	1,824,881	6.1
Total	29,746,090	100.0

Source of basic data: Department of Trade and Industry