



PRE-FEASIBILITY REPORT- DATE PROCESSING



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PREFACE

This report was prepared for the USAID/INMA project in order to further define the scope and equipment needs for the revitalization of the Iraqi date industry. The focus of the report is on strategies and financial projections for establishing Rural (date) Collection Centers and a Central date processing facility suitable for the exporting of dates and date products. The objective is to create a higher value and higher price for Iraqi dates and thereby increase interest in the production and post-harvest care of dates.

The report draws upon earlier studies, including an “Iraq-A Strategy for Dates”, December 2007 and “Date Sector Report and Value Chain Development Program”, January 15, 2008, as well as discussions with date equipment suppliers in Dubai, Italy and in (California) USA.

This report is the first step in defining processing opportunities, particularly export opportunities, for the Iraqi date sector.

**IRAQ DATE SECTOR
PRE-FEASIBILITY REPORT-DATE PROCESSING**

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1. BACKGROUND

An important step in the re-vitalization of the Iraqi date industry is to provide assistance in building modern facilities and providing equipment to properly grade, process and store dates. Over the past 25 years countries such as Iran, Pakistan, Saudi Arabia, UAE and Oman have invested in both date production and processing facilities. During this period, Iraqi faced many challenges that, added together, greatly diminished the date industry and very limited investment was possible for up-grading and providing facilities for the handling and processing of dates. Background for this study can be found in the previously prepared INMA reports, *Iraq- A Strategy for Dates*, and *the Date Sector Study*, previously noted.

The purpose of the pre-feasibility study is to outline the facilities, equipment and management required for a modern date collection and processing facilities to service both domestic and export markets. It is envisaged that these facilities will be developed by Iraqi and other investors with technical and financial assistance from the USAID/INMA project.

The objective is to assist the Iraqi date industry modernize and promote at least one or two central processing facilities that can receive raw material from Rural Collection Centers in major date production regions.

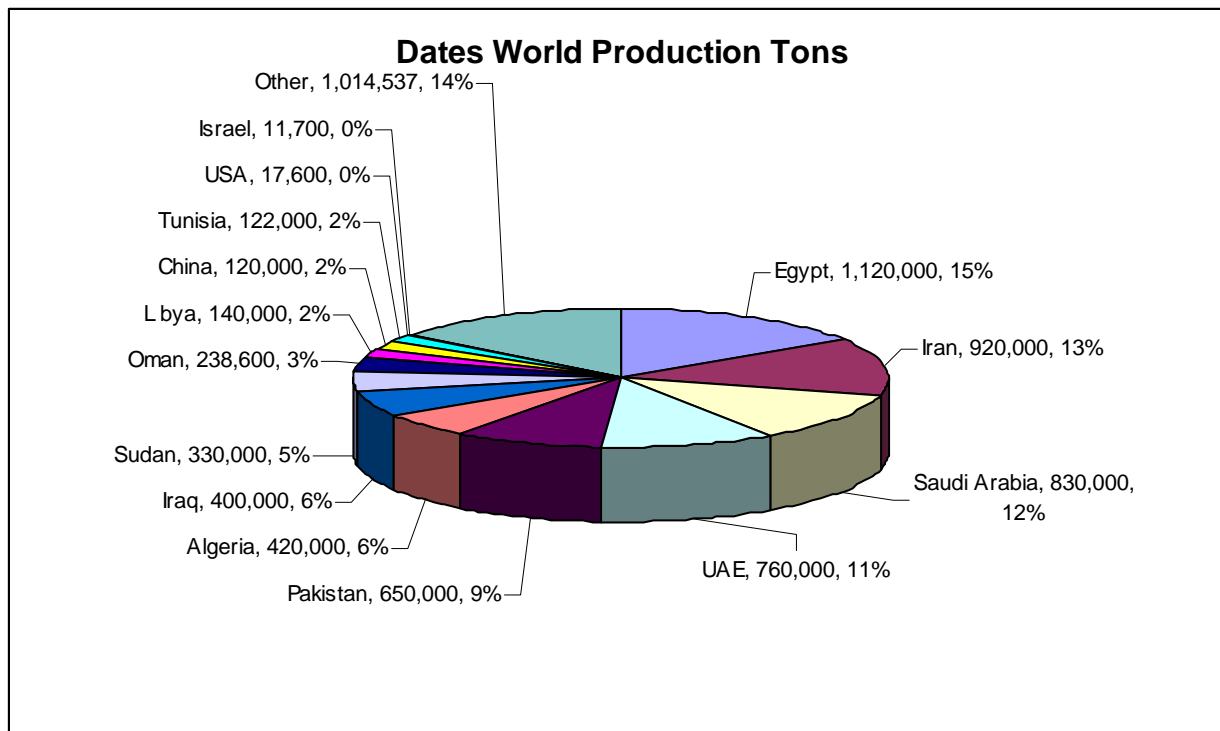
2. GLOBAL DATE MARKET OUTLOOK

Worldwide date production has increased exponentially over the last three decades. Starting in 1965 at about 1.85 million tons, it reached 2.7 million tons in 1985 and 7.0 million tons in 2005.

The industry turning point occurred in the early 80s, during, and immediately after the Iraq-Iran conflict. This conflict disrupted the worldwide date supply, creating shortages on the lucrative EU export market and in the fast-growing Asian export market.

The gap in supply and the consequent drastic rise in prices prompted other countries, notably Saudi Arabia, Tunisia, Algeria, UAE, Pakistan and Israel, to invest heavily in expanding date palm cultivation to target the EU and Asian markets. Iran rejoined the global export market in the late 1980s; unfortunately, Iraqi date production continued to be affected by the boycott imposed after the 1991 invasion of Kuwait.

On the supply side, there is no correlation between production volume and importance as an exporter. Tunisia and Israel, for example, are two top exporters to the EU, despite producing less than 2 percent of the global date supply.



Source: COMTRADE 2006 – FAOSTAT - EUROSTAT

Leading importers of dates are Europe (highest market value), India (highest volume), UAE (although data seems inconsistent, and more realistic import could be close to 50.000/60.000MT) and other Asian countries such as Sri Lanka, Indonesia, Malaysia and Bangladesh.

| Dates: Import Countries | Value \$ Million | Volume (000Tons) | Price/kg \$ |
|-------------------------|------------------|------------------|-------------|
| EU | 188,160 | 68,569 | 2.74 |
| India | 74,686 | 286,317 | 0.26 |
| UAE* ¹ | 33,713 | 196,873 | 0.17 |
| Turkey | 8,864 | 10,821 | 0.82 |
| Russia | 10,684 | 20,263 | 0.53 |
| USA | 8,099 | 6,938 | 1.17 |
| Canada | 14,567 | 8,140 | 1.79 |
| Australia | 9,017 | 6,201 | 1.45 |
| Syria | 7,411 | 23,917 | 0.31 |

Source: COMTRADE 2006

¹ Data available only up to 2005.

3. IRAQ DATE SECTOR

3.1 Date Production in Iraq

Iraq has historically been one of the major date-producing countries in the world. In the 1980s and mid-1990s, Iraq was consistently among the top five date-producing countries in the world and often ranked number one in terms of production by volume. Into the 1990s, Iraq had 22 million date palms planted over 120,000 hectares. The production of dates in Iraq has long been a matter of national pride.

Date Production by Governorate

Dates have always been grown nationwide in Iraq; however, commercial production of in-demand varieties has always been centered in the southern governorates, with Basrah renowned as the virtual center of the date industry worldwide. Due primarily to the Iran-Iraq war (1980 to 1988) and Saddam Hussein's draining of the southern marshes (early 1990s), some of the commercial production has shifted north of Basrah, but much still remains in the southern governorates.

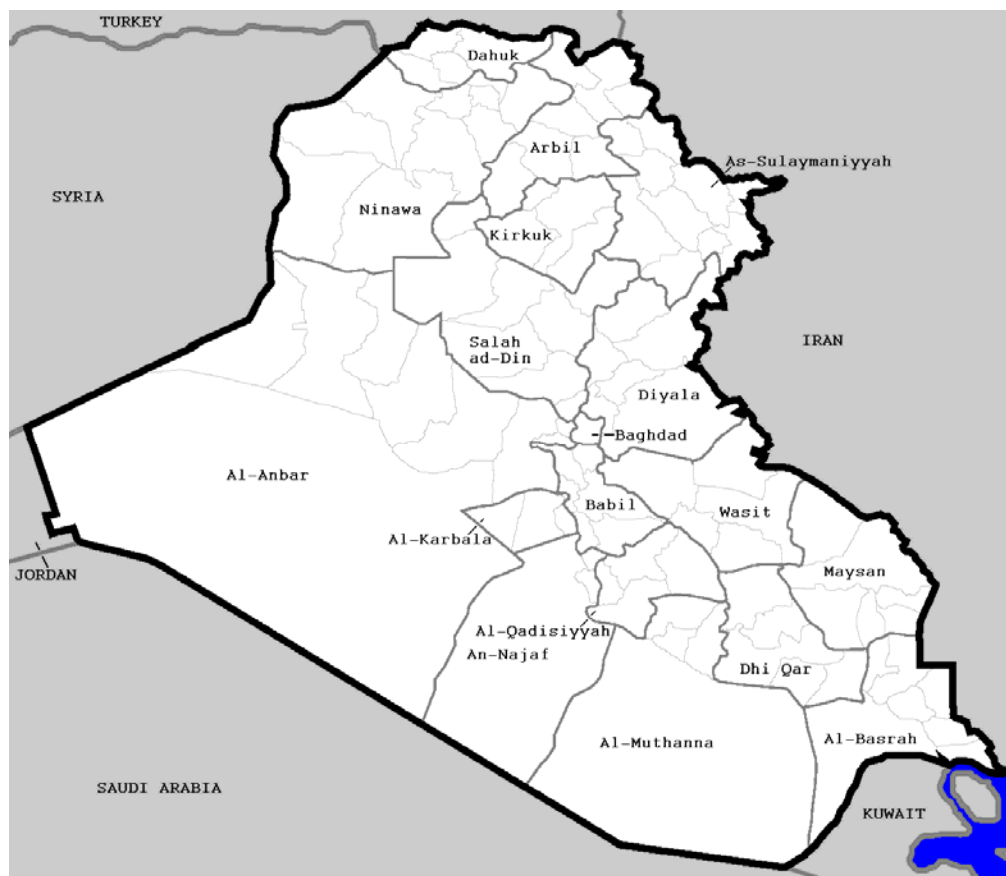
According to the most up-to-date information available, in 2001 the top five governorates in terms of date production by volume are Babil (Babylon), Karbala, Diyala, Baghdad and Basrah.

Table 1. Date Palm Trees, Production and Productivity by Governorate in 2001

| Governorate | Total no. of trees | No. of fruiting trees | Production (tons) | Yield (kg/tree) |
|------------------------|--------------------|-----------------------|-------------------|-----------------|
| Babil (Babylon) | 3,370,800 | 3,012,500 | 227,060 | 75.4 |
| Karbala | 2,079,500 | 1,894,000 | 128,840 | 68.0 |
| Diyala | 1,982,400 | 1,710,300 | 123,670 | 72.3 |
| Baghdad | 1,506,900 | 1,347,700 | 108,830 | 80.8 |
| Basrah | 2,697,600 | 2,108,600 | 73,280 | 34.8 |
| Anbar | 680,600 | 634,400 | 50,990 | 80.4 |
| Qadissya | 822,400 | 765,300 | 49,650 | 64.9 |
| Dhi-Qar | 814,500 | 770,600 | 47,050 | 61.1 |
| Wasit | 640,900 | 540,000 | 39,600 | 73.3 |
| Najaf | 626,300 | 604,300 | 24,170 | 40.0 |
| Salah al-Din | 273,900 | 231,800 | 17,160 | 74.0 |
| Maysan | 194,800 | 168,700 | 8,770 | 52.0 |
| Muthanna | 219,800 | 154,800 | 7,720 | 49.9 |
| Kirkuk (Tamim) | 400 | - | | |
| Total | 15,910,800 | 13,943,000 | 906,790 | - |

Source: <http://www.usaid.gov/iraq/contracts/pdf/ARDI14-IraqiDateIndustry.pdf>

Figure 1. Map of Governorates of Iraq



Source:http://upload.wikimedia.org/wikipedia/en/e/e3/Iraq_Dist.png

Date Production in Iraq by Variety

Dates can be identified by their characteristic appearance and texture and fall into three types: soft, semi-dry and dry. The type of fruit depends on the glucose, fructose and sucrose content. This division is based on the texture or consistency of fruit under normal conditions of ripening.

- Fresh Dates boast a soft flesh, high moisture content with high sugar content.
 - e.g. Khastawi and Barhee varieties
- Semi-Dry Dates feature a firm flesh, fairly low moisture content and high sugar content.
 - e.g. Halawi and Khadrawy varieties
- Dry Dates have a high sugar content, low moisture content and dry, hard flesh.
 - e.g. Zahidi and Sayer varieties

There are well over 400 varieties grown in Iraq, although the exact number of varieties of dates is not known. Production is dominated by the Zahidi variety (dry) followed distantly by Khastawi (fresh), Sayer (dry) and Khadrawy (semi-dry). These include the following:

| Variety | Description |
|-----------------------|---|
| Zahidi | Semi-dry date from Iraq. Medium size, cylindrical, light golden-brown, very sugary, and sold as soft, medium-hard and hard. Distinguished by its large seed in proportion to the fruit itself. This date lends itself well to processing and softening by steam hydration. This date is known for its high invert sugar level and is widely used to make diced dates and date sugar products. It features a crunchy and fibrous flesh. Industrial uses. |
| Khastawi or Khusatawi | Leading fresh date in Iraq; it is syrupy and small in size, prized for dessert. For fresh market. |
| Sayer or Sayir | Dry. Dark orange-brown, medium size, soft and syrupy. Industrial uses. |
| Khadrawy | A cultivar favored by many Arabs, it is a soft, very dark date. Originally from Iraq, it has many desirable qualities. It cures well; it ripens to amber, then cured to a reddish brown, with a caramel like texture and a sweet flavor. Industrial uses for export and fresh consumption locally. |
| Halawi or Halawy | Semi-dry. Extremely sweet, small to medium in size. Thick flesh, caramel taste, and sweet, is somewhat wrinkled in appearance, with a yellow color ripening to a light amber and then to a golden brown. Originally from Iraq. Fresh or industrial markets. |
| Barhee | Caramel taste, sweet, wrinkled in appearance, fresh market. |

The following table is the most current information available in regards to date palm trees, production, and productivity by variety.

Table 2. Date Palm Trees, Production and Productivity by Variety in 2001

| Variety | No. of Palms | Total No. Bearing | Total No. Non-Bearing | Production (tons) | Production (%) |
|--------------|-------------------|-------------------|-----------------------|-------------------|----------------|
| Zahidi | 10,309,500 | 9,412,600 | 121,000 | 654,240 | 72.1 |
| Khastawi | 1,285,400 | 1,047,300 | 38,900 | 63,310 | 7.0 |
| Sayer | 957,200 | 864,000 | 56,700 | 31,780 | 3.5 |
| Khadrawy | 666,800 | 584,000 | 29,400 | 24,800 | 2.7 |
| Halawi | 829,100 | 721,000 | 90,100 | 22,300 | 2.5 |
| Barhee | 289,400 | 84,800 | 192,700 | 5,800 | 0.6 |
| Other | 1,573,400 | 1,229,300 | 141,300 | 104,560 | 11.5 |
| Total | 15,910,800 | 13,943,000 | 670,100 | 906,790 | 100 |

Source: <http://www.usaid.gov/iraq/contracts/pdf/ARDI14-IraqiDateIndustry.pdf>

Dates ripen in four stages, which are known throughout the world by their Arabic names kimri or chimri (unripe), khalal (full-size, crunchy), rutab (ripe, soft) and tamer (ripe, sun-dried). These stages of ripening can be described as follows:

- Kimri (Chimri): first 17 weeks after pollination. The dates are green, hard, bitter, and are 80 percent moisture
- Khalal: next 6 weeks when dates become full grown, although they are still very hard. The color changes to yellow, orange or red, and sugar levels increase
- Rutab: next 4 weeks the dates become half-ripe, soft, and turn to a light brown color, and the sucrose turns to invert sugars
- Tamer: dates are ripe in the last two weeks of development. The dates become soft and sugar becomes mostly invert. Dates at this stage of development - semi-dry and dry dates - will contain about 50 percent sucrose and invert sugar.

Dry/semi-dry dates may be picked early when their color is still light and are not fully ripe and semi-dry dates may be picked as soon as they are soft. After picking dates can be further ripened at temperatures of 80 to 95 degrees F. Dry dates are generally left on the palm until they are ripe.

The principal varieties in demand for Western markets are Sayer and Zahidi dates. Halawi and Barhee are consumed as fresh, table fruit. However, the Barhee variety has limited shelf life of no more than one month and could not be feasibly shipped outside the Middle East. According to European food safety standards, all other varieties are classified as common dates when shipped to other countries. The definition of “common dates,” means that they are not distinguished from all other varieties. Limited amounts of Barhee are produced.

Sayer and Zahidi are the principal varieties for “industrial grade” dates. These dates are classified as “dry” or “semi-dry” dates due to their relatively low moisture content which ranges from 10 to 14 percent.

Market Players for Fresh and Industrial Dates

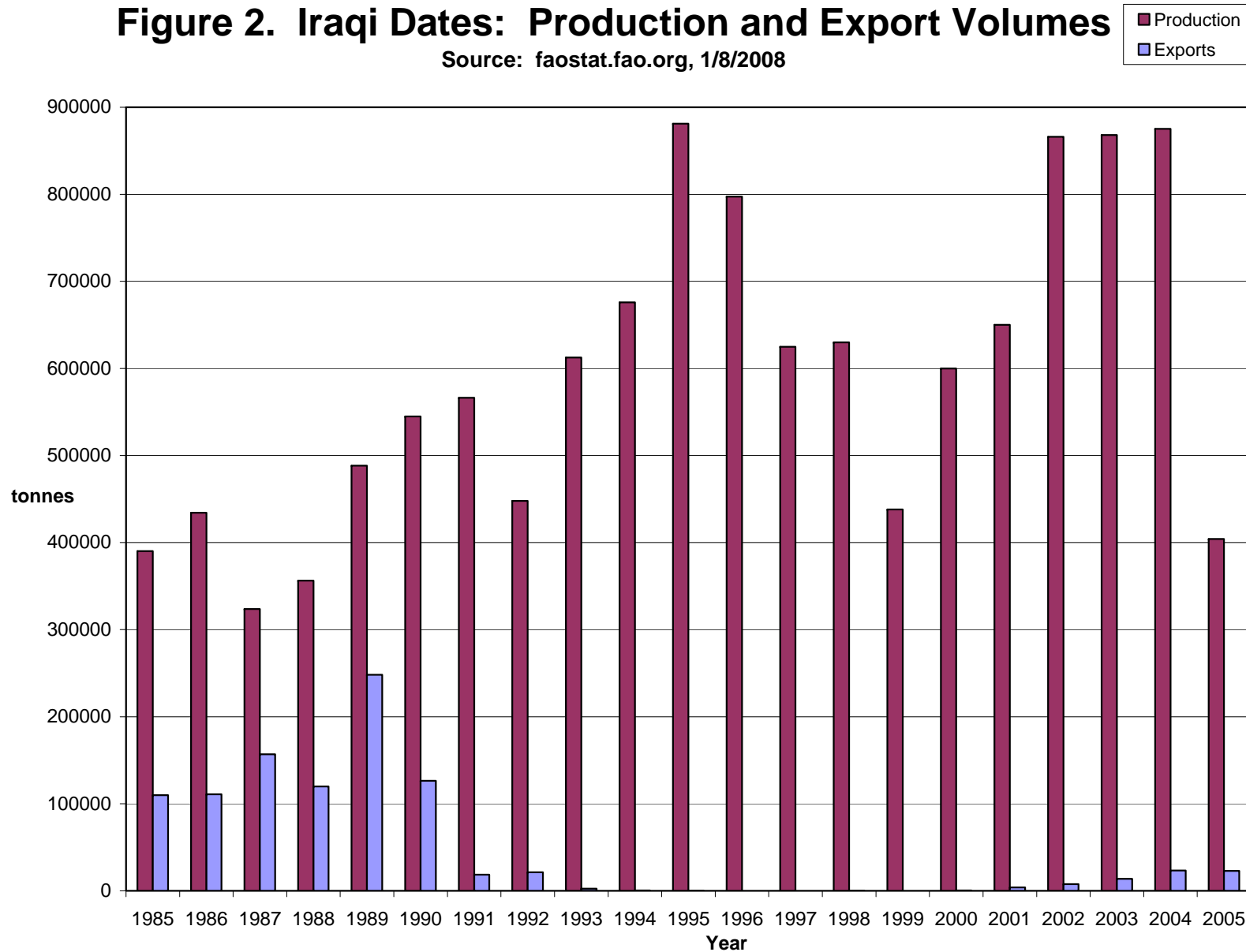
Iraq is very capable of producing large quantities of premium “industrial grade” dates, namely Sayer and Zahidi. Iraq’s main competitors in producing “industrial grade” dates are Iran and Pakistan. Iran grows both Sayers and Zahidis, especially Sayers. Pakistan grows the Aseel and BJ, dry varieties that compete with Sayers and Zahidis.

Historical Date Production

Producing up to 900,000 metric tons annually, Iraq has often had a surplus of dates to export. Iraq was a major player in the international market through the early 1990s, commanding a significant portion of the world market share. But production and quality waned in the 1990’s, due to a combination of the Iran-Iraq war, draining of the southern marshes and UN-imposed sanctions. Beginning in the early 1990s, Iraqi date exports declined dramatically and Iraq began to lose market share. The following figure illustrates the sudden and significant decrease of Iraqi date exports.

Figure 2. Iraqi Dates: Production and Export Volumes

Source: faostat.fao.org, 1/8/2008



3.2 Marketing Systems

Domestic Consumption

Dates are a staple of the Iraqi diet and per capita consumption is considered high. Figures on domestic consumption run from 100,000 to 350,000 tons, although there are no reliable figures by market share or by total domestic consumption.

Dates are an important traditional crop in Iraq. Dates can be eaten out-of-hand, added to cereals, puddings, cakes, ice cream and breads. Dry or soft dates are eaten out-of-hand, or may be pitted and stuffed with various fillings. Dates can be processed into cubes, paste, spreads, date syrup or dibis, powder (date sugar), vinegar or alcohol. Dates can also be dehydrated, ground and mixed with grain to form a nutritious livestock feed.

Higher-end, fresh dates are sold in bulk in local markets in Iraq. The prices for fresh dates in the domestic market have not been reliably collected, but can be roughly estimated to be USD 200 to 400 per ton bulk. The prices of fresh, processed, value-added dates (pitted, stuffed, packaged) would be considerably higher.

The lowest-quality dates are sold as animal feed to the dairies, sheep herders and companies making dibis (date syrup) and other fermented products. Low-quality dates are sold in the domestic market for approximately USD 100 per ton. Low-quality dates are also exported at prices of USD 75 to 150 per ton.

The “Date Strategy Report” indicated that there is a “consensus in the Iraqi market that current production – harvested October-November 2007 – may be at a historical low of only 350.000MT. This is mainly because of palm diseases due to lack of Integrated Pest Management program (IPM), since traditional aerial spray has virtually stopped”. The report made the following “best estimate” on the utilization of the current date crop:

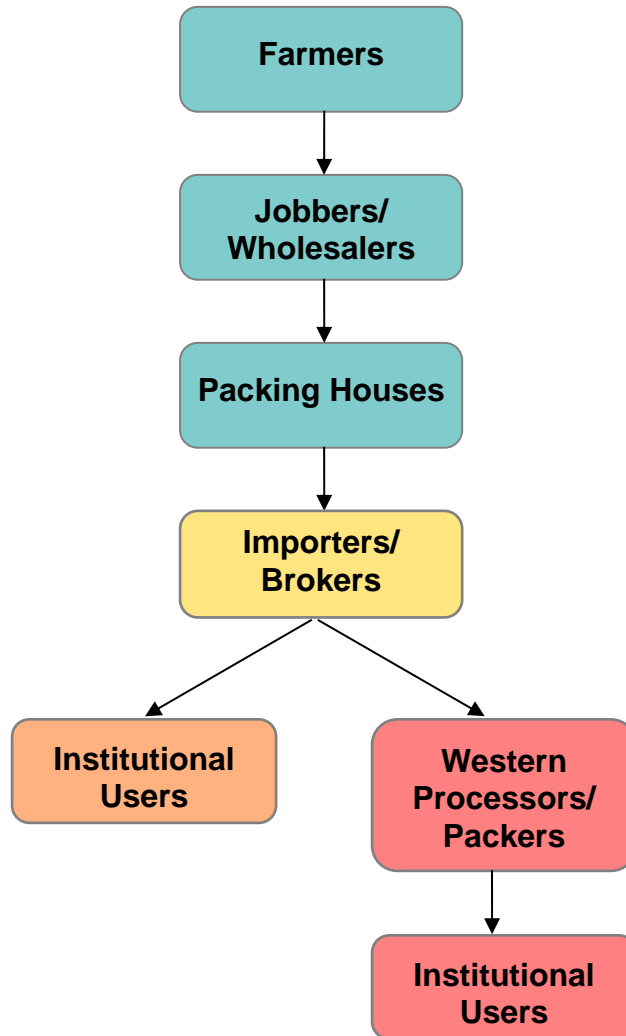
| Iraq Dates Usage (2006 Est.) | MT | % |
|------------------------------|---------|--------|
| Quantity wasted | 60,000 | 14.3% |
| Household Consumption | 120,000 | 28.5% |
| Export | 50,000 | 11.9% |
| Industrial Usage | 90,000 | 16.7% |
| Animal Feeding | 100,000 | 35.7% |
| Total Production | 420,000 | 100.0% |

Domestic Market Channels and Structure

Roadside vendors, small shops, and markets of all sizes sell packaged and bulk date products throughout Iraq. The following is a diagram of the marketing chain of dried dates (tamer) in Iraq.



Figure 3. Marketing Chain of Dried Dates (Tamer) in Iraq



Export Market Channels—Current and Historical

Under Saddam’s regime, the government formed the Iraqi Date Agency, which controlled the export of all dates. An “agency” was awarded to a given broker or importer for a particular marketing area i.e. North America, Europe, Asia, etc.

Following Operation Iraqi Freedom (OIF), this government entity ceased to exist and Iraqi date packers/shippers had to face the reality of the world trading system. Iraqi packers/shippers lack the benefit of experience in this regard and were also limited by the low-quality dates and

minimal processing capabilities. The industry currently exports little and relies mainly on two Palestinian brokers in Dubai.

3.3 Issues and Constraints

The current condition of the Iraqi date industry and the principal issues and constraints facing the Iraqi date industry divide into topics related to:

- Farming and production practices
- Harvesting and post-harvest handling
- Processing and processed products
- Marketing

Farming and Production Practices

It is reported that there are 150,000 date farmers in Iraq. The number of commercial date farmers is indefinite, but we estimate that some 20,000 to 25,000 date farmers could be classed as “commercial producers.” The majority of Iraq’s farmers do not own the land they farm. Most of the landowners are absentee, living in Baghdad and increasingly out of the country altogether. The majority of date farmers are essentially sharecroppers: in exchange for tending to an orchard, they receive a percentage of the crop and are often allowed to live on the land. The majority of date farmers also grow other cash crops.

In Iraq, the average size of a date farm is 3 to 10 acres. Date farms are rarely more than 10 acres. By comparison, in California 20 acres is a very small orchard and larger orchards are in excess of 100 acres. In Iraq there are larger commercial date farms, mainly in the south. Most dates grown in the north, east and west are not commercial. Commercial date farming remains mostly in the southern governorates. The size and number of commercial date farms in Iraq is unknown.

Farmers themselves do not have money for fertilizers, insecticides, tools or equipment. Given that the sharecroppers are without funds for farm inputs and are lacking supervision or oversight, they often pay little to no attention to the condition of the date trees. More money is made by allowing herders to graze sheep in the orchards and growing row crops such as tomatoes, cucumbers and onions, which can be sold in local markets. Consequently, date orchards suffer tremendously in terms of quality of fruit produced and yield per hectare. Presumably the commercial date farmers do have a tie to a date buyer or packer who provides financing for inputs.

Harvesting Methods and Post-Harvest Handling

Lacking even the most fundamental knowledge of harvesting practices, sharecroppers revert to the easiest way of harvesting fruit, if they even harvest at all.

Typically whole clusters of ripening or ripe fruit are simply cut off at the stem and allowed to drop 20 or more feet to the ground. Fruit on the bottom and outside of the clusters is destroyed outright and much of the remaining fruit is engulfed in a cloud of sand and dust that becomes

embedded in the fruit. Fruit in this condition cannot be processed for export to Western markets regardless of the technology or equipment in the processing plant.

Presumably there is minimal field equipment such as human hoists like “cherry pickers” or a fork lift with a basket to lift workers into the top of the palm to carry out insect control, pruning and harvesting of the dates.

Minimal effort is made to properly store the harvest. Fruit is sometimes stored in sheds or porous concrete buildings. More often the fruit is stored uncovered in open areas, although it is sometimes stored under plastic sheeting. Under such conditions, the fruit quickly becomes infested by insects, rapidly ferments in the hot climate and quickly deteriorates.

Processing and Processed Products

There is currently no date processing facility in Iraq that meets Western standards. The current facilities lack the capacity to process and store dates in a hygienic and suitable environment: there are no vacuum fumigation chambers, sorting equipment, grading equipment, machine-pitting equipment, macerating equipment, paste-making equipment, dicing equipment or cold storage adjoining processing facilities in which to store dates.

If date packers do fumigate, they simply stack boxes of dates in an enclosed room and use Fostoxin pellets. Fostoxin requires a minimum of 48 hours to be effective. Use of Fostoxin pellets is simply not reliable under the best of conditions—a scenario that is often not the case in Iraq.

It is reported that no processor has a modern, efficient cold-storage room. In a makeshift effort, a few processors use Chinese AC units mounted in enclosed concrete rooms. All of Iraq is in desperate need of cold storage. Without adequate and proper cold storage, fruit is exposed to the elements and pest infestation occurs within a few days, more often within several hours.

It is also reported that most of the packing is done by women working in unsanitary conditions. Workers do not wear hairnets or latex gloves and there is no overhead lighting. Fruit is simply scattered over tables, mostly made out of wood. No effort is made to grade or sort the fruit according to size, color or characteristics. Pitting is by hand with small rusty knives. Workers often nick or cut themselves in the process of removing the pit.

In packaging dates, women dip their hands in a bowl of often unclean water and sprinkle the hand-pitted fruit with water. The dates are then pressed into 250 mg, 350 mg, and 500 mg blocks or bricks of pressed dates using rusty, antiquated, hand-operated presses circa 1950s. These blocks are then vacuum-wrapped in cellophane and labeled. Hand-pitted fruit is also stuffed with nuts such as almonds, walnuts, pistachios, peanuts and cashews. The stuffing also takes place in unsanitary and less than ideal conditions. This type of activity would traditionally take place at a packing shed.

Iraq has not exported fruit meeting Western standards in nearly twenty years. As previously noted, much of the low-quality fruit is exported to other countries such as India for conversion to

animal feed or as raw material for fermentation. Under existing conditions, there is little opportunity that Iraq will be able to ship any fruit to lucrative Western markets where quality products receive premium prices.

Marketing

In addition to whole fruit that is sold in bulk in the local markets, cellophane-packed brick or pressed dates seem to be the most popular retail product produced by packers. There is some attempt by packers to “brand” their product with the family name on the label.

Hand-pitted fruit is also stuffed with nuts, such as almonds, walnuts, pistachios, peanuts and cashews. At times this fruit can be packaged nicely and sold under the family name of the packer.

Dates of all varieties in various state of ripeness (khalal, rutab, tamer) are packed in 60 kg plastic bags and taken by Dhows to Dubai. Currently two Palestinian traders sell the dates to brokers and importers in China, India and Malaysia. This fruit is only fit for animal consumption and fermentation into date syrup and alcohol.

According to Mohammad Suleiman Hasan, Director General of the Iraqi Date Processing & Marketing Company, in the 2007 season just over 50,000 metric tons of low quality dates were exported. The profit margin earned by the Iraqi Company on these sales ranges from a USD 10 per ton loss to a maximum of a USD 20 per ton profit. Presumably additional trading profits were earned by international exporters and distributors of the dates.

3.4 Market Opportunities for Iraqi Dates

Overview: Fresh and Industrial Dates

The market for dates is divided into dates consumed fresh, which are usually the highest quality dates and the dates found in retail packs in Western markets, and dates that are destined for further processing as ingredients in bakery, confectionary and other products.

Sayer and Zahidi are the principal varieties for “industrial grade” dates. These dates are classified as “dry” or “semi-dry” dates due to their relatively low moisture content which ranges from 10 to 14 percent. “Fresh” dates, namely Deglect Noors and Medjools found in international markets, are classified as such due to their high moisture content of 18 to 26 percent.

The principal competition in the domestic market is local and regional supplies of dates sold or bartered in the informal market. Local markets exist for fresh dates, pressed dates (date bricks) and date syrup more commonly called Dibis. For exports, the principal market for the variety of dates produced is Iraq, is the industrial or ingredient market.

Market Players for Fresh and Industrial Dates

Iraq is currently capable of producing large quantities of premium “industrial grade” dates, namely Sayer and Zahidi. Iraq’s main competitors in producing “industrial grade” dates are Iran and Pakistan. Iran grows both Sayer and Zahidis, especially Sayers. Pakistan grows the Aseel and BJ, dry varieties that compete with Sayers and Zahidis.

California, Tunisia, Morocco, Algeria and Egypt mainly produce varieties suitable for the fresh market. Fresh variety dates are table fruit and packed accordingly for retail sale. They are not adequate or acceptable for use as ingredients or industrial grade dates due to the high moisture content. Even if they were, the price of secondary or cull fruit of fresh variety dates is far in excess of the cost of premium dry-variety dates. As such, it is not economical to replace the market for dry-variety dates with fresh-variety dates for use as ingredients or industrial grade fruit.

Annex A contains a sample list of buyers for dried dates and date products in the USA and EU. Further market studies can develop additional jobbers and wholesalers for these products.

Competitiveness of Dry-Date Market Competitors

Iran Iran is the major competitor to Iraqi dry-variety dates. However, Iran’s date export program suffers under the weight of certain financial sanctions and constraints. Many Western companies are hesitant to buy Iranian products due to fear of negative perceptions resulting from country of origin labeling. Changes in Iranian government policies have resulted in the loss of farm subsidies to Iranian date farmers and it is reported that date packers are no longer provided financial incentives such as no interest or very low interest loans. There is also direct and indirect pressure from governments not to do business with Iran and a growing and continuing fear of future and further sanctions being applied against Iran.

It is reported by the Persian Dried Fruit Exporter Association that Iran produces 1 million tons of dates and 100,000 tons are exported. Iran does produce the Sayer variety of date in Khuzestan province. The Zahedi variety grows in Fars and Bushehr provinces.

Pakistan Recognizing the opportunity presented by the ongoing political and economic problems of both Iran and Iraq, Pakistan began growing industrial grade dates on a commercial basis. The result has been one of mixed success: Pakistan does not have the optimum climate for industrial date production and catches the tail-end of the monsoon season in most years. Dates grow best in areas where temperatures are high, humidity is very low and sufficient water is available. High humidity and especially rainfall during and/or immediately after harvesting causes a rapid spike in mold and insect infestation and raises the moisture content of the dates to unacceptable levels. High moisture content in dry-variety dates will cause sugaring and even fermentation. The FDA regulations do not allow the entry of dry-variety dates into the U.S. if moisture content exceeds 16 percent.

Western buyers have turned to Pakistan as a supplier of last resort. Pakistan has recognized the limited success of commercial production of dry-variety dates and has ceased new plantings of

date palms. Western buyers are looking for a supplier capable of reliably shipping dry-variety dates of consistent quality. Although Pakistan remains a competitor, they are viewed as unreliable due to seasonal weather conditions.

Competition of Dates with Similar Products

Dates also compete with dry raisins and paste made from raisins. Another competing product is paste made from dry figs. Fortunately, Iraqi dates are lower in cost than many of the competing dried fruit products. Dates, as an ingredient, are considered an “under-marketed” product i.e., there has been little emphasis or active marketing to potential industrial users of dates. In comparison there is considerable promotion by grower groups and marketers of dried fruit and nut products such as raisins, almonds, cranberries, etc.

Market Opportunities for Iraqi Dates

Iraq is now faced with a unique opportunity to reclaim its position as the world’s largest producer and exporter of dry-variety dates. It is reported that Western buyers will even pay somewhat more for quality Iraqi fruit to avoid buying Iranian fruit due to the risk and potentially negative market connotation or buying from such an unreliable supplier as Pakistan. Although faced with many challenges, there are opportunities for Iraqis to produce the following dates and date products in target production regions within Iraq and for different domestic and international markets:

| Whole Dates | Date Products | Value-Added Products |
|-----------------|----------------------|------------------------|
| Retail packs | Pitted | Date syrup (dibis) |
| Wholesale packs | Macerated & Pressed | Date vinegar |
| | Chipped and/or Diced | Date Energy bars |
| | Paste | Fructose |
| | | Sorbitol and Mannitol* |

*High-value, low-calorie, sugar alcohol sweeteners produced from fructose

Pricing

The FOB export price per ton for the principal products to be produced delivered to major EU and USA markets is:

| Description | Price (USD/ton) |
|---------------|-----------------|
| Pitted dates | 600 |
| Date paste | 850 |
| Chopped/diced | 900 |

From the above price, the estimated cost of transport to major markets is \$150 per ton.

International Market for Date Products

As previously discussed, producers in Iran and Pakistan have developed a market for dry dates. The market for dates as an ingredient in cereals, trail mixes, confectionary and bakery products needs further development, as well as emphasis on Iraq as a supplier of quality product. A list of companies purchasing processed date products is attached as Annex A.

3.4 Conclusions

The wars, sanctions and general turmoil within Iraq over the past 25 years has led to the demise of the date industry during a period when other countries, such as Saudi Arabia, UAE and Iran, were investing heavily in both date production and modern processing facilities, often with the assistance of government subsidies. Fortunately, many of the Iraqi date gardens remain and can be rehabilitated by a series of interventions that will provide appropriate farming, post-harvest and processing, as well as marketing technology, facilities and skills to the industry.

Implementation of a Date Value-Chain Strategy

A domestic market does exist for dates and date products and, as the economy gradually improves, a market can develop for branded, packaged dates and date products. An established export market for date products exists in global markets if the product is processed in modern, sanitary plants. Ingredient buyers of date products in Asia, EU, and USA can be cultivated and a market established. The key to the rehabilitation of a date industry is to focus on producing product for industrial date products. This requires a central processing plant.

The principal elements in a value-chain strategy will include:

- Improved farming practices and higher yields to include a focus on selected varieties
- Initiation of better post-harvest handling procedures
- Processing and production of value-added products
- Export premium date product



4. DATE PRODUCTION AND POST-HARVEST CARE

Good quality raw material in volume is important to the development and modernization of the Iraqi date industry. A date agricultural extension program is needed to provide information, small-scale tools and assistance to farmers in important tasks such as pollination. The extension program may initially start on a small scale and can be expanded to reach out to selected regions.

It must be remembered that currently Iraqi date farmers have little incentive to care for the date gardens or improve date production because the price received is very low. Since there are no facilities or systems suitable for producing a higher quality date or date product, there is no market except for a low-quality, bulk product. Furthermore, as with many crops, the dates are all harvested over a two-month period; this results in a market glut for two to four months and limited supply of reasonable quality fruit for the remainder of the year.

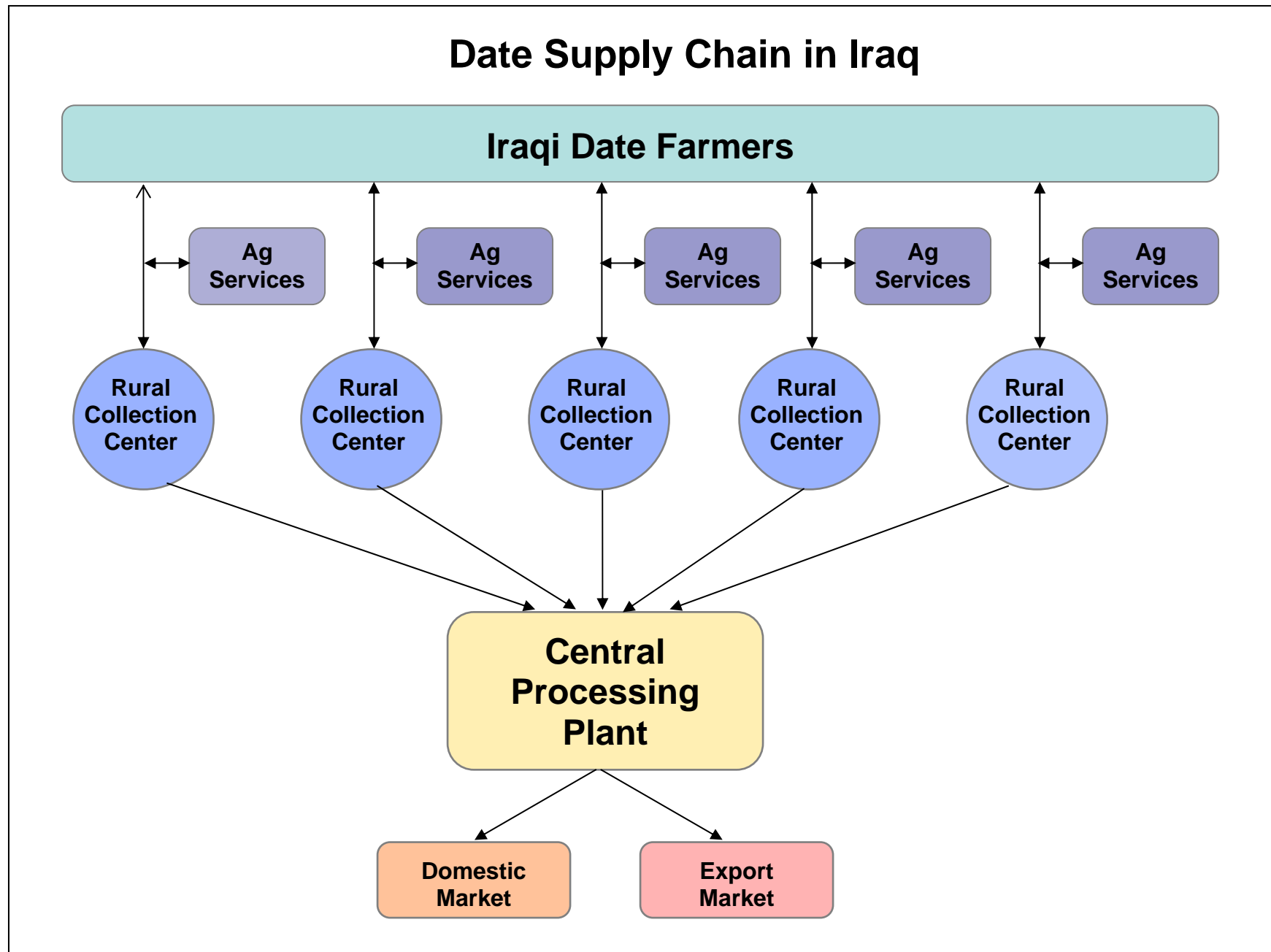
A program to improve date farming systems and post-harvest handling is discussed in further detail in Chapters IV and V of the “Date Sector Report and Value Chain Development Program”, dated January 15, 2008. It is also reported that the Ministry of Agriculture, supported by FAO, will initiate a five-year agricultural rehabilitation and improvement program for date producers.

Rural Collection Centers

An important element in the date improvement program is the formation of Rural Collection Centers that are located in important date production provinces and regions. The purpose of the Collection Center is two fold. It provides a central location to create a buying hub and initial grading and processing of dates that have export potential and can be shipped to the Central Processing Facility. Secondly, it is a site from which teams of Agricultural Extension Agents can work to educate and assist farmers with improved practices in the care and harvesting of dates. (See page 18 for Date Supply Chain in Iraq)

Development of a strategy to staff and operate the Rural Collection Centers with Iraqi owners and managers requires further evaluation. There are two approaches to the size and activities to be included in the Centers.

One approach is to have the Center primarily as a collection, preliminary grading and shipping point for dates with minimum processing. The second approach is to be a collection, grading and shipping point plus processing of lower grade fruit into date syrup (Dibis) for processing and sale to a regional market. Both approaches need to be researched as to location, structure and market demand for Dibis.



A preliminary investment budget for each approach is listed below:

Rural Collection Center-Facilities and Equipment Requirement for Rural Collection Centers (excluding working capital)

Capacity Assumptions: Receive 4,000 tons per year, 2,000 tons graded and approved for shipment to Central Processing Plant; remainder for local sale or export as animal feed, etc.

| Basic Design | |
|--|-------------------|
| Description | Cost (USD) |
| Warehouse Building, grading shed and ripening area | 140,000 |
| Office furniture and computer | 8,000 |
| Scales | 5,000 |
| Grading Tables | 30,000 |
| Plastic Totes 5,000 @\$4.00 ea. | 20,000 |
| Pick-up Truck(s) 2 @ \$25,000 | 50,000 |
| Agricultural Services Equipment | |
| Pollen Processing machine | 10,000 |
| Pollen Application (atomizer) | 15,000 |
| Hand tools, ladders, drills etc. | 5,000 |
| Portable Generator | 10,000 |
| Misc. | 20,000 |
| Annual Materials required | |
| Fostoxin-date fumigant | |
| Plastic bags | |
| Dubas control-Phosphine | 20,000 |
| Note: Agricultural Services Team will charge farmers for treatment of date palms | |
| Subtotal Basic Design Investment | 333,000 |

| Expanded Rural Collection Center (Basic Equipment plus Dibis Processing Capability) | |
|--|-------------------|
| Description | Cost (USD) |
| Screened, hygienic building | 100,000 |
| Cold Storage Containers Option: use 3 or 4 -20 ton refrigerated containers | 80,000 |
| Generator (back-up electricity for processing and cold storage) | 20,000 |
| Dibis Processing line (based on equipment from Gulf supplier) | 500,000 |
| Storage tanks | 60,000 |
| Filling equipment | 60,000 |
| Misc. | 70,000 |
| Subtotal Expanded Rural Collection Center | 890,000 |
| Subtotal Basic Facility | 333,000 |
| Total Basic Investment and Date Syrup Production | 1,223,000 |

5. CENTRAL DATE PROCESSING FACILITIES

The central processing facility plays an important role in the preservation of date quality and production of products having an international market. The general specifications and assumptions for such a plant are summarized in this section.

Raw Material Supply

| Project Phase | Project Year | Raw Material Supply (MT) |
|----------------------|---------------------|--|
| Phase I | Year 1 | 6,000 |
| | Year 2 | 12,000 |
| Phase II | Year 3 | 20,000 |
| | Year 4 | 25,000 |
| Phase III | Following Years | 25,000 plus Liquid Sugar Production |

For Phase II and III additional storage and equipment will be required. As the plant gains experience in years 1 and 2, new efficiencies will be found that will make the plant more productive and operating costs lower.

Date Varieties

The two primary varieties to be collected and processed are Zahidi and the Sayer varieties. Additional varieties can be added as market opportunities develop, particularly for fresh date consumption (fresh dates are perishable).

Primary Products and Pricing

The processed product mix is:

| Product | Market Share (%) | CIF Price per Ton (USD/ton) |
|--------------------------|-------------------------|--|
| Pitted dry | 65 | 750 |
| Chopped and diced | 25 | 1,000 |
| Paste and other products | 10 | 1,050 |

Plant Location

In order to achieve security, support services and be close to a port the plant will be located in the Zubair Free Trade Zone near Basrah. The plant is located near the port of Qum Qasar.

Raw Material Collection Option

Dates are produced over a wide area. It is proposed (see Date Sector Report and Value Chain Development Program) that 5 Rural Date Collection Centers be established initially as regional grading and collection centers for dates, with the highest quality dates being shipped to the central date processing center, primarily for export. It is assumed that a network of 25 Date Collection Centers could be established over 5-7 years.

For planning purposes it is assumed that each Date Collection Center would handle, at full production, 2000 tons of fruit in a season and 1000 tons would be sold to the Central Processing Plant. The other 1000 tons would be bagged and marketed locally or sold overseas as low quality product i.e., India being a major buyer. Another option is to increase the capacity and build and equip the Date Collection Center to produce date syrup for the regional market.

A local Iraqi date wholesaler or entrepreneur, experienced and focused on a specific region, is required to become the developer of the rural Date Collection Center. He will have the best idea of what is needed in terms of building and equipment to handle the volume and products for the market. The Center also becomes the best location to provide agronomic and pest control services to the local date growers.

5.1 Central Processing Facility

Pre-graded fruit will arrive in plastic tote bins, weighed (for determination of payment) and will again be inspected/graded and segregated by variety and end use in the processing plant. The fruit is then fumigated and put into cold storage.

Fumigation capacity is a key determinant of processing capacity. A chamber holds 4 metric tons and requires 4 hours per cycle. The plant will have 4 chambers and will provide, over 24 hours, the ability to fumigate 80 tons per day. In the event there is not capacity to fumigate during the peak of the harvest season, the fruit is put into a segregated cold storage.

During the harvest season fumigated fruit can go directly into the processing plant, and a minimum of two-shifts is required. Excess fruit goes into cold storage for future processing.

The objective is to only bring clean, fumigated fruit into the processing facility in order to maintain quality control over the process, and prevent re-infestation of fruit.

The objective is also to process, at full production, 2000 to 3000 tons per month of fruit over a 10-month season (cold storage is used to hold fruit prior to processing as well as storage for processed fruit). Two shifts will be required for part of the year.

The plant will be able to handle 12,000 tons in year two and thereafter management will evaluate what further equipment and storage is needed to expand to 25,000 tons. Much of the equipment may be suitable for the larger volume but additional storage and pitting equipment will be required. The real and potential demand from industrial customers will be known and better understood after two years of operation, and it will be possible to introduce new date products to meet the demand. Initially, buyers are going to be skeptical of buying product from Iraq. It will be important for the processor to “prove himself” to key customers, as a bakery or confectionary company depends on delivery of what may be a minor ingredient but an important ingredient i.e., one poor ingredient spoils the whole product.

5.2 Primary Date Products

Product will be washed, graded for size and quality on belts, and then channeled to three lines for further processing. The end products are discussed in this section which includes pitted dates, pressed date blocks, chopped/diced dates and date paste.

Pitted Dates

Sixty five percent of the fruit will be for pitting (it is important to start with uniform sizes). Semi-automatic machines manufactured by Sovimp, Italy, are proposed to be utilized for pitting as buyers are increasingly interested in fruit where sanitation is maintained by lack of human hands handling or cutting the fruit. The machines are small and require two operators per machine. The machines have the advantage of being able to be used with different date varieties. Each machine has a capacity of 30 kgs per hour. The heavy usage of hand labor makes the large scale pitting of this product uneconomic in the EU and Western markets.

Fruit is fed into the machines manually (gloved hands). Dates are preferably pitted when taken from cold storage at a temperature of 4° C.

There is an automatic pitting machine manufactured for dates, but it is engineered for the Delget Noir variety and the manufacturer does not recommend it for other varieties.

A large area of the plant floor will be devoted to this activity and fruit will again pass through an inspection belt prior to bulk packing in 10 or 12.5 kg. telescopic cartons.

Pressed Date Blocks

Pitted dates can be pressed into blocks and are found in local markets. This type of product is primarily used for home cooking, and is often produced in small volumes under poor conditions. It is a product that can be marketed locally and in the Gulf region.

In domestic and Gulf markets there is a demand for pressed or brick dates in 250, 375 and 500 gram cello packs.

Chopped/Diced Dates

Fruit can be mechanically pitted by utilizing a macerator. This method of processing removes the pit by squeezing the pit out between two counter rotating wheels. Date flesh is crushed and shredded in the process. This product can then be fed into a dicing machine to make chopped/diced product and coated with dextrose or oat flour, put through screen shakers to remove excess coating material and packed in 10 or 12.5 kilo telescopic cartons. This type of product is often found in trail mixes.

Date Paste

Macerated fruit can also be fed into a paste making-machine to produce date paste. This is a product that can be modified to fit the needs of industrial users. This product can be produced once specialized buyers are identified, in order that it can be produced to meet their specifications.

Fresh Dates and Whole Fruit

The market for fancy grade fruit for the domestic and regional market can be packed by hand. This is the primary product seen in retail stores and little equipment is required, as it primarily requires hand labor. Preferably a local demand for such a product will have to be found and most of the date varieties do not lend themselves to this market. This may become a product produced in the Date Collection Centers.

5.3 Facilities and Equipment

Building

A processing plant is planned and will be built to meet EU specifications for food processing plants. The primary structure is the cold storage warehouse that is used to maintain the quality of both un-processed and processed fruit. It is important that the warehouse be built in sections in order to keep un-processed and processed fruit in different chambers.

Central Date Processing Equipment List and Budget

A list of equipment for the Central processing plant is summarized below:

| Item Description | Cost (USD) |
|--|-------------------|
| Land in Industrial Park | Long term lease |
| Fruit Reception | |
| Preliminary inspection | 200,000 |
| Fumigation chambers | 900,000 |
| Tote boxes: 12,000 @ \$4.00 | 48,000 |
| Tote box washer | 150,000 |
| Fruit Processing | |
| Dumping, Washing, drying and sorting line | 500,000 |
| Line 1- Pitted dates | |
| Sizer | 280,000 |
| Semi-automatic pitting 55 machines @\$15,000 ea | 825,000 |
| Grading | 200,000 |
| Packaging | 200,000 |
| Line 2- Date maceration and paste | 1,200,000 |
| Packaging/case carton (vacuum pack) | 100,000 |
| Line 3- Date bits and pieces | |
| Date dicer | 70,000 |
| Date dehydrator or hydrator | 600,000 |
| Packaging (by hand) | 50,000 |
| Automatic rotary stretch wrapper | 50,000 |
| Subtotal, processing equipment | 5,373,000 |

Central Date Processing Buildings

| Building Description | Cost (USD) |
|---------------------------------------|-------------------|
| Fruit Reception Area | 50,000 |
| Cold Storage & dry storage | |
| 40,000 sq. ft. cold storage @ \$70 | 2,800,000 |
| 10,000 sq. ft dry storage @ \$30 | 300,000 |
| Processing and office | |
| 20,000 sq. ft. @ \$60 | 1,200,000 |
| Garage and maintenance | |
| 5,000 sq. ft. @ \$30 | 150,000 |
| Subtotal, buildings | 4,500,000 |

Other Equipment and Installation

| Description | Cost (USD) |
|------------------------|-------------------|
| Equipment Installation | 500,000 |
| Laboratory equipment | 20,000 |
| Trucks | |
| 10 ton Truck -1 | 50,000 |
| Pick-up trucks-3 | 75,000 |

| | |
|---------------------------|---------|
| Fork lifts- 2 | 100,000 |
| Stand-by Generator | 80,000 |
| Subtotal, other equipment | 825,000 |

| Description | Cost (USD) |
|----------------------|-------------------|
| TOTAL, ALL EQUIPMENT | 6,198,000 |
| TOTAL, ALL BUILDINGS | 4,500,000 |
| GRAND TOTAL | 10,698,000 |

Annex B contains photos of specific equipment utilized in date processing plants.

Plant Capacity

For the first two years, 12,000 tons will be processed and will be increased by year 4 to 25,000 tons, with an estimated additional investment of \$2,000,000 in equipment. Improved efficiency and market feed-back information will influence the equipment required and products produced.

The cost of the processing equipment is dependent on the products to be produced. The list should be considered an initial plan and be finalized in the feasibility stage through further evaluation by a food plant engineer, utilizing information from equipment suppliers and matching it with further market information.

Plant and Equipment Layout

Summarized in the following flow diagram for the date processing and factory floor plan is the equipment layout for the processing plant. (See page 27).

Labor

In the initial two years, the plant is designed to maximize use of labor and it is estimated that the plant will employ 160 women in each shift and assume two shifts during the harvest season, primarily working at tasks related to date pit removal with the assistance of machines, grading and sorting.

The plant will also require 48 male workers in each shift. Phase I will operate on a one-shift basis

Utilities

The advantage of being in the Industrial Park is the availability and hopefully the reliability of key utilities such as water, electricity and propane. It is assumed that disposal of waste water, primarily wash water, will be available within the Industrial Park.

As yet, it has not been possible to obtain a tour of the Industrial Park and obtain information on terms and conditions. It may be possible for the Industrial Park to provide a suitable building for the processing center.

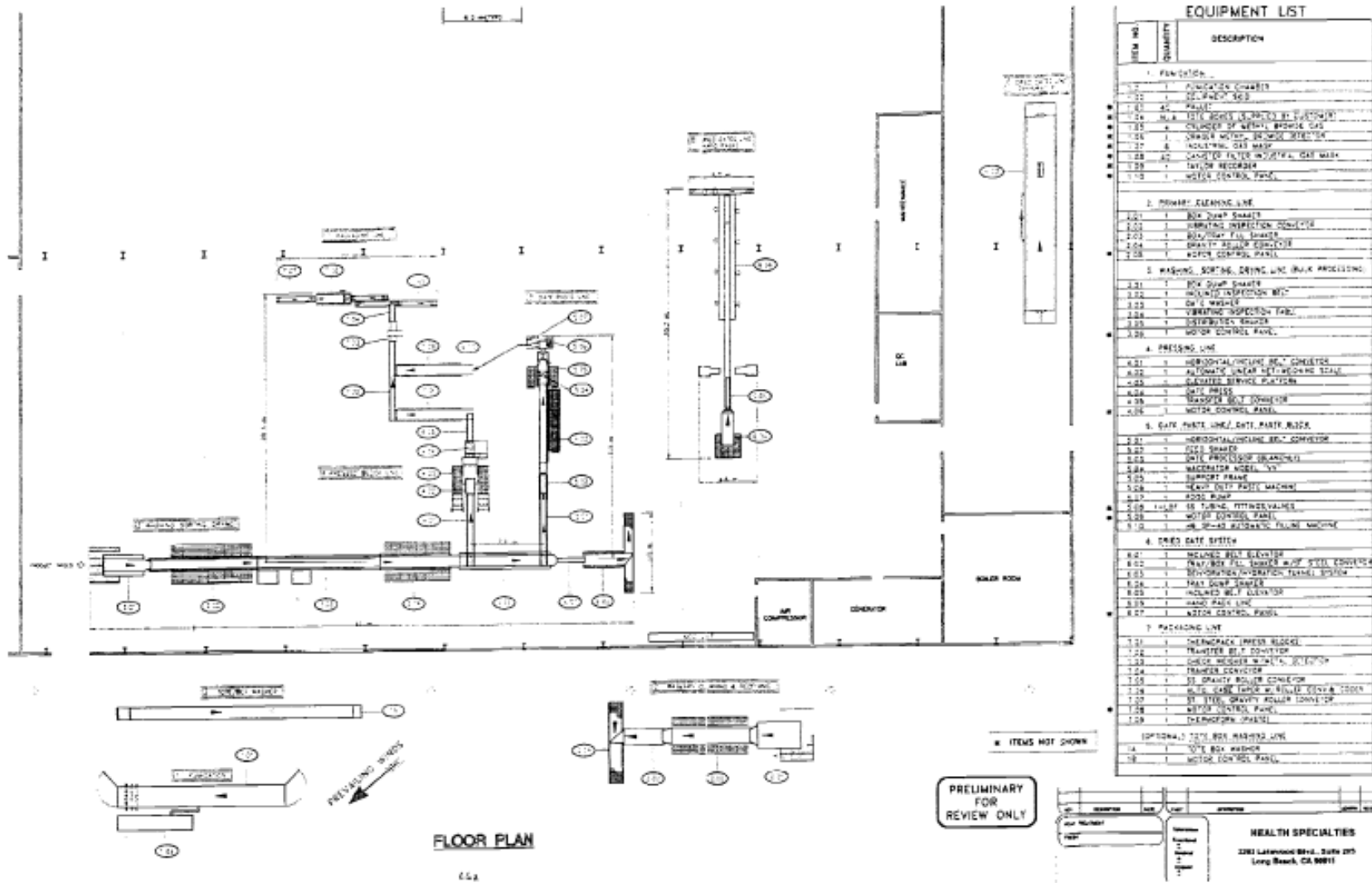
Packaging Material

Most of the packaging material is available in the Gulf region. The use of fully automatic machines, which are expensive, is not planned. Semi-automatic equipment will be used. The cost of packaging is estimated to be 6% of the cost of production.

Management and Administration

The key to a successful operation is not so much the buildings and equipment but the management that will operate the plan. Several of the positions, such as General Manager, Processing Manager and Marketing Manager are likely to be expatriates the first two years of operation, in order to take advantage of knowledge gained from date processing in other countries. The remaining positions should be filled by Iraqi staff, either currently in the country or located outside of Iraq (it has been indicated by others that there are Iraqis working in the Gulf that could be hired for key positions). It is estimated that the budget for expatriate managers will be \$600,000 and for Iraqi managers \$700,000.

Plant and Equipment Layout

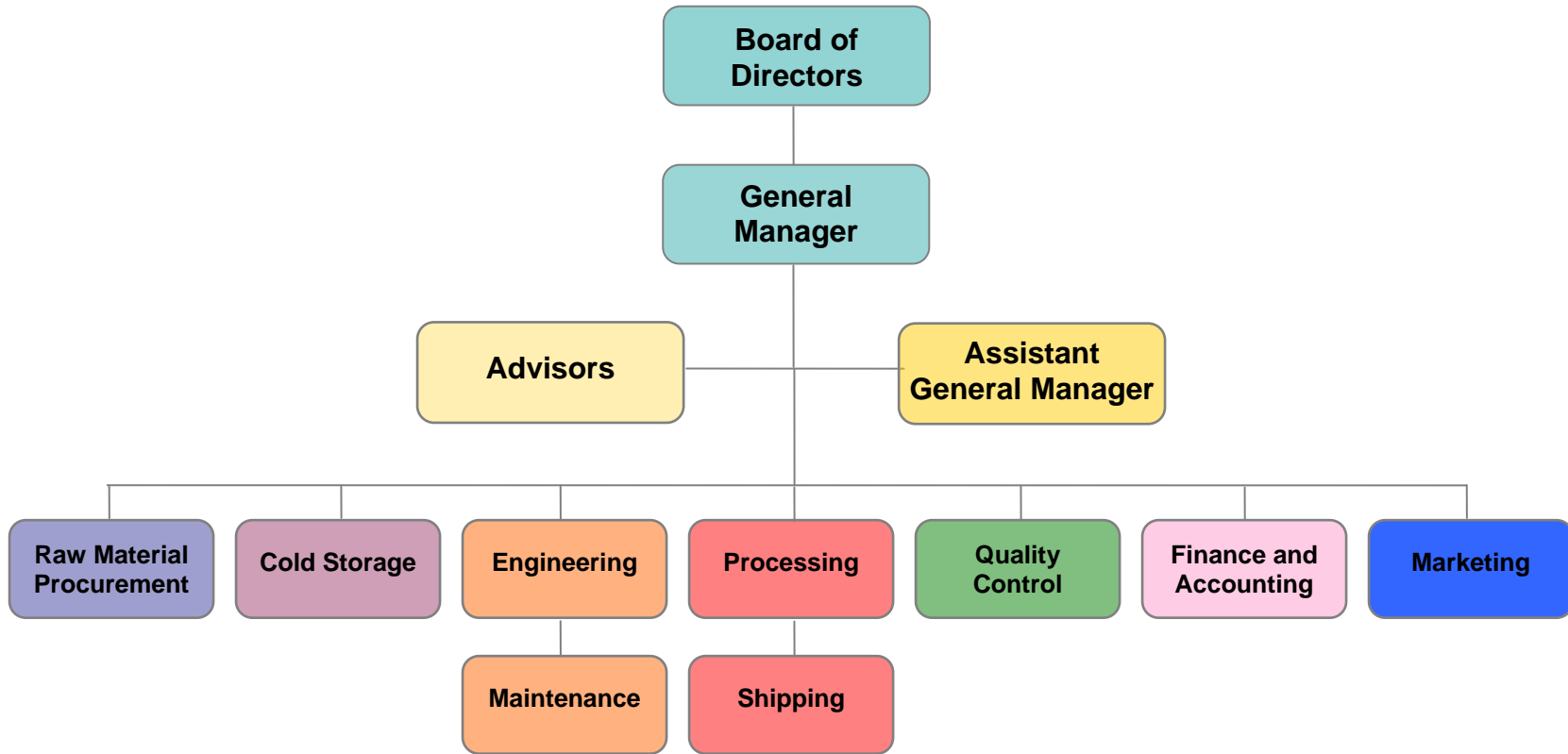


Please see pages 29, 30 and 31 for the factory organization chart and the overall flow chart and diagram for the collection of dates for processing.

Environment

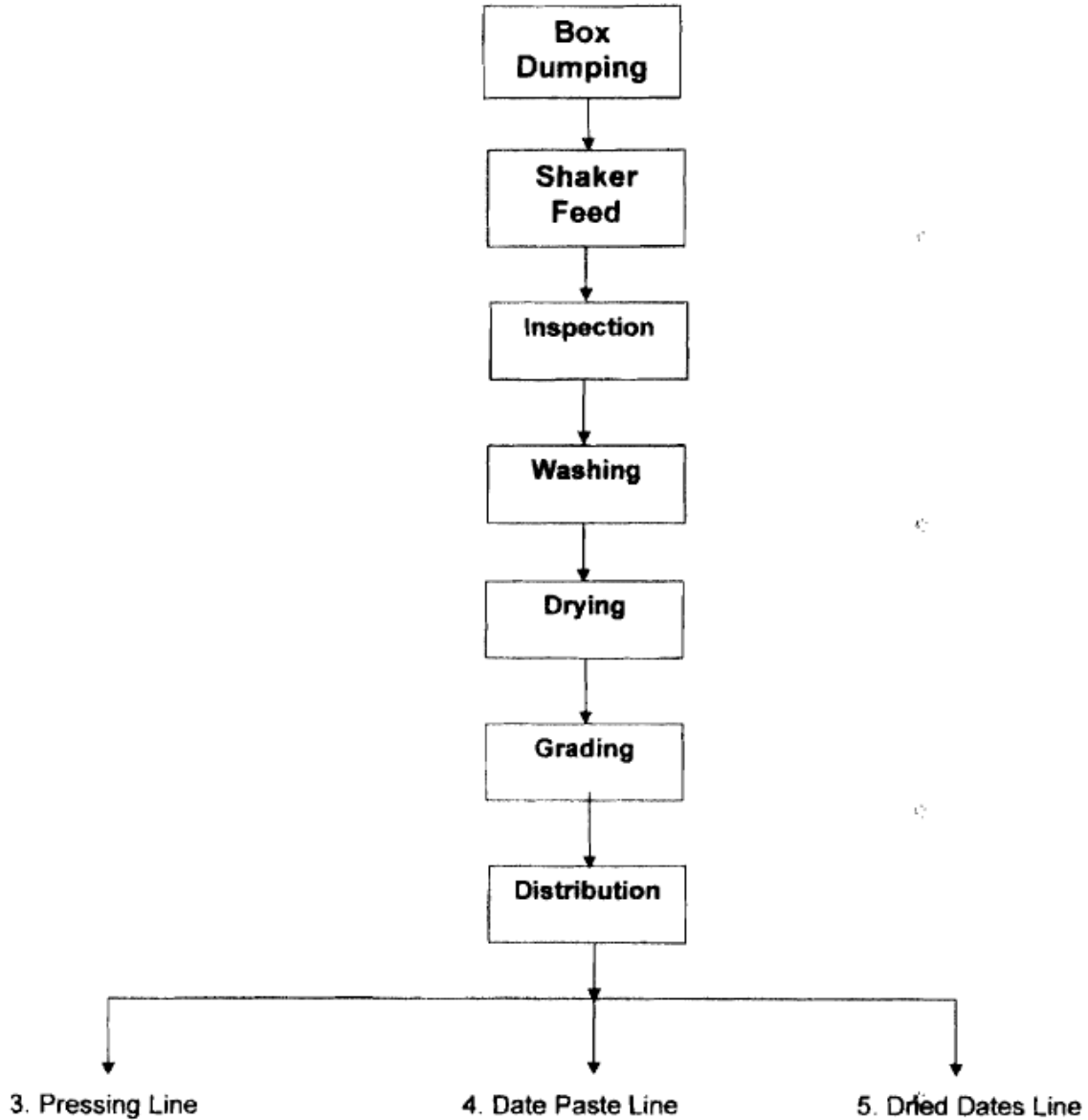
The utilization of chemicals in date growing and harvesting will have to be checked with local, USA and EU regulations. Also, the chemicals can be evaluated as to what is approved in Gulf countries and how chemicals are used. The reduction or elimination of aerial spraying will have a positive impact on the environment.

Central Date Processing: Functional Organization Chart

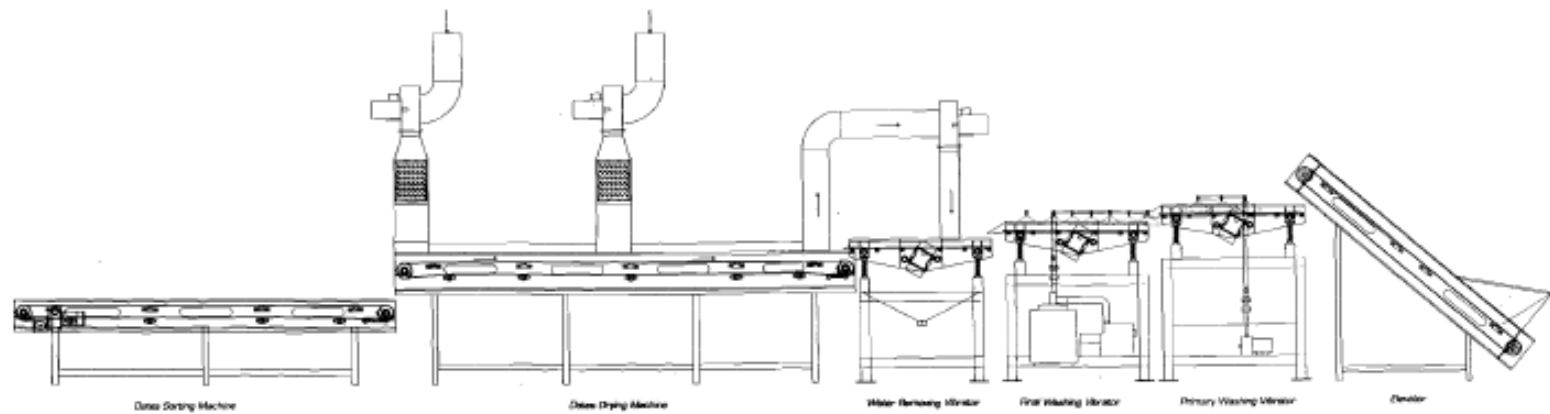


Date Processing

3. SORTING, WASHING, DRYING LINE



Standard Date Processing, Sorting and Cleaning Line



6. FINANCIAL PROJECTION

A financial projection was prepared based on the best estimate of equipment and operating costs for a date processing facility with an annual capacity of 25,000 tons, and a facility that would meet generally accepted international standards for hygiene and quality specifications.

6.1 Investment

The total investment is estimated to be \$10.7 million and it would be located in an Industrial Park near Basrah. The building would include facilities for the processing lines and would include a 10,000 sq. ft. dry storage building and a 40,000 sq. ft. cold storage building. These buildings would allow proper storage of dates in order to have an extended processing season.

6.2 Production

The primary product (65%) is pitted dates and the highest quality product from this product line can be selected to be packed as a fresh date product. The other two products, chopped and diced dates and date paste, are utilized by food manufactures as ingredients.

6.3 Financial Return

Two assumptions were utilized in the preparation of 12-year financial projections:

- 100% equity financing
- 5% equity (approximately) and 95% subsidized debt

The initial year of operation generates a loss; followed by a modest operating profit in year 2 and profitability is reached in year 3. In year 4 the projected profit, assuming 100% equity financing, is \$5.1 million on sales of \$16.4 million.

The 100% equity financing internal rate of return (npv) is 25%. For the debt financed project the rate of return (npv) is, as would be expected, significantly higher reaching 39%.

Iraq Central Date Processing Facility (No Loan)

Updated 4-4-08

ROI Summary

Equity IRR **25%**
Equity NPV **\$ 12,017,574**

Debt percent **0%** Enter debt amount under "Financial assumptions," further below.

Volumes and product mix

| | Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------------|-----------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Total raw material | in metric tons | 6,000 | 12,000 | 20,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| Volume with yield loss | 15% yield loss | 5,100 | 10,200 | 17,000 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 |
| Pitted dates net volume | 65% % of volume | 3,315 | 6,630 | 11,050 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 |
| Chopped dates net volume | 25% % of volume | 829 | 1,658 | 2,763 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 |
| Date paste net volume | 10% % of volume | 83 | 166 | 276 | 345 | 345 | 345 | 345 | 345 | 345 | 345 | 345 | 345 |

CIF price (US\$/MT)

| | Base price CIF | Increase yrs 1-5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|----------------|------------------|--------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Pitted dates | \$ 750 | 5% | \$ 750 | \$ 788 | \$ 827 | \$ 868 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 |
| Chopped dates | \$ 1,000 | 5% | \$ 1,000 | \$ 1,050 | \$ 1,103 | \$ 1,158 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 |
| Date paste | \$ 1,050 | 5% | \$ 1,050 | \$ 1,103 | \$ 1,158 | \$ 1,216 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 |
| Gross Revenue | | | \$ 3,402,019 | 7,144,239 | 12,502,419 | 16,409,425 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 |

Operating cost assumptions

| | | |
|-------------------------------|------------|--|
| Raw material costs | \$ 175 | per ton purchased |
| Expatriate managers | \$ 600,000 | Fixed for the first two years |
| Iraqi managers | \$ 700,000 | Fixed |
| Plant labor | \$ 728,000 | Computed at 208 workers x yearly salary of US\$3,500, starting Year 1. Note: Iraq GDP/capita is US\$2,000 or US\$3,600 at PPP. |
| Packaging | \$ 100 | Per ton commercialized product |
| Transportation/shipping costs | \$ 150 | International (CIF) shipping cost per ton from processing plant |
| Utility costs | \$ 150,000 | Assumption of \$300,000 for 1 HA size plant. Proposed plant is 0.5 HA. |
| Land lease cost | | To be determined |

Financial assumptions

| | | |
|------------------------------|-----------------------------|--|
| Tax rate | 0 0% | Assumption of free trade zone |
| Depreciation | 15 | years, straight line |
| Discount rate (equity) | 15 0% | |
| Working capital requirements | 50% | % of Year 1 tot. operating cost: \$ 2,251,500 |
| Debt financing | \$ - | Amount funded by debt |
| Cost of Debt | 2 0% | 6%, with Iraqi gov. subsidizing 4% of interest |
| Reimbursement periods | 1 | times / year |
| Loan duration | 10 | years |
| Allow tax credit? | <input type="checkbox"/> no | yes = negative income provides tax credit no = negative income, no tax credit |

Capital structure:

| | | | |
|----------------------------------|----------------------|------|---|
| Equity investment | \$ 14,050,481 | 100% | Investment to cover cash shortfall in initial years |
| Debt financing | \$ - | 0% | |
| Total financing required: | \$ 14,050,481 | | |

Uses of funds:

| | |
|--------------------------|----------------------|
| Investment in PP&E | \$ 12,898,000 |
| Financing for operations | \$ 1,152,481 |
| Total: | \$ 14,050,481 |

Discounted Cash Flow Analysis

| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--|----|----------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Gross Revenue | | \$ 3,402,019 | 7,144,239 | 12,502,419 | 16,409,425 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 |
| Operating costs: | | | | | | | | | | | | | |
| Raw material | | \$ (1,050,000) | (2,100,000) | (3,500,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) |
| Expatriate managers | | \$ (600,000) | (600,000) | | | | | | | | | | |
| Iraqi managers | | \$ (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) |
| Plant labor | | \$ (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) |
| Packaging | | \$ (510,000) | (1,020,000) | (1,700,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) |
| Shipping/transport costs | | \$ (765,000) | (1,530,000) | (2,550,000) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) |
| Utilities | | \$ (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) |
| Land lease cost | | \$ - | - | - | - | - | - | - | - | - | - | - | - |
| Total operating costs: | | \$ (4,503,000) | (6,828,000) | (9,328,000) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) |
| Operating income (EBITDA) | | \$ (1,100,981) | 316,239 | 3,174,419 | 5,143,925 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 |
| Margin % | | | -32% | 4% | 25% | 31% | 35% | 35% | 35% | 35% | 35% | 35% | 35% |
| Financing cash flows: | | | | | | | | | | | | | |
| Change in working capital | \$ | (2,251,500) | | | | | | | | | | | 2,251,500 |
| Debt financing available (positive cashflow) | \$ | - | | | | | | | | | | | |
| Debt service (principal + interest) | \$ | - | - | - | - | - | - | - | - | - | - | - | - |
| Investment cash flows: | | | | | | | | | | | | | |
| Equipment | \$ | (6,198,000) | | | (2,200,000) | | | | | | | | |
| Buildings | \$ | (4,500,000) | | | | | | | | | | | |
| Tax computation: | | | | | | | | | | | | | |
| EBITDA | \$ | (1,100,981) | 316,239 | 3,174,419 | 5,143,925 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 |
| Depreciation | \$ | (713,200) | (713,200) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) |
| Interest expense | \$ | - | - | - | - | - | - | - | - | - | - | - | - |
| Taxable income | \$ | (1,814,181) | (396,961) | 2,314,552 | 4,284,058 | 5,104,529 | 5,104,529 | 5,104,529 | 5,104,529 | 5,104,529 | 5,104,529 | 5,104,529 | 5,104,529 |
| Tax (can choose to allow tax credit) | \$ | - | - | - | - | - | - | - | - | - | - | - | - |
| Equity Free Cash Flow | \$ | (12,949,500) | (1,100,981) | 316,239 | 974,419 | 5,143,925 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 8,215,896 | 39,762,640 |
| Equity IRR | | | | | | | | | | | | | 25% |
| Equity NPV | \$ | | | | | | | | | | | | 12,017,574 |

| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---------------------------------------|----|------------|------------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Debt amortization | | | | | | | | | | | | | | |
| Yearly payment | \$ | - | - | - | - | - | - | - | - | - | - | - | - | |
| Interest expense | \$ | - | - | - | - | - | - | - | - | - | - | - | - | |
| Principal balance | \$ | - | - | - | - | - | - | - | - | - | - | - | - | |
| Depreciation table (B/S) | | | | | | | | | | | | | | |
| Beginning PP&E on Balance Sheet (B/S) | \$ | - | 10,698,000 | 9,984,800 | 9,271,600 | 10,611,733 | 9,751,867 | 8,892,000 | 8,032,133 | 7,172,267 | 6,312,400 | 5,452,533 | 4,592,667 | 3,732,800 |
| PP&E investment | | 10,698,000 | - | - | 2,200,000 | - | - | - | - | - | - | - | - | - |
| Year 1 PP&E depreciation schedule | | | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | |
| Year 2 PP&E depreciation schedule | | | | - | - | - | - | - | - | - | - | - | - | |
| Year 3 PP&E depreciation schedule | | | | | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | |
| Year 4 PP&E depreciation schedule | | | | | | - | - | - | - | - | - | - | - | |
| Year 5 PP&E depreciation schedule | | | | | | | - | - | - | - | - | - | - | |
| Annual depreciation expense | | | 713,200 | 713,200 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | |
| Ending PP&E on Balance Sheet | | 10,698,000 | 9,984,800 | 9,271,600 | 10,611,733 | 9,751,867 | 8,892,000 | 8,032,133 | 7,172,267 | 6,312,400 | 5,452,533 | 4,592,667 | 3,732,800 | 2,872,933 |

Investment items for processing facility

Land in Industrial Park long term lease

Equipment

Fruit Reception

| | |
|----------------------------|-----------|
| Preliminary inspection | \$200,000 |
| Fumigation chambers | 900,000 |
| Tote boxes 12,000 @ \$4.00 | 48,000 |
| Tote box washer | 150,000 |

Fruit Processing

| | |
|--|-----------|
| Dumping, Washing, drying and sorting line | 500,000 |
| Line 1- Pitted dates | |
| Sizer | 280,000 |
| Semi-automatic pitting 55 machines @\$15,000 ea | 825,000 |
| Grading | 200,000 |
| Packaging | 200,000 |
| Line 2- Date maceration and paste | 1,200,000 |
| Packaging/case carton (vacuum pack) | 100,000 |
| Line 3- Date bits and pieces | |
| Date dicer | 70,000 |
| Date dehydrator or hydrator | 600,000 |
| Packaging (by hand) | 50,000 |
| Automatic rotary stretch wrapper | 50,000 |

Sub total, processing equipment **\$ 5,373,000**

Central Date Processing Buildings

| | |
|------------------------------------|-----------|
| Fruit Reception Area | 50,000 |
| Cold Storage & dry storage | |
| 40,000 sq. ft. cold storage @ \$70 | 2,800,000 |
| 10,000 sq. ft dry storage @ \$30 | 300,000 |
| Processing and office | |
| 20,000 sq. ft. @ \$60 | 1,200,000 |
| Garage and maintenance | |
| 5,000 sq. ft. @ \$30 | 150,000 |

Sub total, buildings **\$ 4,500,000**

Other equipment and installation

| | |
|----------------------------|----------------------|
| Equipment Installation | 500,000 |
| Laboratory equipment | 20,000 |
| Trucks | |
| 10 ton Truck -1 | 50,000 |
| Pick-up trucks-3 | 75,000 |
| Fork lifts- 2 | 100,000 |
| Stand-by Generator | 80,000 |
| | |
| Sub-total, other equipment | \$ 825,000 |
| | |
| TOTAL, ALL EQUIPMENT | \$ 6,198,000 |
| | |
| TOTAL, ALL BUILDINGS | \$ 4,500,000 |
| | |
| GRAND TOTAL | \$ 10,698,000 |

Note: Additional equipment investment required in year 3: **\$ 2,200,000**

Iraq Central Date Processing Facility (with Loan)

Updated 4-4-08

ROI Summary

Equity IRR **39%**
Equity NPV **\$ 16,430,354**

Debt percent **62%** Enter debt amount under "Financial assumptions," further below.

Volumes and product mix

| | Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------------|-----------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Total raw material | in metric tons | 6,000 | 12,000 | 20,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| Volume with yield loss | 15% yield loss | 5,100 | 10,200 | 17,000 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 | 21,250 |
| Pitted dates net volume | 65% % of volume | 3,315 | 6,630 | 11,050 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 | 13,813 |
| Chopped dates net volume | 25% % of volume | 829 | 1,658 | 2,763 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 | 3,453 |
| Date paste net volume | 10% % of volume | 83 | 166 | 276 | 345 | 345 | 345 | 345 | 345 | 345 | 345 | 345 | 345 |

CIF price (US\$/MT)

| | Base price CIF | Increase yrs 1-5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------|----------------|------------------|--------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Pitted dates | \$ 750 | 5% | \$ 750 | \$ 788 | \$ 827 | \$ 868 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 | \$ 912 |
| Chopped dates | \$ 1,000 | 5% | \$ 1,000 | \$ 1,050 | \$ 1,103 | \$ 1,158 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 | \$ 1,216 |
| Date paste | \$ 1,050 | 5% | \$ 1,050 | \$ 1,103 | \$ 1,158 | \$ 1,216 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 | \$ 1,276 |
| Gross Revenue | | | \$ 3,402,019 | 7,144,239 | 12,502,419 | 16,409,425 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 |

Operating cost assumptions

| | | |
|-------------------------------|------------|--|
| Raw material costs | \$ 175 | per ton purchased |
| Expatriate managers | \$ 600,000 | Fixed for the first two years |
| Iraqi managers | \$ 700,000 | Fixed |
| Plant labor | \$ 728,000 | Computed at 208 workers x yearly salary of US\$3,500, starting Year 1. Note: Iraq GDP/capita is US\$2,000 or US\$3,600 at PPP. |
| Packaging | \$ 100 | Per ton commercialized product |
| Transportation/shipping costs | \$ 150 | International (CIF) shipping cost per ton from processing plant |
| Utility costs | \$ 150,000 | Assumption of \$300,000 for 1 HA size plant. Proposed plant is 0.5 HA. |
| Land lease cost | | To be determined |

Financial assumptions

| | | |
|------------------------------|--------------------------------------|--|
| Tax rate | 0.0% | Assumption of free trade zone |
| Depreciation | 15 years, straight line | |
| Discount rate (equity) | 15.0% | |
| Working capital requirements | 50% % of Year 1 tot. operating cost: | \$ 2,251,500 |
| Debt financing | \$ 10,000,000 | Amount funded by debt |
| Cost of Debt | 2.0% | 6%, with Iraqi gov. subsidizing 4% of interest |
| Reimbursement periods | 1 times / year | |
| Loan duration | 10 years | |
| Allow tax credit? | <input type="checkbox"/> no | yes = negative income provides tax credit no = negative income, no tax credit |

Capital structure:

| | | | |
|----------------------------------|----------------------|-----|---|
| Equity investment | \$ 6,099,619 | 38% | Investment to cover cash shortfall in initial years |
| Debt financing | \$ 10,000,000 | 62% | |
| Total financing required: | \$ 16,099,619 | | |

Uses of funds:

| | |
|--------------------------|----------------------|
| Investment in PP&E | \$ 12,898,000 |
| Financing for operations | \$ 3,201,619 |
| Total: | \$ 16,099,619 |

Discounted Cash Flow Analysis

| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--|----|----------------|-------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Gross Revenue | | \$ 3,402,019 | 7,144,239 | 12,502,419 | 16,409,425 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 | 17,229,896 |
| Operating costs: | | | | | | | | | | | | | |
| Raw material | | \$ (1,050,000) | (2,100,000) | (3,500,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) | (4,375,000) |
| Expatriate managers | | \$ (600,000) | (600,000) | | | | | | | | | | |
| Iraqi managers | | \$ (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) | (700,000) |
| Plant labor | | \$ (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) | (728,000) |
| Packaging | | \$ (510,000) | (1,020,000) | (1,700,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) | (2,125,000) |
| Shipping/transport costs | | \$ (765,000) | (1,530,000) | (2,550,000) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) | (3,187,500) |
| Utilities | | \$ (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) | (150,000) |
| Land lease cost | | \$ - | - | - | - | - | - | - | - | - | - | - | - |
| Total operating costs: | | \$ (4,503,000) | (6,828,000) | (9,328,000) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) | (11,265,500) |
| Operating income (EBITDA) | | \$ (1,100,981) | 316,239 | 3,174,419 | 5,143,925 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 |
| Margin % | | | -32% | 4% | 25% | 31% | 35% | 35% | 35% | 35% | 35% | 35% | 35% |
| Financing cash flows: | | | | | | | | | | | | | |
| Change in working capital | \$ | (2,251,500) | | | | | | | | | | 2,251,500 | |
| Debt financing available (positive cashflow) | \$ | 10,000,000 | | | | | | | | | | | |
| Debt service (principal + interest) | \$ | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | (1,113,265) | - | - |
| Investment cash flows: | | | | | | | | | | | | | |
| Equipment | \$ | (6,198,000) | | \$ (2,200,000) | | | | | | | | | |
| Buildings | \$ | (4,500,000) | | | | | | | | | | | |
| Tax computation: | | | | | | | | | | | | | |
| EBITDA | \$ | (1,100,981) | 316,239 | 3,174,419 | 5,143,925 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 | 5,964,396 |
| Depreciation | \$ | (713,200) | (713,200) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) | (859,867) |
| Interest expense | \$ | (200,000) | (181,735) | (163,104) | (144,101) | (124,718) | (104,947) | (84,780) | (64,211) | (43,229) | (21,829) | - | - |
| Taxable income | \$ | (2,014,181) | (578,695) | 2,151,448 | 4,139,957 | 4,979,812 | 4,999,583 | 5,019,749 | 5,040,319 | 5,061,300 | 5,082,701 | 5,104,529 | 5,104,529 |
| Tax (can choose to allow tax credit) | \$ | - | - | - | - | - | - | - | - | - | - | - | - |
| Equity Free Cash Flow | \$ | (2,949,500) | (2,214,247) | (797,026) | (138,846) | 4,030,660 | 4,851,131 | 4,851,131 | 4,851,131 | 4,851,131 | 4,851,131 | 8,215,896 | 39,762,640 |

| | |
|------------|---------------|
| Equity IRR | 39% |
| Equity NPV | \$ 16,430,354 |

| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
|---------------------------------------|----|-------------|------------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Debt amortization | | | | | | | | | | | | | | |
| Yearly payment | \$ | (1,113,265) | | | | | | | | | | | | |
| Interest expense | \$ | 200,000 | 181,735 | 163,104 | 144,101 | 124,718 | 104,947 | 84,780 | 64,211 | 43,229 | 21,829 | - | - | |
| Principal balance | \$ | 9,086,735 | 8,155,204 | 7,205,043 | 6,235,879 | 5,247,331 | 4,239,012 | 3,210,527 | 2,161,472 | 1,091,437 | - | - | - | |
| Depreciation table (B/S) | | | | | | | | | | | | | | |
| Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Beginning PP&E on Balance Sheet (B/S) | \$ | - | 10,698,000 | 9,984,800 | 9,271,600 | 10,611,733 | 9,751,867 | 8,892,000 | 8,032,133 | 7,172,267 | 6,312,400 | 5,452,533 | 4,592,667 | 3,732,800 |
| PP&E investment | | 10,698,000 | - | - | 2,200,000 | - | - | - | - | - | - | - | - | - |
| Year 1 PP&E depreciation schedule | | | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | 713,200 | |
| Year 2 PP&E depreciation schedule | | | | | | | | | | | | | | |
| Year 3 PP&E depreciation schedule | | | | | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | 146,667 | |
| Year 4 PP&E depreciation schedule | | | | | | | | | | | | | | |
| Year 5 PP&E depreciation schedule | | | | | | | | | | | | | | |
| Annual depreciation expense | | | 713,200 | 713,200 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | 859,867 | |
| Ending PP&E on Balance Sheet | | 10,698,000 | 9,984,800 | 9,271,600 | 10,611,733 | 9,751,867 | 8,892,000 | 8,032,133 | 7,172,267 | 6,312,400 | 5,452,533 | 4,592,667 | 3,732,800 | 2,872,933 |

Investment items for processing facility

Land in Industrial Park long term lease

Equipment

Fruit Reception

| | |
|----------------------------|-----------|
| Preliminary inspection | \$200,000 |
| Fumigation chambers | 900,000 |
| Tote boxes 12,000 @ \$4.00 | 48,000 |
| Tote box washer | 150,000 |

Fruit Processing

| | |
|---|-----------|
| Dumping, Washing, drying and sorting line | 500,000 |
| Line 1- Pitted dates | |
| Sizer | 280,000 |
| Semi-automatic pitting | |
| 55 machines @\$15,000 ea | 825,000 |
| Grading | 200,000 |
| Packaging | 200,000 |
| Line 2- Date maceration and paste | 1,200,000 |
| Packaging/case carton (vacuum pack) | 100,000 |
| Line 3- Date bits and pieces | |
| Date dicer | 70,000 |
| Date dehydrator or hydrator | 600,000 |
| Packaging (by hand) | 50,000 |
| Automatic rotary stretch wrapper | 50,000 |

Sub total, processing equipment **\$ 5,373,000**

Central Date Processing Buildings

| | |
|------------------------------------|-----------|
| Fruit Reception Area | 50,000 |
| Cold Storage & dry storage | |
| 40,000 sq. ft. cold storage @ \$70 | 2,800,000 |
| 10,000 sq. ft dry storage @ \$30 | 300,000 |
| Processing and office | |
| 20,000 sq. ft. @ \$60 | 1,200,000 |
| Garage and maintenance | |
| 5,000 sq. ft. @ \$30 | 150,000 |

Sub total, buildings **\$ 4,500,000**

Other equipment and installation

| | |
|----------------------------|----------------------|
| Equipment Installation | 500,000 |
| Laboratory equipment | 20,000 |
| Trucks | |
| 10 ton Truck -1 | 50,000 |
| Pick-up trucks-3 | 75,000 |
| Fork lifts- 2 | 100,000 |
| Stand-by Generator | 80,000 |
| | |
| Sub-total, other equipment | \$ 825,000 |
| | |
| TOTAL, ALL EQUIPMENT | \$ 6,198,000 |
| | |
| TOTAL, ALL BUILDINGS | \$ 4,500,000 |
| | |
| GRAND TOTAL | \$ 10,698,000 |

Note: Additional equipment investment required in year 3: **\$ 2,200,000**

7. PHASED DATE VALUE CHAIN DEVELOPMENT PROGRAM

A date industry improvement program needs to be implemented in phases, as do the processing facilities. The following is a sample work program of project activities and objectives:

Timeline

See next page for timeline.

ACTIVITY TIMELINE

| No. | Activity | Project Month | | | | | | | | | | | | | | | | | | | | | |
|-----|---|---------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 1 | Finalize investment plans for Rural Collection Centers and Central Date Processing Plant | X | | | | | | | | | | | | | | | | | | | | | |
| 2 | Finalize plans for agricultural Farm Service Teams to provide extension support for date farmers | X | | | | | | | | | | | | | | | | | | | | | |
| 3 | Prepare equipment and building specifications for the date processing center and seek bids | | X | | | | | | | | | | | | | | | | | | | | |
| 4 | Form Iraqi company with appropriate investors to own and operate the date processing center | | X | | | | | | | | | | | | | | | | | | | | |
| 5 | Identify sites and initiate one or two model rural date collection centers supported by date Farm Services Teams | | X | | | | | | | | | | | | | | | | | | | | |
| 6 | Meet with Iraqi date industry leaders and entrepreneurs to discuss development plan for the date industry and define their role | | X | X | | | | | | | | | | | | | | | | | | | |
| 7 | Prepare a Work Order for a multi-year Date Industry Rehabilitation Plan | | | X | | | | | | | | | | | | | | | | | | | |
| 8 | Contract for date processing equipment and building, including cold storage | | | X | | | | | | | | | | | | | | | | | | | |
| 9 | Initiate three to four additional date collection centers supported by date Farm Services Teams | | | | | | | | | | | | X | | | | | | | | | | |
| 10 | Equipment arrives for Central Date Processing Center | | | | | | | | | | | | | X | | | | | | | | | |
| 11 | Identify and hire key management staff for date processing center | | | | | | | | | | | | | | | X | | | | | | | |
| 12 | Complete date processing center and commission | | | | | | | | | | | | | | | X | | | | | | | |
| 13 | Develop date procurement program for the date processing center | | | | | | | | | | | | | | | | X | | | | | | |
| 14 | Operate date processing center for 2009 harvest | | | | | | | | | | | | | | | | | X | | | | | |
| 15 | Initiate Iraqi date market development campaign | | | | | | | | | | | | | | | | | | X | | | | |
| 16 | Prepare Work Program for 2010 and 2011 | | | | | | | | | | | | | | | | | | | | | X | |
| 17 | Evaluate other value-added processed date products to be added to the processing center | | | | | | | | | | | | | | | | | | | | | | X |

8. NEXT STEP

The next step is to prepare a more detailed feasibility study with a particular focus on market opportunities, plant engineering and finance.

8.1 Market Opportunities

It is difficult to obtain public information on the market for processed date products. Additional contacts directly with buyers are needed to identify specific markets both for domestic and export markets. For export markets, a market research study is required before a feasibility study can be completed in order to verify product, product specifications and pricing.

The establishment of a date processing facility also provides an opportunity to produce unique processed date products for the domestic market and even regional export markets. Specific products and specifications need to be identified.

8.2 Engineering

Additional work is required by a food processing engineer on equipment design and specification, in order to provide sufficient information to seek bids for the equipment and the required buildings and cold storage facilities. This includes additional information on the site and buildings for the processing equipment.

8.3 Finance

The ideal investment partner in the project will be a firm or individual that has an established market for processed date products, particularly in the EU and USA/Canada. This will allow the plant to produce a product that meets the specific needs of targeted markets. With this type of investor involvement it should be relatively easy to obtain significant financing from Middle Eastern and Gulf sources.

9. ANNEXES

Annex A List of U.S. Buyers of Date Products

Annex B Date Food Processing Equipment Supplied by Elliott Mfg., Fresno, CA

Annex C Flow Chart-Date Juice Extraction Line and HFDS Palm Date Syrup Line

ANNEX A

U.S. BUYERS OF DATE PRODUCTS

There are a wide range of importers and processors who purchase dry fruit and nuts both domestic production and imported product and, in turn, supply processors with product. Listed below is an example of companies that have historically purchased dates.

American Nuts

8000 Wheatland Avenue
Sun Valley, Calif. 91352
818-768-1028

Glory Bee Foods

120 N. Seneca Road
Eugene, Oregon 97402
Toll Free USA/Canada 1-800-456-7923
info@glorybeefoods.com

J.R. Braun

265 Post Avenue
Westbury, New York 11590

Kellogg Company

1 Kellogg Square
Battle Creek, Mich. 49016
(269) 961-2800
investor.relations@kellogg.com

Purity Foods

2871 West Jolly Road
Okemos, Mich. 48864
Phone: (517) 351-9231
Fax: (517) 351-9391
purityfoods@voyager.net
<http://www.purityfoods.com>

Setton International Foods

85 Austin Blvd.
Commack, N.Y. 11725
Phone: 631-543-8090 Fax: 631-543-8070

General Mills Inc.

(Nature Valley Division)

Hadley Orchards

83-555 Airport Blvd.
Cabazon, Calif.
1-800-854-5655
hadleyscom@hadleyfruitorchards.com
<http://www.hadleyfruitorchards.com>

Kalustyan Corp.

855 Rahway Avenue
Union, New Jersey 07003
Phone: 908-688-6111
Fax: 908-688-4415
<http://www.kalustyan.com>

Otis McAllister

353 Sacramento Street, Suite 300
San Francisco, Calif.
Tel: 415-421-6010
Fax: 415-421-6016
info@otismcallister.com
<http://www.otismcallister.com>

RDM International

11643 Otsego St., No Hollywood, Ca 91601
Phone (818) 985-7654 Fax (818) 760-2376
rdmintl@aol.com
<http://www.rdmintl.com>

Specialty Brands Inc.

4200 East Concoors
Ontario, Calif. 91764
909-477-4700
<http://www.specialtybrandsinc.com>

ANNEX B

DATE FOOD PROCESSING EQUIPMENT SUPPLIED BY ELLIOTT MFG. FRESNO, CALIFORNIA



Food Processing



**EQUIPMENT SUPPLIED BY
 ELLIOTT MFG. CO.**

MIDDLE EAST ACTIVITIES

| Company | County | Description |
|---|---------|-------------------------------|
| FMC International | Algeria | Date Processing Equipment |
| Arab Agriculture Co. for Packing Fruits and Vegetables (ARATCO) | Egypt | Packaging Equipment |
| Crocodile/Teco | Egypt | Packaging Equipment |
| El Wadi Export Co. | Egypt | Packaging Equipment |
| FMC International | Egypt | Fruit Processing Equipment |
| Rozetta Date Plant | Egypt | Date Processing Equipment |
| Al-Fayoum Date Plant | Egypt | Date Processing Equipment |
| Dashte Morghab | Iran | Date Packaging Equipment |
| FMC International | Iran | Date Processing Equipment |
| Garmseer Co. | Iran | Packaging Equipment |
| Jalal Movaghar Co. | Iran | Packaging Equipment |
| Junoub Date Plant | Iran | Date Processing Plant |
| Pars Oil Co. | Iran | Packaging Equipment |
| Shiraz Vegetable Oil Co. | Iran | Packaging Equipment |
| Iraqi Date Administration | Iraq | Date Processing Equipment |
| Kuwaiti Nat'l Petroleum Co.- Petrochemical Industries | Kuwait | Packaging Equipment |
| Procter & Gamble | Kuwait | Packaging Equipment |
| Societe des Dattes de Zagora Office de Developement Industriel | Morocco | Date Processing plant |
| Modern Conserves | Lebanon | Canning Plant |
| Libyan Govt Date plant | Libya | Packaging Equipment |
| Libya (via Impianti of Italy) | Libya | Date Processing Equipment |
| Al-Hassa Date Plant | KSA | Turnkey Date Processing Plant |
| Hofuf Date Plant | KSA | Date Processing Lines |
| National Co. for Food Stuff | KSA | Packaging Equipment |
| National Dairy Co. | KSA | Packaging Equipment |
| Al-Fakhra Date Co. | KSA | Date Processing Equipment |
| National Agricultural Development Company (Nadec) | KSA | Date Processing Lines |
| Al-Jazira Dates Co. (Savola) | KSA | Turnkey Date Processing Plant |
| Procter & Gamble | KSA | Packaging Equipment |
| RJM International | KSA | Packaging Equipment |

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| | | |
|----------------------------------|-------------------|-----------------------------------|
| Private Dept of the Crown Prince | KSA | Packaging Equipment |
| Al-Mohammadia Dates | KSA | Date Processing Lines |
| Onaizah Date Plant | KSA | Date Processing Equipment |
| Makkah Date Plant | KSA | Date Processing Equipment |
| Nizwa Date Plant | Sultanate of Oman | Turnkey Date Processing Plant |
| Rostaq Date Plant | Sultanate of Oman | Turnkey Date Processing Plant |
| FMC International | | |
| The Private Dept of His Highness | UAE | Turnkey Date Processing Equipment |
| Sheikh of Al-Ain | | |



Box Dump Shaker ▶



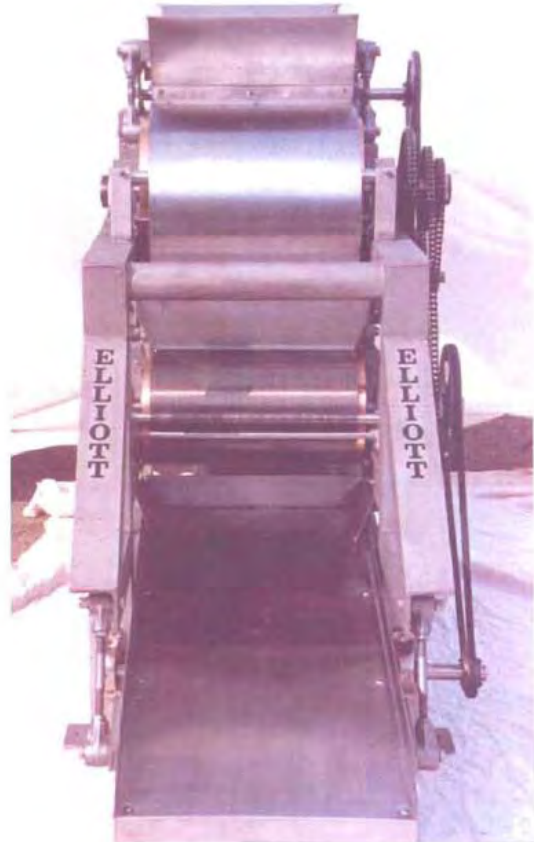
◀ Box Dump Shaker

Primary Receiving and Cleaning ▶





▲ Date Paste Grinder



▲ Date Macerator



← Date Paste Pumping System



← Blancher



← Tote Box Washer



Box Dump Shaker ▲



Sorting/Grading Table ▲



▲ Distribution Conveying to Paste and Press Equipment



Shaker Distribution Conveyor ▲



Dehydrator ▲



Motor Control ▲



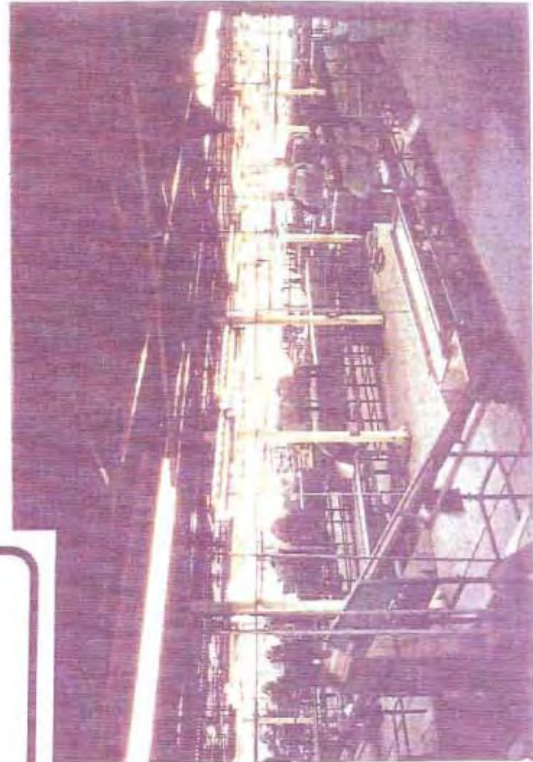
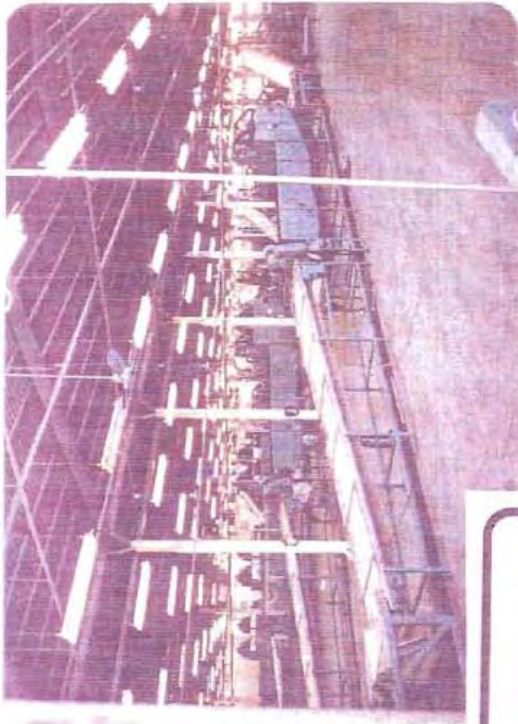
Vacuum Chambers Ready for Shipment ▲



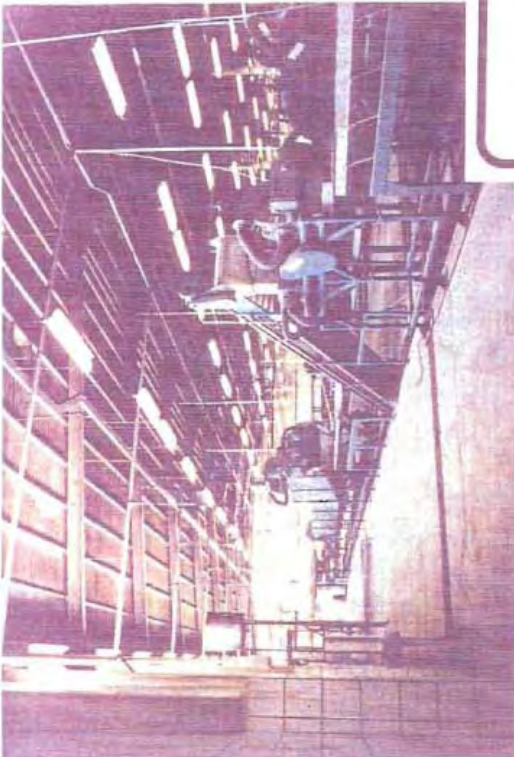
Loading on Truck ▲



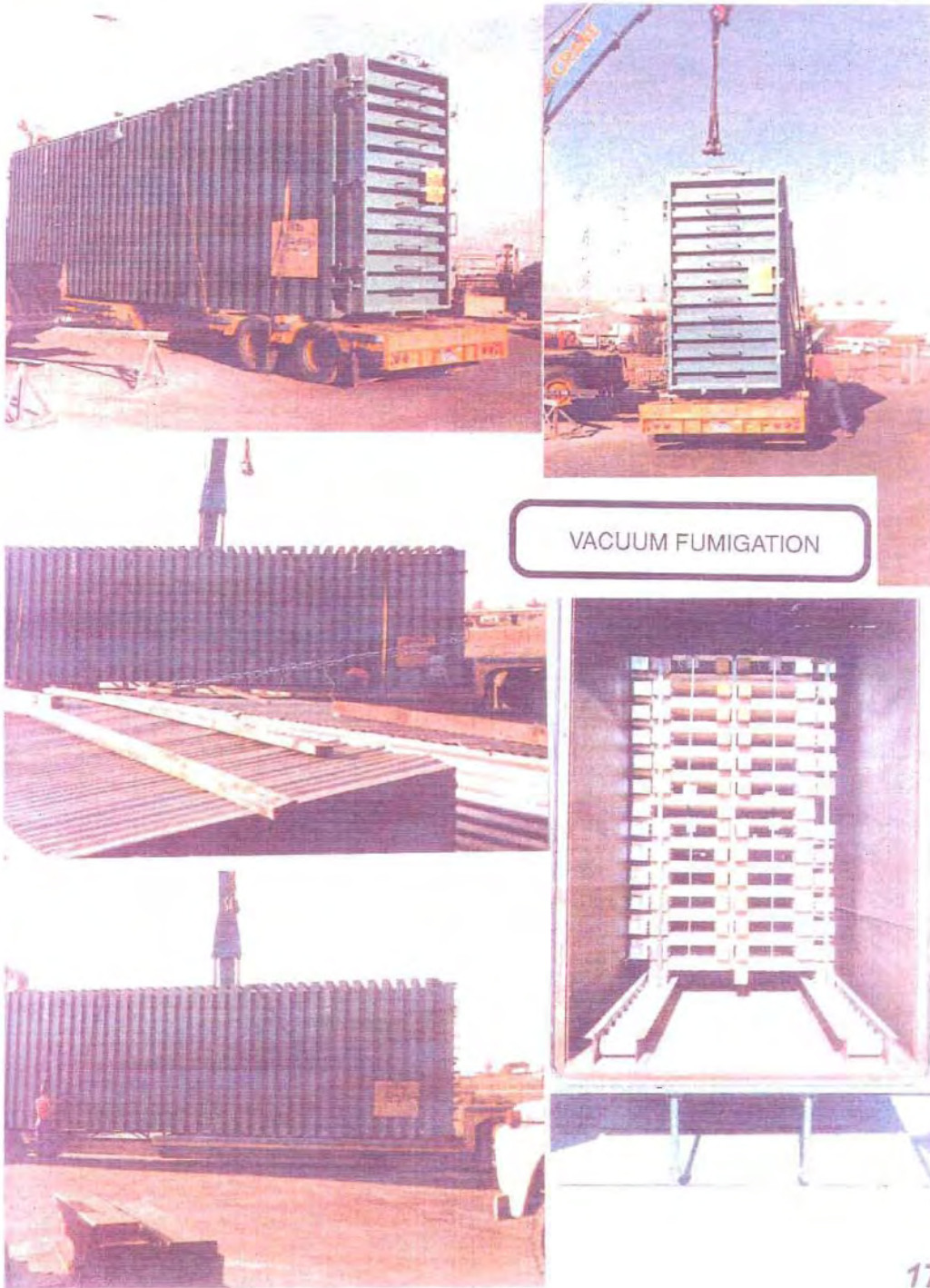
Equipment Skid Inside Vacuum Chamber Ready for Shipment ◀



DATE PROCESSING



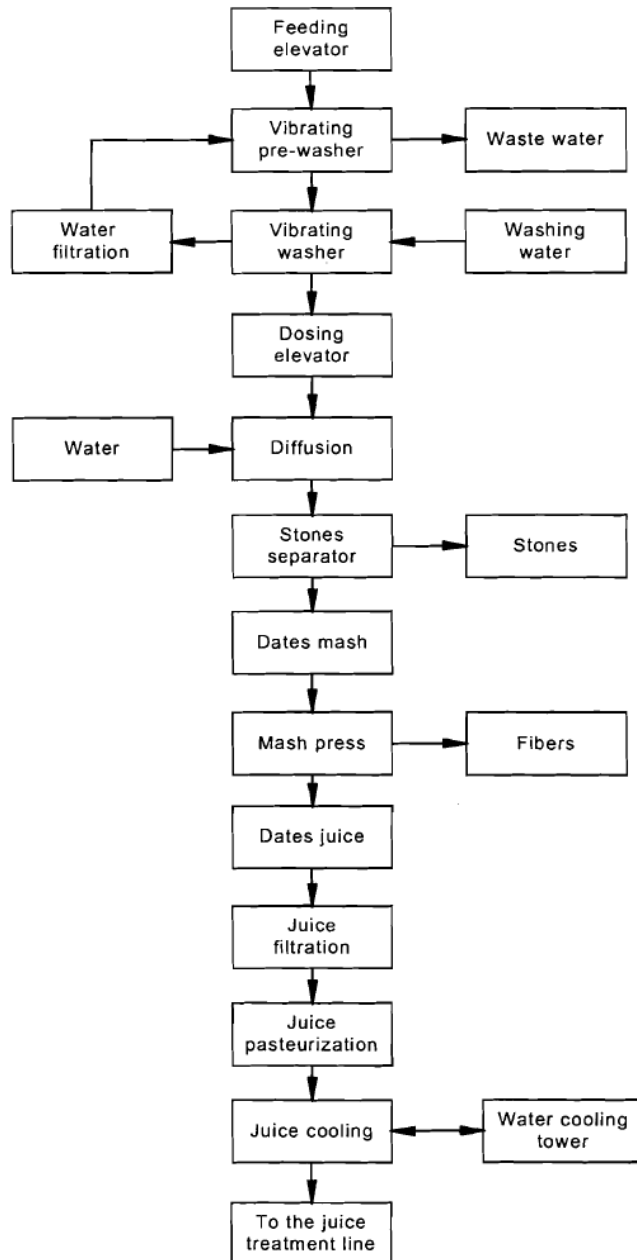
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ANNEX C

FLOW CHART
DATE JUICE EXTRACTION LINE AND HFDS PALM DATE SYRUP LINE

DATES JUICE EXTRACTION LINE



Offer no. 146/07-I
HFDS PALM DATES SYRUP
PROCESSING LINE