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A BUSINESS PLAN FOR EXPORT OF CUT FLOWERS FROM JORDAN

Prepared for

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and

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PREFACE

"A Business Plan For Export Of Cut Flowers From Jordan" documents the steps, procedures, and information necessary for an entrepreneur to make an informed decision about what an export program for cut-flowers from Jordan will have to include. As the production of cut-flowers continues to rise in Jordan, opportunities exist to direct the growing interest of the private sector in Jordan to establish production for export programs. As this document demonstrates, production for export entails a whole host of sophisticated issues and procedures that are essential to achieving a viable export program that delivers the high quality and quantity demanded at destination at competitive prices. Thus an export program would be fundamentally different from domestic marketing in the way the cut-flowers are grown, harvested, handled and marketed.

This business plan presents a comprehensive approach to developing a private sector entrepreneur based export program for cut flowers. It proposes that Jordanian cut-flower exporters aim to satisfy the demands of the European markets through the setting up of sophisticated and optimal production and post harvest operations, detailed market analysis for product demanded, and a viable financial plan that accounts for the best and worst outcomes.

A comprehensive approach is necessary to developing the exports of cut-flowers from Jordan. The Plan is designed for consideration by an individual entrepreneur or a joint venture. The form of the private sector establishment is not critical to this plan. The approach must be taken in its entirety, with appropriate modifications, for a reasonable chance at for the success of the venture. It would not serve the entrepreneur to adapt some of the practices, like appropriate cutting techniques, but not installing a pre-cooler.

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GENERAL OUTLOOK

The main purpose of this manual is to provide Jordanian entrepreneurs with the basic knowledge to design a comprehensive business plan for cut flower exports. The plan takes into consideration the market potential, marketing and production process, and the implementation strategy in order to maximize entrepreneur's profits and minimize his risk. The production and the post-harvest techniques included in this manual have been investigated by several national and international cut flower specialists. In summary a high degree of professionalism and organization is essential to produce and export cut flowers successfully, especially to the sophisticated markets of Western Europe.

ORGANIZATION OF THE MANUAL

The manual consists of four parts: The first part includes a general outlook of the cut flower business. A brief description will be provided for major world cut flowers, new producers & new markets, and seasonality of major cut flowers such as carnations and roses. In addition details on major consumer countries will be provided as well as prices and volume trends. On the national level, a brief description on the starting of the business, major production areas, market structure, and consumers will be included.

The second part of the manual demonstrates the process of product and market selection (an analysis of market potential for the selected products by destination and season). This part also includes the market selection process based on some indicators such as the disposable consumption, price trends and the availability of the needed product in the local markets.

The third part of the manual contains the analysis of the production and post-harvest practices for the selected products. The analysis leads to a set of suggestions on appropriate production and post-harvest practices. A comprehensive description of the farm consists of design, most appropriate technical practices such as multispan design, planting materials, fertilization, and irrigation.

The fourth part deals with the issue of investment and profitability analysis. A detailed financial analysis for an optimal cut flower farm is included.

The fifth part presents the implementation strategy for the proposed business plan. In other words, it includes the guidelines needed to start an export oriented cut flower production in Jordan. It addresses marketing, exporting, and regulatory and logistical issues.

PART I

1. THE JORDAN CUT FLOWER INDUSTRY

1.1 PRODUCTION

- * Historically, most of the cut flowers consumed in Jordan were imported. The banning of cut flower imports in early 1985 helped launch the industry and encouraged farmers to grow cut flowers.
- * Currently, Jordan produces a large range of cut flowers such as Carnations, Large & Small Roses, Gypsophilla, Gladiolus, Alestromeria, Aster, Freesia, Gerbera and others. The dominant species grown are carnations and roses.
- * Production of cut flower varies through out the year, reaching the peak in the spring and the lowest level at winter time. Moreover, the local production of cut flower covers all the needs of the local market with over supply during certain times of the year. Table 1 presents the production calendar & the yearly production of some cut flowers in Jordan.

TABLE 1 PRODUCTION CALENDAR OF THE MAIN CUT FLOWERS IN JORDAN

Item	J a n	F e b	M a r	A p r	M a y	J u n	J u l	A u g	S e p	O c t	N o v	D e c
Carnation	@	@	@	@	@	@	@	@	@	@	@	@
Roses	@	@	@	@	@	@	@	@	@	@	@	@
Gypsophilla		@	@	@	@	@	@	@	@	@	@	
Dianthus	@	@	@	@	@	@	@	@	@	@	@	@
Stalice	@	@	@	@	@	@	@	@	@	@	@	@
Tuberose							@	@	@			
Freesia		@	@									

- * Official data on cut flower production in Jordan are not available. Recent studies estimate that a total of 80-85 hectares are devoted to cut flowers.

BOX 1 AREA CULTIVATED WITH CUT FLOWERS IN JORDAN

Interviews with producers, Cut Flower Association and Cut Flowers Auction indicated that the total cultivated area of cut flowers is about 100 hectares. About 50 % are grown under plastic tunnels while the rest are grown in the open fields. There are about 70 growers, some of which have more than one farm.

- * Most farms are small in size (1.5 to 2 Hectare) with the exception of about 6 farms which can be classified as being comparatively large. Thus it was estimated that over than 40% of the total cultivated area are grown by the 6 large growers.
- * Most of the cut flower farms are located in the highlands (Amman and the surrounding areas). In addition, there is limited production in the Jordan Valley and Al-Azraq.
- * Most farmers grow cut flowers to meet their own retail outlets needs, the local market and to export the over supply to the regional markets which do not impose strict quality standards.
- * The quality of the cut flower produced in Jordan varies among growers. In general, quality of cut flowers can be classified as medium with the exception of standard carnations. Some of the standard carnations are good and few are of a high quality.

BOX 2 CONDITIONS FAVORING CUT FLOWER PRODUCTION IN JORDAN

Jordan has a climate variation that gives it a significant comparative advantages over some other suppliers of the cut flowers especially in the winter time in Jordan. Additionally, Jordan enjoys a comparatively low labor cost and airfreight over some other main world suppliers of cut flowers such as Israel and Holland. The location, political stability especially after the peace process and the availability of alternative markets (Regional markets) makes Jordan an excellent place for investment in the cut flower business.

- * Nevertheless, it was noticed that many growers have improved their know how and awareness about the production and post harvest of cut flowers through trail and error and through participation in several international trade fairs and seminars.

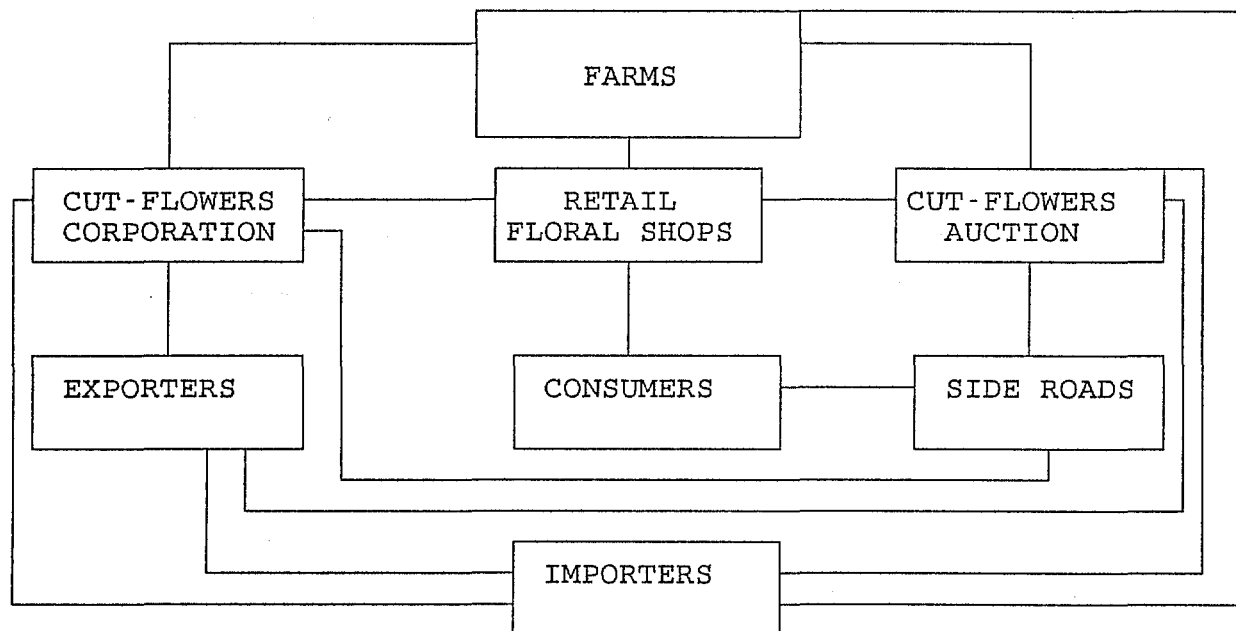
1.2 MARKETING

BOX 3 WHOLESALE OUTLETS OF CUT FLOWERS IN JORDAN

Jordan's cut flowers are marketed locally through two main outlets:

- 1) the Flower Auction which was established in 1987.
- 2) the Cut Flowers Producers Cooperative Association which was established in 1989.

- * On average, cut flower producers pay marketing fees of 5 to 7.5 per cent to market their produce through the Auction and/or the Association.
- * Many growers sell their produce directly to the consumers throughout their retail outlets. Cut flower's marketing channels in Jordan are demonstrated in the following chart:



BOX 4 EMERGING EVENTS IN CUT FLOWER BUSINESS IN JORDAN

While writing this report a milestone event took place regarding the marketing structure of cut flowers in Jordan. The Amman Municipality has discontinued the Cut Flower Producers Cooperative Association and Amman Flower Auction from practicing the wholesale of cut flowers in their marketing centers. On April 4th, 1996, the Municipality opened its own cut flower and foliage wholesale market.

The new market consists of 9 wholesale outlets located on the second floor of King Abdullah Gardens Complex in Shamisani. The Municipality will charge 3 percent of the total sales value as a marketing fee for each shipment sold in the new market. The Municipality hopes that the new market will encourage competition and prevent monopoly.

It is hard to evaluate the effects of the new market on the domestic cut flower industry at this point of time. The following would be some of the expected effects:

- 1) The new market will help in establishing an official data base for cut flower supplies and prices in the local market.
- 2) Since cut flower producers will be paying a 3% marketing fee on cut flower sales in the new market, the authors believe that the new market may increase the total marketing cost of cut flowers in Jordan.
- 3) The location of the new market in the second floor above the car parking of the complex may have a negative effect on the quality of the marketed cut flower due to the high levels of ethylene produced by vehicles and other logistical concerns.
- 4) As producers will not be allowed to sell their products directly to retailers, it is believed that the marketing cost and the delivery time for cut flowers may be increased.
- 5) Cut flower producers may choose to emphasize exports over domestic marketing by packaging their exports on the farms.

1.3 DOMESTIC CONSUMPTION

- * Domestic demand for cut flower varies through out the year with the highest in summer and spring and the lowest in the fall and winter. On certain occasions such as the Mothers day (March 31), Valentine day (February 14), Christmas (December 25) and New year (January 1) the demand and prices are at their highest.
- * Local prices of cut flower can be described as being unfair (comparatively low) through out the year. That is because the high demand of cut flower on summer and spring is offset by the high supply and some times the low quality due to the high summer temperatures.

1.4 EXPORT MARKETS FOR JORDAN

- * Available data on Jordan's cut flower exports during the period 1992 through 1995 shows that Jordan exports of cut flowers has increased dramatically through out the period 1992-1994 as shown on Table 1.

BOX 5 CUT FLOWER EXPORTS IN 1992 AND 1995

Jordan cut flower exports have increased from Mt 84.5 in the year 1992 to Mt 156 in the year 1995 (an increase of 85 per cent).

- * Jordan cut flower export markets are mainly to the Gulf states and the neighboring Arab countries such as Lebanon & Egypt.
- * Few quantities are exported to Austria, the Netherlands, Germany and some other EU countries.

TABLE 2 JORDAN MONTHLY EXPORTS OF CUT FLOWER FOR THE PERIOD 1992, - 1995. (000)KG

MONTH	1992	1993	1994	1995	TOTAL
JAN.	2.97	5.04	17.43	8.98	34.42
FEB.	1.32	4.83	10.22	11.44	27.81
MAR.	5.20	5.04	15.63	16.52	42.39
APR.	6.30	11.70	18.27	18.48	54.75
MAY.	10.20	16.00	20.67	23.75	70.62
JUNE	10.20	11.36	14.25	14.82	50.63
JULY	8.70	16.80	12.54	10.14	48.17
AUG.	6.22	10.90	11.25	9.34	37.71
SEP.	7.90	12.37	14.50	11.02	45.79
OCT.	10.77	12.37	15.36	8.81	47.31
NOV.	8.59	14.80	11.90	13.03	48.32
DEC.	6.10	16.65	6.09	9.19	38.03
TOTAL	84.47	137.86	168.11	155.51	545.95

Source: Agricultural Marketing Organization

BOX 6 NEW MARKETS TO JORDAN'S CUT FLOWER INDUSTRY

During 1994-1995, Jordan's exports reached new markets such as Yemen, Austria, Russia and Ukraine as shown on Table #2 & 3.

- * Saudi Arabia, U.A.E and Lebanon are the largest regional and international importers of Jordanian cut flowers through out the period 92 - 95. Table 3 and 4 show that Saudi Arabia has imported about 40 per cent of Jordan's exports of cut flowers in 1994 and 27 per cent in 1995.
- * Ukraine, Austria, and Russia have imported about 9.9, 12.5 and 6.2 per cent of the total Jordanian cut flower exports for the year 1995 respectively. This indicates that Jordan's exports have started to penetrate new markets in the Eastern and Western European countries.

TABLE 3 JORDAN CUT FLOWER EXPORTS BY DESTINATION FOR
THE YEAR 1994. (000)KG

Month	S.ARABIA	UAE	LEBANON	QATAR	BAHRAIN	EGYPT	HOLLAND	AUSTRIA	GERMANY	OTHERS	TOTAL
JAN	8.7	2.8	1.8	1.2	1.1	0.0	1.7	0.0	0.1	0.0	17.4
FEB	3.5	3.0	2.2	0.7	0.8	0.0	0.0	0.0	0.0	0.0	10.2
MAR	5.7	5.4	2.3	1.0	1.2	0.0	0.0	0.0	0.0	0.0	15.6
APR	6.3	6.4	3.4	0.8	1.3	0.0	0.0	0.0	0.0	0.0	18.3
MAY	7.9	6.8	4.3	1.4	0.1	0.1	0.0	0.0	0.0	0.0	20.7
JUN	7.7	4.1	0.0	1.4	1.1	0.0	0.0	0.0	0.0	0.0	14.2
JUL	9.3	2.1	0.0	0.5	0.7	0.0	0.0	0.0	0.0	0.0	12.5
AUG	5.2	2.2	1.1	0.6	0.6	0.0	0.0	1.6	0.0	0.0	11.3
SEP	4.7	3.2	0.9	0.9	0.6	0.0	0.0	4.2	0.0	0.0	14.5
OCT	3.4	4.0	1.0	1.0	0.6	0.1	0.0	5.0	0.0	0.2	15.4
NOV	4.0	3.1	1.6	1.3	0.6	0.0	0.1	1.1	0.0	0.2	11.9
DEC	2.0	2.7	0.0	0.6	0.0	0.0	0.0	0.7	0.0	0.0	6.1
TOTAL	68.4	45.7	18.6	11.3	8.7	0.2	1.9	12.8	0.1	0.5	168.1

TABLE 4 JORDAN CUT FLOWER EXPORTS BY DESTINATION FOR THE YEAR 1995. (000)KG

Month	S.ARABIA	UAE	LEBANON	QATAR	BAHRAIN	YEMEN	RUSSIA	AUSTRIA	UKRAINE	OTHERS	TOTAL
JAN	4.0	2.7	0.0	0.7	0.0	0.0	0.0	1.4	0.2	0.0	9.0
FEB	3.0	3.0	0.5	0.4	0.1	0.0	0.0	2.5	1.9	0.0	11.4
MAR	3.6	4.2	0.5	1.2	0.2	0.4	0.0	2.9	3.5	0.0	16.5
APR	4.0	5.3	1.2	0.0	0.6	0.8	0.4	2.6	2.9	0.5	18.5
MAY	3.3	6.3	1.4	0.6	0.5	0.5	3.1	4.6	3.4	0.0	23.8
JUN	3.0	5.1	0.7	0.1	1.3	0.3	1.5	0.8	1.1	1.0	14.8
JUL	6.1	2.1	0.0	0.3	0.3	0.4	0.0	0.3	0.6	0.1	10.1
AUG	3.0	2.9	0.9	0.4	0.2	0.5	0.2	1.1	0.2	0.0	9.3
SEP	2.3	2.7	0.0	0.9	0.0	0.0	1.0	3.0	0.7	0.4	11.0
OCT	3.0	3.1	0.0	0.3	0.0	0.4	0.3	0.0	0.7	1.1	8.8
NOV	5.2	3.7	0.2	0.7	0.1	0.5	2.1	0.0	0.3	0.1	13.0
DEC	3.8	3.1	0.1	0.1	0.0	1.1	1.1	0.0	0.0	0.0	9.2
TOTAL	44.3	44.2	5.5	5.9	3.3	4.9	9.7	19.1	15.4	3.3	155.5

1.5 CONSTRAINTS FACING CUT FLOWERS IN JORDAN

- * Several obstacles face the cut flower industry in Jordan. Such barriers hinder entrepreneurs to invest in this industry and phrase the question "why not to invest in Jordan?".

BOX 7 WHY NOT JORDAN?

High import tariff on cuttings and mother plants and their limited availability and cost of irrigation water are the main constraints for investing in the cut flower industry in Jordan. Import duties amounts to about 55% of the total import value of the mother plants. Additionally, duties are also charged on imports of cooling and heating systems and some other fixed assets. The cost of water per cubic meter ranges from 80 - 600 fils (12 - 90 US cents) and it varies considerably depending on the source of water. If the farmer has his own well the

PART II

2. MARKET AND PRODUCT SELECTION

As mentioned above, Jordan has a substantial competitive advantage for exporting cut flowers. In order to utilize these advantages up to the maximum, it is essential to select the right products to be exported and the right markets. An essential part of the selection process is to review the cut flower situation in prospect markets in terms of domestic production, imports, exports, and price trends. The following part contains an assessment of the world cut flower markets.

Available information on cut flowers, cut foliage and plants indicates that in 1992 the total world production of these three products amounted to US\$ 17,813 million. The Dutch floricultural industry contribution amounted to US\$ 3,563 of total world production (i.e. twenty per cent).

Total world exports of cut flowers were \$4,063 million in 1992, of which Holland exported \$2,438 million or sixty per cent of the total world exports. Europe is the largest world market in floricultural trade. In general, Holland is the leading country in world floricultural trade, and the European markets in particular. Holland provides over 80% of cut flowers imported into Germany, France, Belgium, and Denmark, and over 50% of the imports of all other European markets.

Figure 1 shows the expected retail sales of cut flower and pot plants according to the Flower Council of Holland. The chart indicates that a huge market exists for floricultural products in these countries.

Major world exporters of cut flowers are Holland, Columbia, Italy, Israel, Spain and Kenya. Figure 2 demonstrates the share of each exporter in world exports of cut flowers. Holland occupies the highest share of 59% followed by Columbia at 10%.

Figure 1. Projected Cut flowers Retail Sales in Selected EC Markets in 1997

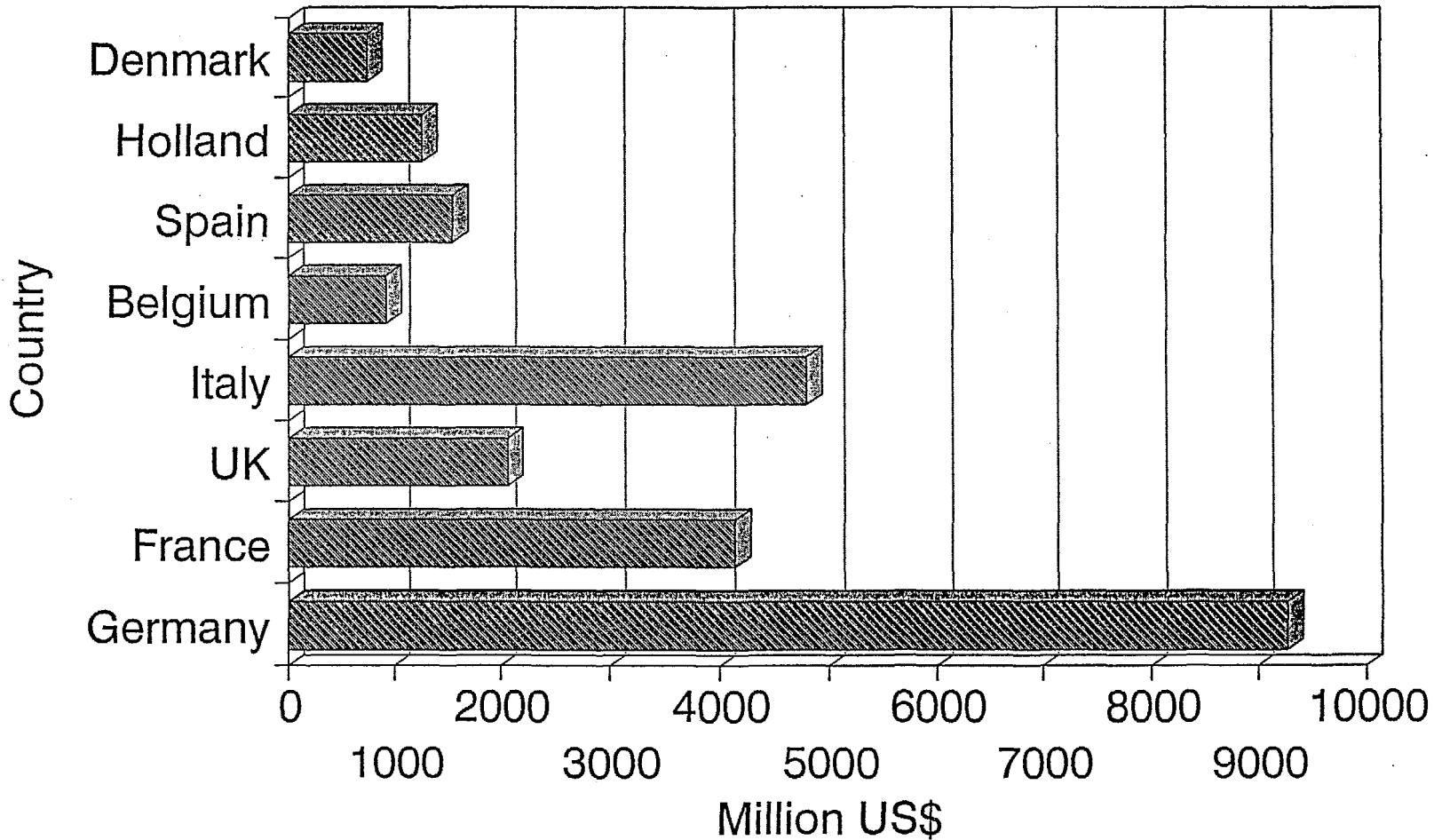
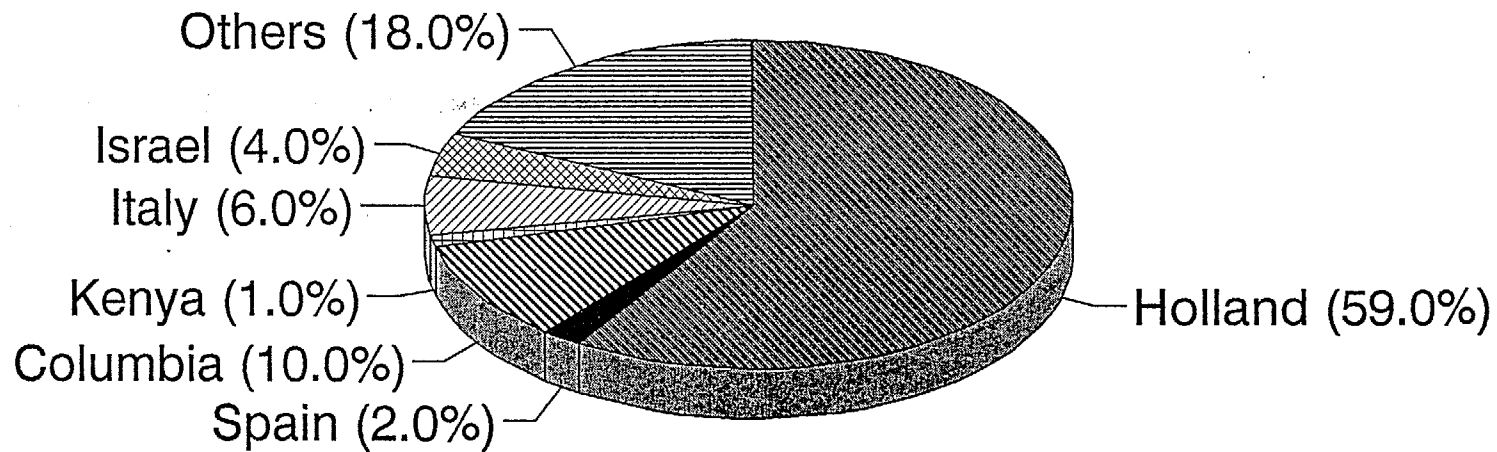


Figure 2. World Exports of Cut Flowers By Origin (1992)



2.1 MAJOR WORLD CUT FLOWER IMPORTERS

Western European countries are the major cut flower importers in the world. Nineteen countries form the EC and EFTA with a combined population of over 370 million consumers and a 40% allotment of aggregate world trade. In 1994, European imports of cut flowers from other EU countries, amounted to about US\$ 442 million. As shown in Figure 3, Israel, Columbia, Kenya, and Zimbabwe are the major importers into the European Union.

Holland plays a significant role in the cut flower trade in Europe in terms of imports, exports, and domestic production. In the following part the key issues of cut flower business for major Western European countries discussed.

2.1.1 HOLLAND

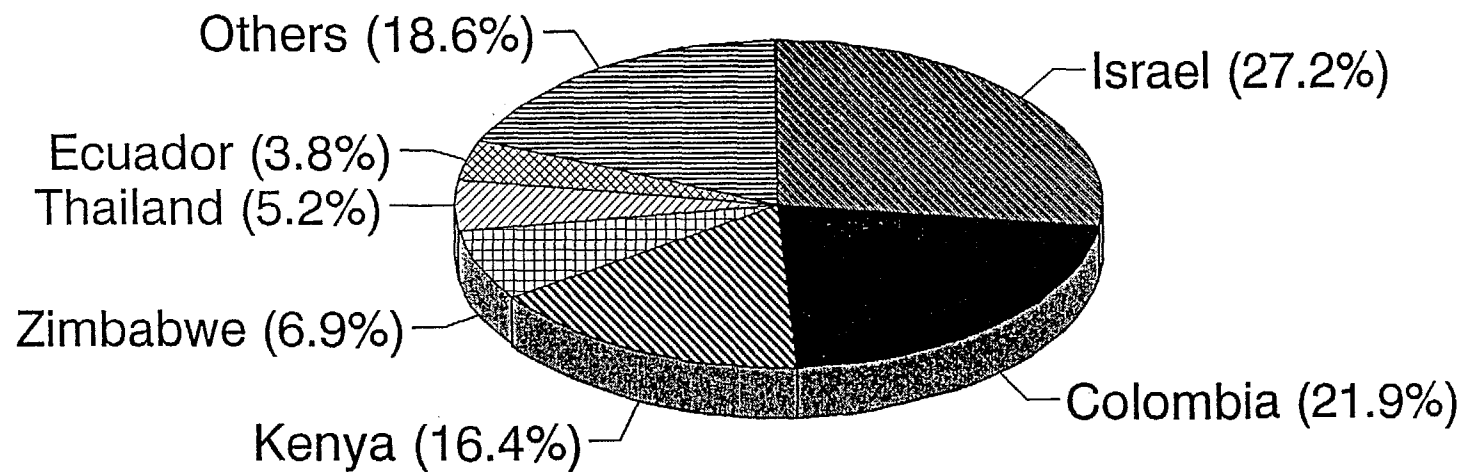
2.1.1.1 Production

- * Holland accounts for 10% of the total world acreage under cultivation of cut flower and pot plants. Holland's contribution in the total world production amounts to 20%. In 1992, the total area under cultivation was 7,625 hectares of which 70% was under glass. In 1992 the value of cut flower and pot plants production was 3,563 million US Dollars.
- * Roses and chrysanthemums form 35-40% of total production of cut flowers.

2.1.1.2 Exports

- * 59% of total world exports of cut flower are dominated by Holland.
- * Holland's principal competitors for cut flower exports are Columbia, Israel, Italy, Kenya, and Spain.
- * Roses, Chrysanthemum, Carnations, Tulip, Freesia, Gerbera, and summer flowers are the key Dutch exports. Figure 5, shows the relative importance of these cut flower exports.

Figure 3. Major Exporters of Cut Flowers to EU Countries in 1994



- * European countries are the major destinations of Holland's exports of cut flowers and other floricultural products. Figure 4 demonstrates that Germany, France, and UK accounts for 70% of Holland's exports.

- * The main reasons behind the leading role of Holland in the world floricultural trade are the well experienced auction markets, the location as a key center for the buying and selling of floricultural products in Europe, and the well developed infrastructure of the Dutch importers and exporters.

2.1.1.3 Imports:

- * Cut flower imports especially during winter months, assist Dutch traders to provide the European markets with a wide variety and adequate quantities of cut flowers all year round.

BOX 8 MAJOR IMPORTED CUT FLOWERS INTO DUTCH MARKET

Carnations, Chrysanthemum, Gladiolus, Orchid, and Roses are the major imported cut flowers into the Dutch markets as shown in Table 5. Imports are most important during the winter season from October/November until April/May. The rest of the year is supplied mainly by Dutch producers.

- * Special events which prompt cut flower sales are Mother's Day, Christmas (December 25), Valentine's Day (February 14), Easter (April 5), Birthdays, and Bereavements.

TABLE 5 IMPORT VOLUMES OF MAJOR CUT FLOWERS TO DUTCH MARKETS
IN 1992 (IN MILLION STEMS)

Flower Type	Millon Stems
Carnations	753
Chrysanthemum	15
Roses	243
Orchid	21
Gladiolus	2

BOX 9 MAJOR IMPORTERS INTO DUTCH MARKETS

Major importers to Dutch markets are Israel, Columbia, Spain, Kenya, Zimbabwe, and Zambia. Import shares of these countries into Holland varies based on the type of imported cut flower as shown in Table 6.

TABLE 6. SOURCES OF CUT FLOWER BY TYPE AND ORIGIN INTO
HOLLAND IN 1992

Flower Type	Major source and share
Carnations	Spain (39%), Israel (18%), Columbia (18%), Kenya (13%), and Germany (8%)
Chrysanthemum	Israel (66%), Zimbabwe (14%), Nigeria (7%), S.Africa (2%), and Italy (1%)
Rose	Israel (39%), Zimbabwe (29%), Kenya (11%), Zambia (4%) and Ecuador (4%), Others (10%)
Orchid	Thailand (75%), South Africa (5%), and Germany (3%)
Gladiolus	Israel (64%), Spain (15%), Zimbabwe (6%), Zambia (6%), S.Africa (3%) and France (3%)

Figure 4. Holland's Exports of Cut Flowers By Destination (1992)

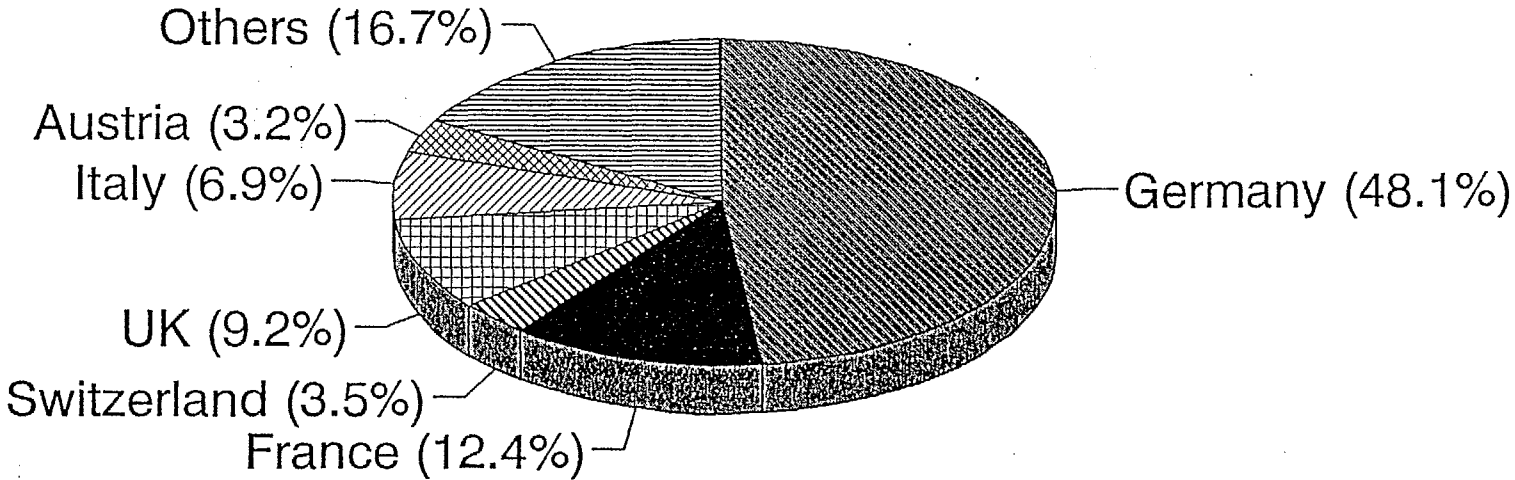
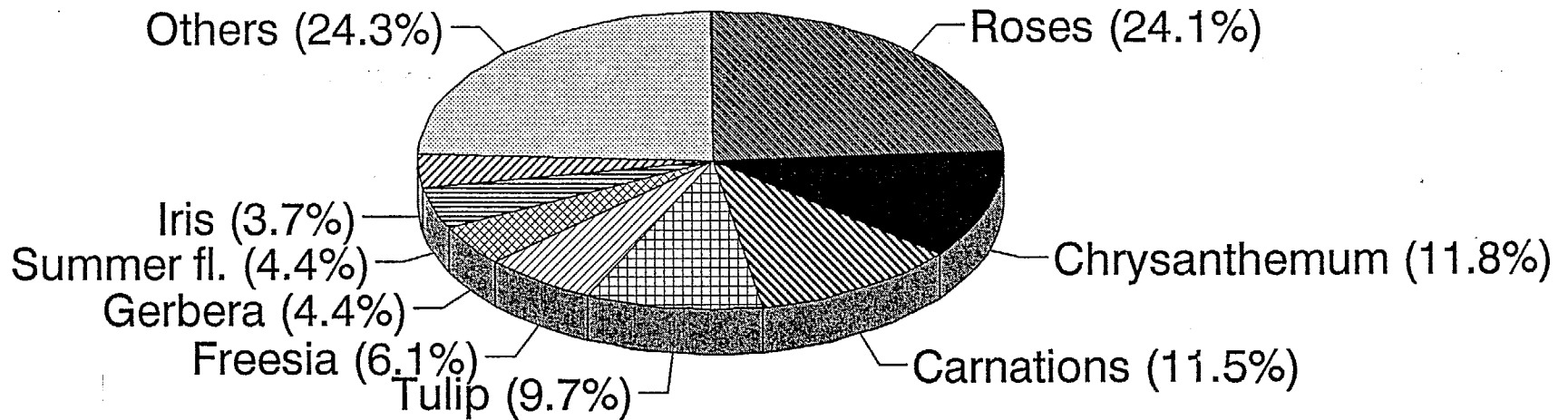
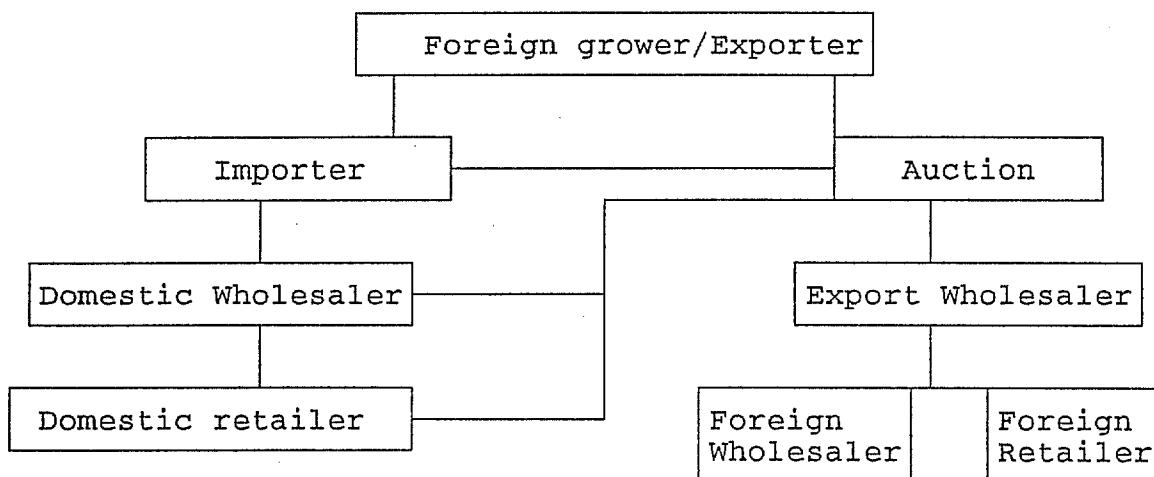


Figure 5. Holland's Exports of Major Flowers By Type (1992)



- * Expected imports of cut flowers to Holland market for the year 1996, in million pieces, would be as follows: carnations 1157, roses 456, chrysanthemum 16, orchid 22, and gladiolus 2.
- * Major Dutch flower auctions are: Aalsmeer, Naaldwijk, and Rijnsburg. Their share of the total auctioned cut flower in Holland are 42, 32, and 18 per cent, respectively.
- * Cut flowers submitted to Dutch auctions are sold either at the auction clock or through the intermediary office "bemiddelingsbureau".
- * The auction clock procedure is performed as follows: each batch of cut flowers is examined by auction inspectors for compliance with quality standards and is assigned a quality class. Flower trolleys move the product for sale past the auction clock. The auctioneer describes the product, name of grower, species, quality class and grading code, and then a single hand of the clock descends until a prospective buyer, by pushing a button, halts the hands of the clock. The price then indicated is the purchase price. The whole process is highly automated.
- * The intermediary office procedure is performed as follows: the Auction acts as intermediary between seller and buyer on a commission basis. This approach is useful for very large traders buying big lots of highly uniform cut flower.
- * Imported stock is traded at the auction on the basis of an annual contract between the importer/seller and the auction. A standard form of contract is issued by the Federation of Dutch Flower Auctions (VBN) is used by all Dutch auctions. In applying for a license each year the importer must provide details regarding the name and location of the grower, the period that the cut flower will be auctioned, the product species, the area under cultivation, the number of pieces to be delivered, the share this represents in total production, and the number of shipments per week.
- * Estimated total marketing costs of imported cut flower to Dutch auctions (handling and administration costs and commission) ranges between 12 and 15 percent of revenues.
- * The marketing channels for cut flower in Holland could be described in the following diagram:



BOX 10 BENEFITS OF CONTACTING IMPORTERS IN DESTINATION MARKETS

The CBI recommends that new exports to Holland and EC countries should establish business via an importer. To decide the best method of selling the products, the importer acts as a valuable link with the market place providing the foreign grower with information on the required standard of quality, packaging and presentation. The importer can also help the foreign grower to identify the highly demanded species, provide technical advice on the growing of cut flowers and plant transportation, handling, and care.

* Cut flower exports are highly recommended during the period November 1, to May 31. During summer months, Dutch and other European countries satisfy the needs of the Dutch markets. Jordan's quota of cut flowers that can be imported into EC duty free is about 55 tonnes (equivalent of about 1.5 million stems). Any quantity exceeding this quota is subjected to about 15% tariff during winter season and 20% during June 1, to October 31.

2.1.2 BELGIUM

2.1.2.1 Production

- * The total cultivated area of cut flowers in Belgium is 219 hectare of which 151 hectares are under glass.
- * Local production accounts for 46% of domestic consumption of cut flowers and 70% of pot plants.

2.1.2.2 Imports

- * Major suppliers of Belgium's cut flower markets are Holland 82%, France 2.5%, Israel 1.4%, and Italy 1.2%.
- * The composition of cut flower imports indicates that roses forms 14% of total imports, followed by carnations 9%, chrysanthemum 8%, orchid 3%, and others 65%.

In Belgium, the wholesalers are the most important channel of delivery to retail outlets.

- * On the retail level, 52% of total sales are marketed thorough florist shops, followed by street traders 17% , growers 13%, groceries 6%, and garden centers 6%.

2.1.3 Denmark

2.1.3.1 Production

- * Production of pot plants accounts for over 90% of the total.
- * The Danes have the highest per capita consumption of floricultural products in Europe. In 1992, they spent 678 million US Dollars on floricultural products.

2.1.3.2 Imports

- * Roses, chrysanthemum, and carnations are the major imported cut flowers into Denmark. The three cut flowers form 41.2% of the country's total imports. Holland is the main source of imports (89%), in addition to Italy (3%), UK (5%) and Columbia (1%).

- * There is a very important wholesale market (KGT) in Copenhagen. KGT is considered as the biggest trading center for flowers and plants in Denmark. There is also another wholesale cooperatives in Gasa's Arhus and Odensee.
- * On the retail level, supermarkets, florist shops, and other multiple retailers are the major outlets in Denmark.

2.1.4 FRANCE

2.1.4.1 Production

- * Area cultivated to cut flower amounted to 1100 hectares of open field and 790 hectares under glass, mainly in Provence, Alpes, and Cote d'Azur regions.
- * Major types of cut flowers grown are gladiolus (26%), rose (22%), and carnation (7.4).

2.1.4.2 Imports

- * France is a large importer of cut flowers. 49% of cut flower requirements are imported. In 1992, the value of imported cut flower was US\$ 317 million.
- * Roses, carnations, chrysanthemums, orchid, and foliage add to 8% of the total imports of cut flower.
- * The main supplier of cut flowers is Holland (88% of total), followed by Spain (2.4%), Belgium (1.3%), Columbia (1.2%), Italy, Morocco, and Israel.
- * 59% of the total cut flower sales are marketed on the retail level by florist shops. Street traders sell 12% of the total, growers 7%, supermarkets 9%, and garden centers 9%.

2.1.5 GERMANY

In 1992, retail sales of the floricultural products reached US\$ 8,125 million. The forecasted sales for the year 1997 are expected to be at US\$ 9,625 million.

- * German consumers prefer mixed bouquets of cut flowers. Mixed bouquets account for 41% of consumer sales in Germany, roses 20%, carnations 8%, and tulips 8%.
- * Major reasons for buying flowers: gifts account for 75% and personal use for 13%.

2.1.5.1 Production

- * Total area under cultivation is 6,000 hectares of which 2,400 hectares are under glass.
- * Total production of floricultural products was at US\$ 1,250 million of which US\$ 360 million were cut flower.

2.1.5.2 Imports

- * Carnations, roses, chrysanthemums, and orchid are the major imported cut flowers into Germany. Imports of those four types accounted for 44% of total imports with a value of US\$ 661 million.

Germany is a net importer of cut flowers and pot plants. Almost 73% of marketed cut flowers are imported. In 1992, imports of cut flowers and pot plants totalled US\$ 2,313 million.

- * Holland is the principal supplier of cut flowers into the German markets (82% of total imports), followed by Italy 6%, Columbia 1.8%, Israel 1.5%, Kenya 1.2%, and Costa Rica 1.2%.
- * The market for cut flowers is supplied by about 600 specialized cut flower wholesalers.

- * On the retail level, florist shops sell 38% of cut flowers and plants to consumers, growers and garden centers 20%, multiple retailers 23%, and street traders 8%.

2.1.6 ITALY

- * Italy is the second largest EC market for floricultural products. In 1992, the market value of floricultural products in the Italian market was US\$ 4,938 million.
- * Flowers are purchased mainly for weddings, funerals, and gifts for special occasions.
- * The area cultivated under cut flowers was 4,236 hectares under glass and 4,319 hectares in the open field. The value of cut flower production amounted to US\$ 1,313 million. Local production of cut flower supplies about 90% of the domestic needs.
- * In 1992, imports of cut flowers was US\$ at 134 million. Major imported types are chrysanthemums, orchids, and roses.
- * Principal cut flower supplies to the Italian market are Holland (69% of total), Thailand (16%) Mauritius, Israel, and Spain.
- * Growers compete directly with wholesalers in supplying the retail needs. About 70% of cut flowers at the retail level are marketed by florist shops and 27% are marketed by street traders.

2.1.7 SPAIN

- * Consumption of cut flowers and plants in Spain is still at a low level compared to the rest of the European countries. In 1992, the consumption of floricultural products was US 1,188 million.
- * Flowers are purchased mainly for weddings, funerals/graves, presents, and for personal use.
- * Area cultivated with cut flower is 2,000 hectares. Production of cut flower is suffering from serious problems due to the poor infrastructure, high labor cost, and competition from cheaper sources such as Columbia, Turkey and Kenya.

- * Only 21% of total consumption of cut flowers is imported. Main cut flowers imported are chrysanthemums, orchid, rose, lily, and tulip.
- * Imports from Holland accounts for 46% of total imported cut flowers, followed by Columbia 31%.
- * Wholesalers are the main channel of allotment to retailers. However, some of the powerful domestic producers tend to operate their own wholesale activities. Specialized wholesalers control most of the imported stock.

2.1.8 UNITED KINGDOM

- * The total market of floricultural product was worth US\$ 1,938 million. Carnations, chrysanthemums, narciss, and mixed bouquets formed three quarters of total cut flower sales.
- * The British industry of cut flower production amounted to about US\$ 231 million.
- * Area cultivated to cut flower is 650 hectares, mainly carnations, chrysanthemums, roses, and spring bulbs. In addition 6,623 hectares are cultivated in the open field.
- * Carnations, chrysanthemums, and roses together dominate cut flower imports to the UK market. In 1992, the value of imported carnations, chrysanthemums, and roses was US\$ 108, 56, and 24 million, respectively.
- * Holland supplies 65% of total imports, followed by Columbia 17%, and Israel 7%.
- * Thirty five Wholesale markets offer their services to cut flower retailers and these are supported by a network of secondary wholesalers which are increasing in importance.
- * The major retail outlets for cut flower are florists (51%), multiple retail (18%), street traders (13%), and greengrocers (10%).

2.1.9 JAPAN

- * Area cultivated with cut flowers in the four major islands of Japan is 15,300 hectares of which 5,400 hectares are under glass and the rest are under open field conditions.

- * In a descending order, chrysanthemums, carnations, roses, matthiola, and gypsophila are the principal species produced in Japan. Production of these cut flower takes place throughout the year, with no significant seasonal variation.
- * Japan is a market worth around US\$ 6.0 billion at consumer prices. In 1989, flowers worth US\$ 5,113 million were bought in Japan.

2.1.9.1 Imports

- * Japan is considered as the seventh largest importer in the of fresh cut flowers. Total imports between 1985 and 1989 increased almost by five times.
- * In terms of value, Holland is by far the largest foreign supplier of fresh cut flowers in Japan's market. 37% of the total imports are from Dutch source. In a descending order, other importers include Thailand, New Zealand, Singapore, Australia, and USA.
- * The two main flowers imported into Japan from Holland are the freesia and the tulips. Holland is the only source of imports of those two flowers into Japan.
- * More than one half of the imported cut flowers arrive at the Narita Tokyo international airport. A further one fourth arrives at Osaka airport. Other international airports account for the reaming one fourth.

BOX 11 MAJOR FAVORED CUT FLOWERS IN JAPAN

The most popular flower in Japan is the chrysanthemum (35% of all sold flowers) of which 97% are produced locally. The second most popular flower is the carnation, representing 14% of all flowers bought. Almost all carnations are produced locally. The third in popularity is the rose, accounting for around 7% of total consumption. Most of the consumed roses are produced locally except for 7 million stems imported from Holland. Gypsophila is the fourth in popularity which is also totally produced in Japan.

- * There are approximately 30 cut flower importers in Japan. Two thirds of them are members of Japan Cut flower Importer Association (address in provided in Annex 1).

- * In 1989, there were 24,000 retailers in Japan. Cut flower retailers usually buy flowers at auctions and occasionally from wholesalers. There are 340 auctions in Japan. Most of them are small and old-fashioned.
- * Flowers are bought all year round. Peak demands are in March, August, September, and December.
- * Freshness and uniformity of color and size are essential requirements of the Japanese market. The flowers must be absolutely free of insects, pest and diseases. Every shipment is entirely inspected upon arrival in Japan. A shipment is considered contaminated even if only one insect is found in it. This means that the whole shipment must be fumigated. A side effect of fumigation is the delayed entry to the markets and damage to certain flowers.
- * All imported floricultural products must be accompanied by a phytosanitary certificate, which should be obtained after export inspection by the plant quarantine authority of the export country. As this certificate is required at the time of import inspection, it must accompany the shipment or be mailed in advance.

2.1.10 GULF COUNTRIES

- * In 1994, imports of floricultural products into Saudi Arabia and United Arab Emirates (UAE) markets amounted to about US\$ 12 million of which US\$ 5.00 million were cut flower.
- * Dubai represents a trade center for imports into Gulf countries. In 1994, the Dubai Emirate imported US\$ 2.6 millions of fresh cut flower. The fresh cut flower market is developing while the dried flowers market is decreasing.

* Saudi imports of fresh cut flowers are decreasing due to the local production development. Imports decreased from US\$ 2.5 million in 1991 to US\$ 2.0 millions in 1994.

- * Major suppliers of fresh cut flower into Saudi Arabia and UAE in descending order are Holland, Kenya, Malaysia, Jordan, Iran and India.
- * Fresh cut flowers are primarily used by international hotels and by locals for weddings and decorations.

*

Future opportunities for cut flower marketing in UAE are good due mainly to the increasing number of international hotels and the high natural growth rate of the population.

2.2 THE MARKET AND PRODUCT SELECTION PROCESS

A potential market must have a reliable, relatively low risk, profit for the products and seasons under consideration. Available data on prices, volumes and importers to European countries during 1995 was used to conduct the analysis.

The analysis showed that Holland is the main player in the cut flower market in Europe and other countries include Japan and Gulf countries. Daily prices of cut flowers set at the Dutch auction markets are used as reference prices for the world cut flower commerce.

The recommended technology for growing cut flower stated in this report assures that Jordanian growers can achieve competitive yields and consistent quality all year round. A recent study by the High Value Horticulture group (HVH)¹ on cut flower exports from Jordan has concluded that the recommended species which can be grown successfully are: Standard carnations, Gypsophila, and Roses. These species can be sold in large volumes as single products in many European countries especially during winter because it can not be successfully produced in northern Europe in the winter season.

The study has taken into consideration the size of cut flower markets in Europe. The two most favored cut flower species on the European market are roses and standard carnations. While Gypsophila comes in the fifth most favored, in terms of value sold, on the Dutch auctions. The recommended production techniques and facilities by this report provide favorable climatical conditions to produce these species all year round. The profitability analysis, explained later in this report, showed that gypsophila can be exported year round to EU, while carnations and roses can be exported in certain months.

Table 7. contains quantities and selling prices of standard and spray carnations, Gypsophilla, and large and small roses at Aalsmeer auction in Holland during 1995. It is clear from the table that tremendous volumes of these crops that can be exported to one of the auction markets in Holland.

¹ High Value Horticulture group, 1994, "Opportunities for Cut Flower Exports from the Hashemite Kingdom of Jordan". Prepared for the Agricultural Marketing Organization, Amman, Jordan, at the request of Sigma one Corporation, Raleigh, Durham, N.C.

TABLE 7 QUANTITIES AND AVERAGE PRICES OF MAJOR CUT FLOWER SPECIES SOLD AT
AALSMEER AUCTION MARKET DURING 1995.

QUANTITY IS IN MILLION STEMS AND PRICES ARE IN US DOLLAR CENTS.

MONTH	Standard Carnations		Spray Carnations		Gypsophila		Large Roses		Small Roses	
	QUANT	AP	QUANT	AP	QUANT	AP	QUANT	AP	QUANT	AP
JAN	5.1	33.3	9.5	37.0	2.7	45.0	24.1	65.0	49.7	38.0
FEB	11.3	34.8	17.5	27.0	6.5	52.0	32.0	85.6	65.9	55.2
MAR	8.9	29.8	14.5	21.5	6.0	31.3	28.3	68.0	57.7	42.0
APR	11.6	23.3	18.1	18.3	7.6	41.0	35.1	45.6	82.4	30.8
MAY	16.2	26.2	18.1	24.0	6.6	37.8	37.1	47.2	67.2	34.2
JUN	7.8	30.5	3.7	13.3	3.2	33.5	34.0	38.5	84.3	21.5
JUL	10.7	27.0	10.7	13.6	3.8	33.2	41.5	34.0	107.2	17.4
AUG	7.6	34.8	13.3	9.3	3.7	31.8	39.3	37.3	94.5	16.5
SEP	6.0	37.5	9.1	30.3	3.6	59.8	45.6	55.4	111.6	27.0
OCT	5.1	36.8	4.6	22.8	3.5	45.5	38.8	51.0	75.1	28.0
NOV	10.6	21.4	7.2	14.4	3.8	47.8	42.6	54.8	82.9	31.8
DEC	3.3	21.5	3.8	13.5	2.0	58.0	16.8	54.5	23.2	29.5
TOTAL	104.1	29.7	130.0	20.4	52.9	43.1	415.3	53.1	901.7	31.0

Quant: Monthly Quantities of each crop in million stems sold at Aalsmeer market.
AP: Monthly Average price per stem in cent of US Dollar sold at Aalsmeer market.

Figure 6 shows that prices of standard carnations are better than spray carnations all year round except for January. For standard carnations the highest prices are observed during August to October and January to March. However, the highest prices of spray carnations occurred during January and September. Major suppliers of carnations to the Dutch markets in descending order are Spain, Israel, Columbia, Kenya, and Germany.

Figure 7 shows that the Gypsophila prices are high all year round compared to carnations. The highest prices are found to be during September to February. The higher prices of Gypsophila compared to other cut flower favors its selection as an export cut flower.

Numerous varieties of roses are sold at the Dutch actions. In terms of sold stems, the Mercceds and Fresia varieties are the major roses sold at Aalsmeer market. Figure 8 indicates that prices of large roses are always higher than small roses. Prices of large roses were 40 cent above per stem all year round. The highest prices of large and small roses prevailed during February to March and during September to January. Israel, Zimbabwe, Nigeria, Italy, and South Africa are the major supplier of roses to Dutch actions.

Figure 6. Monthly Prices of Standard and Spray Carnations at Aalsmeer market 95

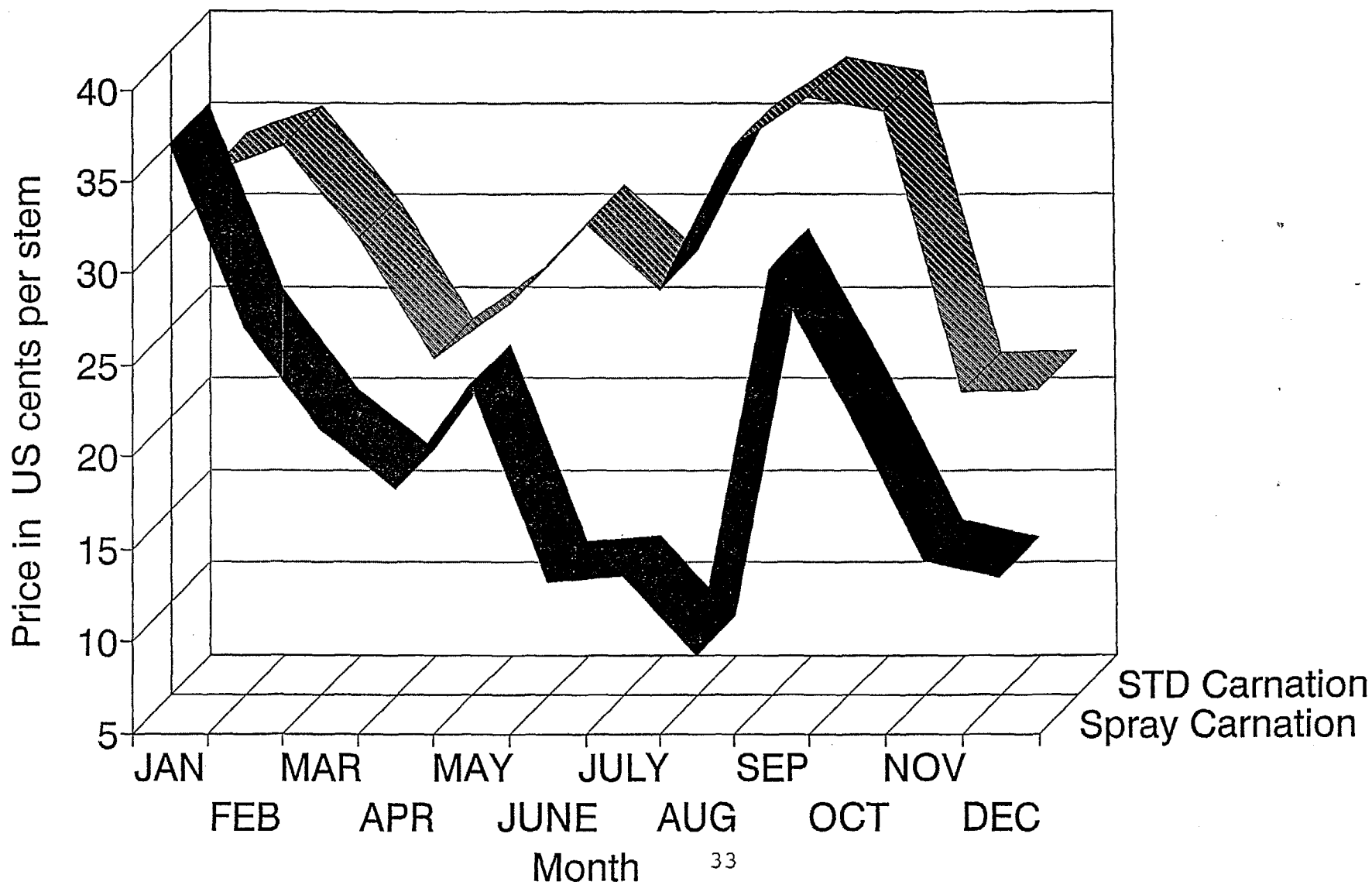


Figure 7. Monthly Prices of Gypsophila at Aalsmeer market 95

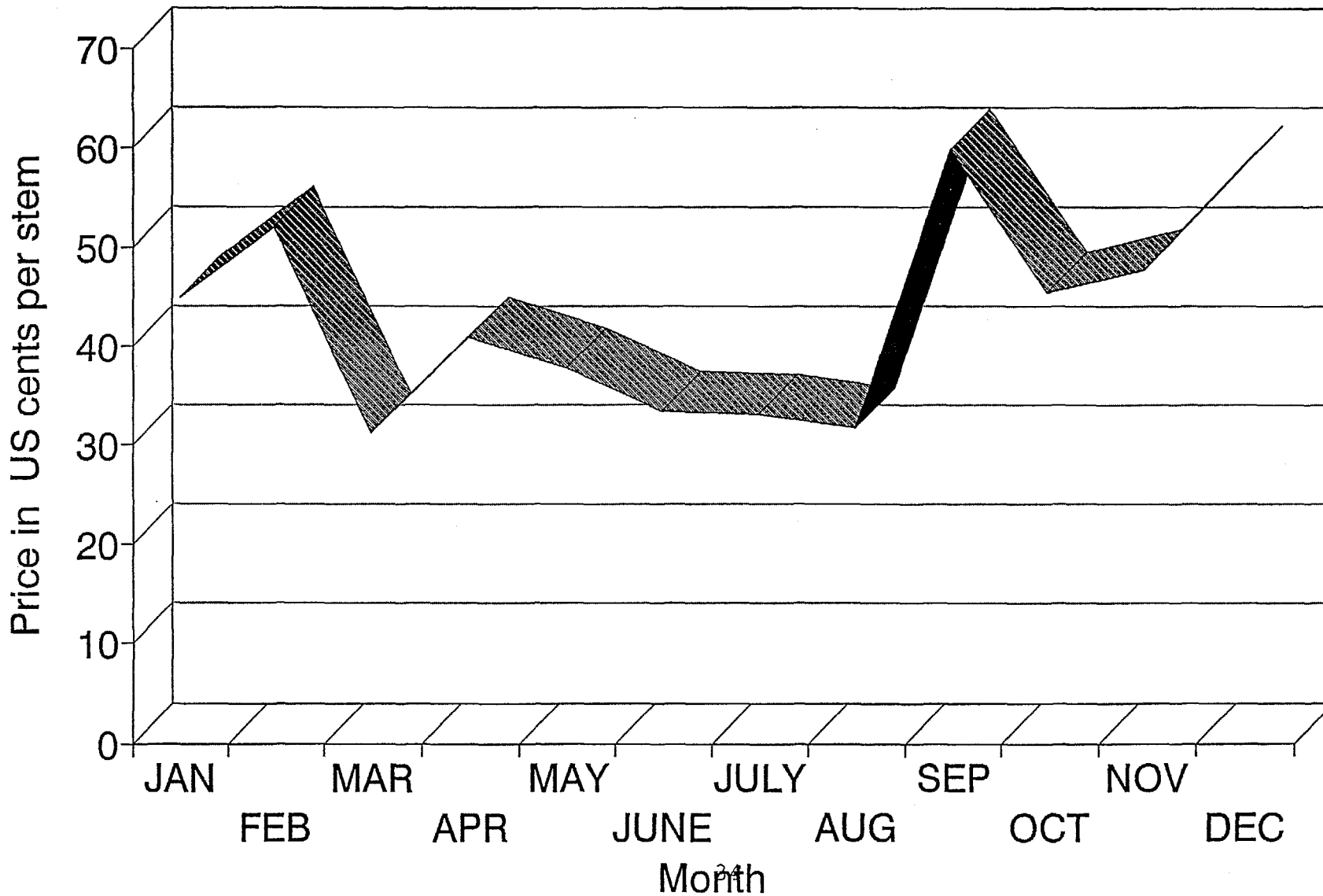


Figure 8. Monthly Prices of Large and Small Roses at Aalsmeer market 95

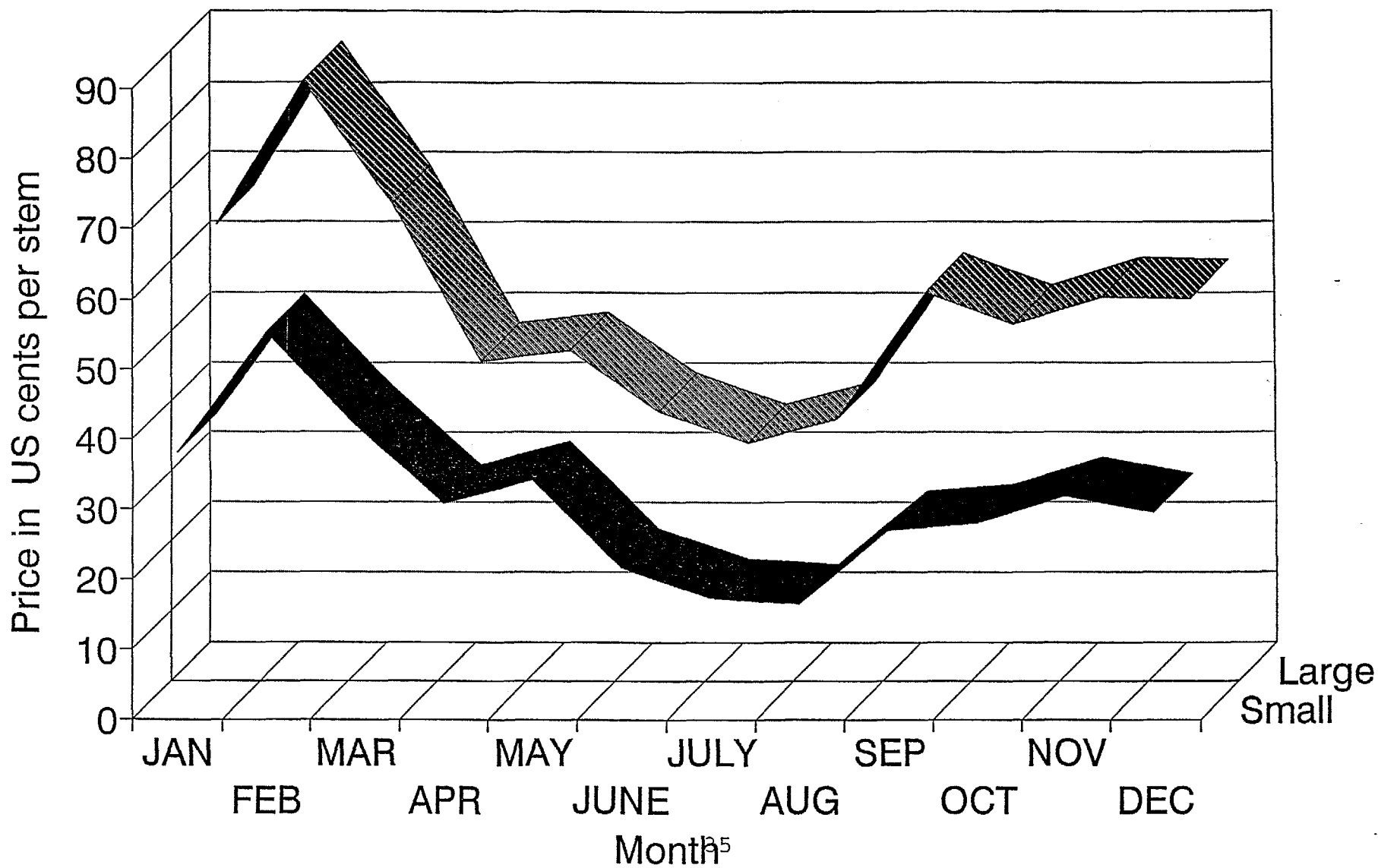


Table 8 and 9 show that wholesale prices of the three selected species in major European countries are not significantly different among each other. But it is worth noting that exports to other EU countries other than Holland are not subjected to marketing fees of 20 percent of the shipment value. This means that if exporters can avoid the Dutch markets they can save the twenty percent marketing fees.

TABLE 8 AVERAGE WHOLESALE PRICES OF STANDARD AND SPRAY CARNATIONS IN HOLLAND, GERMANY, FRANCE, AND GREAT BRITAIN DURING CERTAIN WEEKS IN WINTER AND FALL SEASONS OF 1995

Month/Week #	Standard Carnation				Spray Carnation			
	HOL*	GER*	FRA*	GB*	HOL	GER	FRA	GB
November/1	29	26	27	24	26	21	23	21
2	19	27	23	22	18	25	24	23
3	16	28	26	21	16	21	23	22
December/1	15	25	26	20	12	19	25	25
2	16	26	20	21	11	21	22	23
3	27	33	20	24	16	22	23	31
January/ 2	32	23	22	24	20	20	22	30
3	34	24	23	22	22	22	22	21
4	38	23	23	19	31	21	22	21
February/ 1	37	25	26	23	31	28	24	25
2	34	25	24	25	29	30	24	24
3	30	23	22	21	23	25	23	22
4	35	25	21	23	21	20	22	21
March/ 1	35	30	24	22	21	26	25	21
2	30	27	25	21	22	20	21	20
3	27	25	26	19	21	24	19	22
April/ 1	30	27	31	19	23	26	26	22
2	29	27	24	21	24	25	26	21
3	19	24	31	19	15	22	29	14
4	15	20	31	18	11	20	24	11

* HOL=HOLLAND, GER=GERMANY, FRA=FRANCE, GB=GREAT BRITAIN

TABLE 9 AVERAGE WHOLESALE PRICES OF GYPSOPHILA AND LARGE AND SMALL ROSES IN HOLLAND, GERMANY, FRANCE, AND GREAT BRITAIN DURING CERTAIN WEEKS IN WINTER AND FALL SEASONS OF 1995

Month/week #	GYPSOPHILA				ROSE (TYPE FRISCO)				ROSE (TYPE MERCCEDS)			
	HOL*	GER	FRA	GB	HOL	GER	FRA	GB	HOL	GER	FRA	GB
November/1	46	33	45	39	32	28	39	32	29	38	39	32
2	49	36	42	42	34	36	35	28	33	35	35	28
3	56	43	43	40	32	38	28	25	30	34	34	25
December/1	54	47	45	46	29	49	30	49	27	37	30	40
2	56	46	46	37	23	48	26	23	22	45	26	23
3	50	43	48	56	34	59	35	64	37	63	35	62
January/2	62	47	53	47	34	59	45	42	42	38	40	42
3	52	46	38	40	36	53	38	43	44	40	38	43
4	55	45	38	38	50	39	38	43	52	40	38	43
February/1	57	46	44	45	53	62	42	47	70	60	42	57
2	57	48	47	48	49	57	57	60	65	49	57	47
3	35	44	45	40	37	42	43	51	45	48	43	38
4	35	45	46	43	34	43	40	46	54	47	30	32
March/1	35	40	48	37	34	45	25	44	54	43	25	41
2	25	38	37	38	38	42	25	39	0	52	25	32
3	40	40	47	37	30	34	29	29	26	25	21	27
April/1	37	40	44	40	35	36	29	29	28	23	20	24
2	45	41	40	35	39	33	21	26	34	40	21	26
3	54	44	46	40	27	22	25	21	28	26	25	20
4	35	40	42	40	26	29	21	25	30	33	23	21

* HOL=HOLLAND GER=GERMANY FRA=FRANCE GB=GREAT BRITAIN

The market and product selection process was explained in details in the previous part. The selection process showed that the potential cut flowers to be grown in Jordan for export purposes are carnations, gypsophilla, and roses. This conclusion was reached based on the traded volumes and prices of these flowers in the world markets. The selection process showed also that Europe is the major prospect market for Jordanian exports.

PART III

3. PRODUCTION AND POST-HARVEST

BOX 12 REQUIRED CHANGES IN CUT FLOWER PRODUCTION STYLE

Most farm facilities in Jordan are very basic and in general lack environmental controls such as heating, cooling, ventilation and humidity necessary for proper cut flower production. The quality of the present production is only occasionally satisfactory for the export markets. There are a number of grades and standards that are required for export to European markets. In addition reliable efforts by all parties are necessary for long standing relationships with customers in the export markets. Therefore, fundamental changes in almost all aspects of the industry are required to dramatically increase Jordan's exports of cut flowers in the next years.

This part of the report will identify the steps necessary for Jordanian cut flower farms to become significant producers of a high quality flowers that can be exported to Europe and other markets.

- * There is a critical need for grower/managers with hands on experience in modern production and post harvest treatment procedures for the chosen crops. Grower/managers can be trained at locations that have the proper equipment and expertise.
- * There is a need for greenhouses equipped with the necessary environmental control, packing sheds, coolers and pre-coolers which will be situated to allow proper flow of materials in and out of the farm are essential.
- * Simple computer programs are needed in order to adequately control production, space, product and material required. Such programs are commercially available or can be customized for the operation with one of the various spreadsheet/data base programs.

3.1 PHYSICAL PLANT

3.1.1 Greenhouses

There are two types of greenhouses currently being used in Jordan, tunnels and multi-span structures. Figure 9 is a diagram of a typical tunnel house. Figure 10 shows several types of multi-span houses. Multi-span house designs are superior to the typical tunnels for many reasons:

- a. The heat loss from the connected multi-span is about half that of the tunnel structures.
- b. More uniform temperatures are realized in the multispan type due to it's greater volume of air which resists rapid temperature changes.
- c. A more subtle advantage is that all workers are visible making supervision easier.
- d. Materials movement is also much easier. Collection of rain runoff from the gutters is also straight forward and in the case of Jordan this should be very attractive economically, as the cost of water is a significant portion of the production cost.
- e. Land use is superior since multi-span house utilizes space wasted to sidewalls as well as incorporating the land between the tunnels.
- f. Finally, passive ventilation is significantly superior, particularly in the latest design with top ventilation.

Multispan Green Houses are higher in cost compared to plastic tunnels. The cost of multi-span green houses per square meter is almost double that for the tunnel type.

Figure 9
Structure of the Traditional Plastic Tunnel
Greenhouse

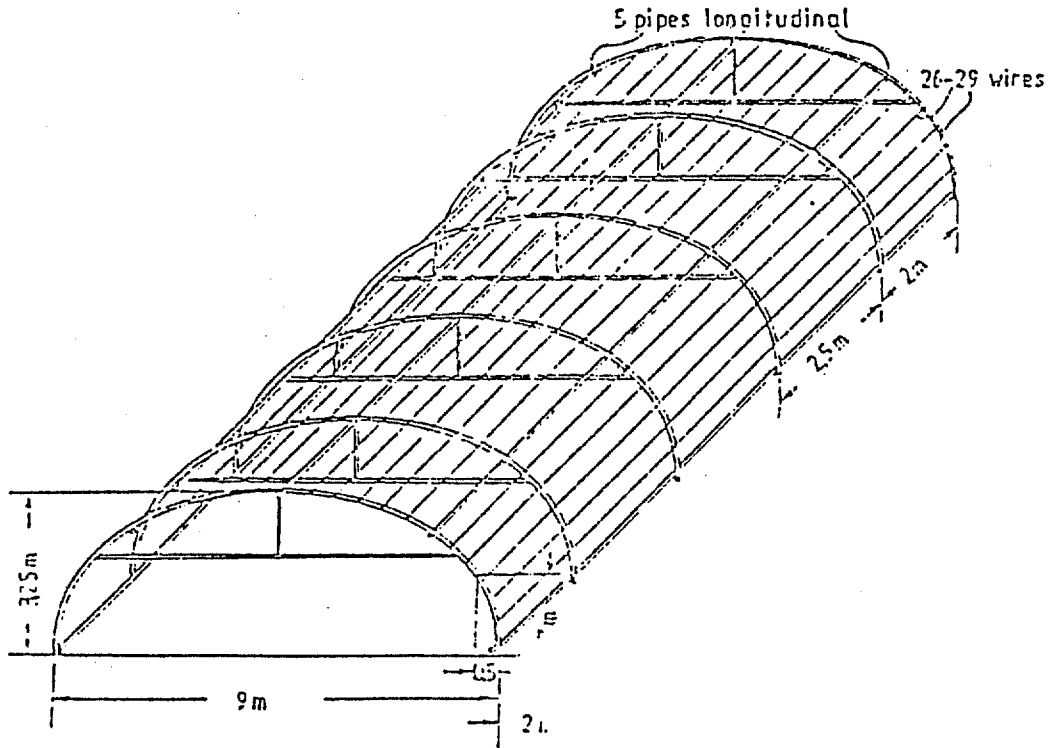
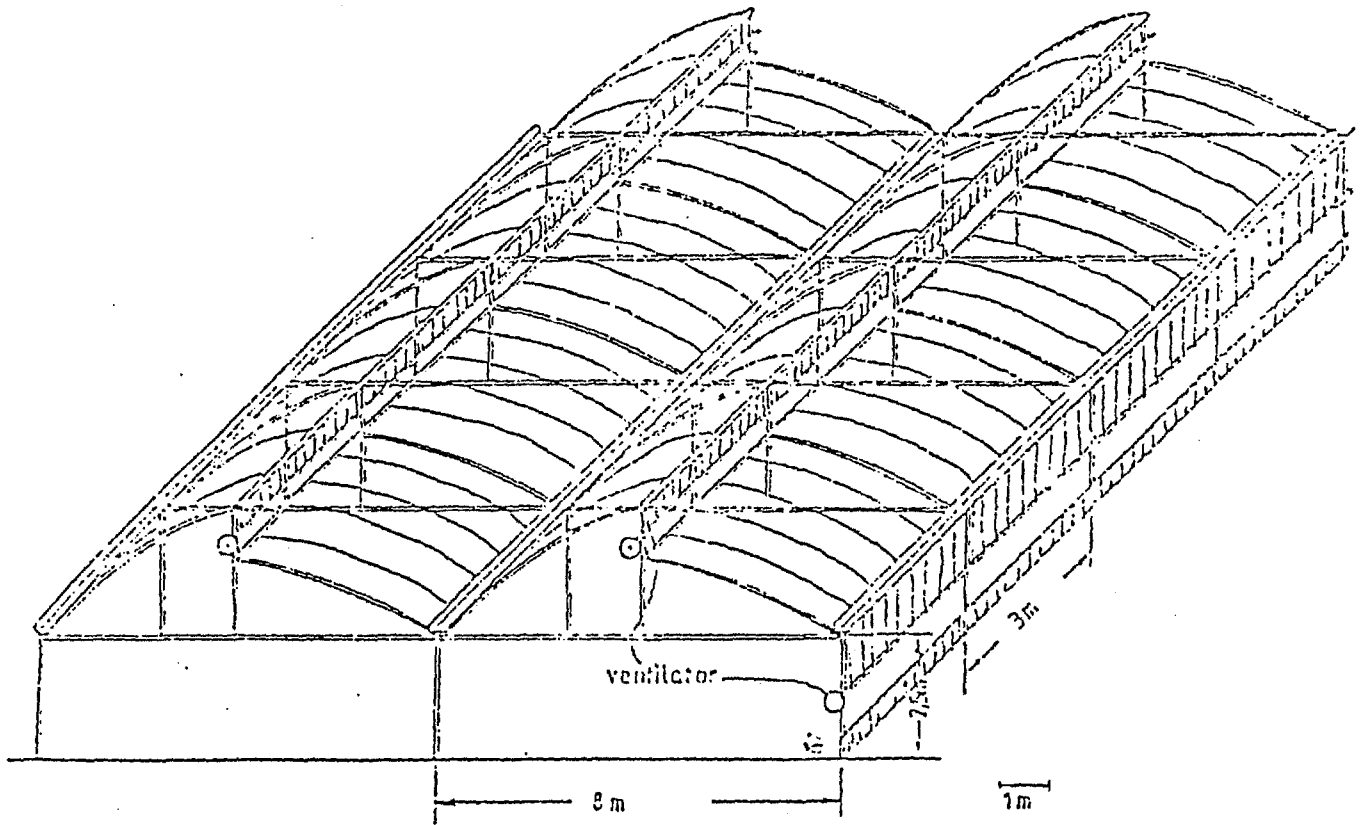


Figure 10
Structure of a Multispan Greenhouse
With Roof Opening Ventilation



3.1.2 Greenhouse coverings

The following are the important criteria for deciding on the specific covering.

- a. Light transmission should be as high as possible. The best films are now approaching 90% transmission for films of 200 micron thickness, when kept clean.
- b. Inflated double layers of 100 micron films, securely fastened with aluminum extrusions called poly-locks. Double layers have two great advantages; heat loss is only 50-70% of a single layer and the plastic is very tight. Houses are designed to withstand snow loads of 98 kg/square meter while the wind is blowing at 115 km/hr.
- c. High quality films with high light transmission are available in the local market and they are designed to last for at least three years.

The choice of film type, thickness and number of layers should be determined by a trade off between higher production due to higher light with single layers of quality film and lower heat costs with the double layers. The choice must be made on an individual basis.

3.1.3 Greenhouse heating

The production of year round export quality carnations and roses requires the installation of proper heating systems. That is because the mean low temperatures at Amman and the surrounding areas in the winter season is 4.3 °C while the minimum air temperature to grow proper roses is 15.5 °C. Moreover, the optimum time for exporting cut flowers into Europe are the winter months. Reliable quality production will require the capability to periodically heat the structures. Therefore, heat will probably be required during the December through March period in the Amman region. A knowledge of the degree days for this period would allow a good estimation of the heating required.

The energy required per square meter/hour is dependent on the surface area of the structure, the heat transmission coefficient of the covering, the difference between the inside and outside temperatures desired and the wind speed. (For detailed information please refer to page 17 of the production and post-harvest report).

Type and placement of heaters can be of great importance. For example roses require a soil temperature of 18.3 °C but the air temperature can be three degrees lower. Therefore the best heat for roses is a system where the heat is supplied at ground level such as root zone tubes carrying hot water that are placed about 0.67 meters apart in the growing area.

3.1.4 Greenhouse cooling

Simple ventilation with fans can at best bring the greenhouse to ambient temperature. Cooling will require taking advantage of the energy required to evaporate water in some fashion, termed evaporative cooling. There are two basic methods of accomplishing this, pad and fans and fogging devices.

3.1.4.1 Pad & Fans

Pad and fans cooling consists of pulling air through a wet pad and in the process evaporating water.

1. A properly designed system should be able to reduce the dry bulb temperature inside the wet wall to approximately 85% of the difference between the outside dry bulb and wet bulb temperatures. Obviously the lower the humidity, the more efficient this system is.
2. The low humidity figures for the Amman region suggest that evaporative cooling would be very effective. The cross flow system is preferred since it is not hard to keep the cool air at crop level. Calculating the pad and fans sizes are straight forward but tedious and depends on local factors such as humidity, wind speed, and length of house.

3.1.4.2 Fogging devices

Fogging devices consists of forcing high pressure water through small openings generating billions of tiny aerosol sized droplets that evaporate quickly and remove heat.

1. Fogging devices and pad and fan systems both rely on the same principle of evaporative cooling. Therefore, the minimum temperatures achievable are theoretically the same. Both in principle produce the same relative humidity increases.

3.1.4.3 Advantages of fog systems over pad and fan

1. More efficient utilization of water.
2. Fog systems can be adapted to passive and positive ventilation designs. For example, a roof ventilated house with fogging capabilities would reduce or remove the need for fans.
3. The cooling is more uniform with fog, Pad and fan greenhouses will show a 3°C difference between the two ends.
4. Fog systems can be adapted to apply pesticides. The billions of droplets give excellent coverage and the manpower to apply the chemical and the exposure of workers is minimized.
5. Cost of installation and operation is less.

There is ample evidence demonstrating that cooling and proper humidity provide substantial benefits for rose crops during the summer months. For example:

1. 5 to 10% increases in stem length.
2. Improves quality.
3. Increases in yields of 15 to 20 percent.
4. Fewer problems with powdery mildew.

Carnation crops also benefit from the cooling by reducing heat stall and improvements in quality.

BOX 13 DISADVANTAGES OF FOG SYSTEMS

- * The water has to be clean.
- * Dissolved minerals may form chalky residue on foliage areas as evaporation occurs over an extended period of time.
- * It needs a reliable power supply so that it will not cause any electricity failure.

3.1.5 Packing Sheds and Post-harvest Facilities

The packing shed and head house must be large enough to accommodate a grading room large enough to inhibit the grading and packing equipments, a cooler, training rooms, repair and maintenance area, and offices.

3.1.6 Design and layout of Farm

The most efficient placement of buildings depends on several factors which will influence the final design. However, many design criteria can be defined.

- a. The long axis of the greenhouse should run in an east-west direction. This maximizes light input.
- b. It has been recommended that the packing shed and associated functions should be positioned to minimize the distance that men and materials must be moved. Although compromises with light input must be made, a packing shed with the greenhouses arranged in a circle around it is a very efficient design.
- c. The farm should be as far from field agricultural operations as possible. Weeds and other plant material around the greenhouses should be minimized. This will reduce the insect population and the transfer of these pests into the greenhouses.
- d. The range should be as close to a main road as possible to minimize large truck travel on secondary roads.
- e. Electricity, water and telephone service should be available. The power and water systems should have backup capabilities to prevent loss of product in power outages.
- f. Appropriate space should be provided for employee training.

Growing media

A proper growing media must provide the following:

- a. Support for the plant.
- b. Provide a reservoir for air, water and nutrients.
- c. Be readily available and reproducible.

d. Be free of disease organisms and weed seeds.

* Many materials can fulfill these criteria, in fact with proper external support excellent plants can be grown with no media.

Table 10 summarizes the important properties of potential media in relative terms, 1 is worst 5 is best. A rating of 1 does not mean that quality plants cannot be grown, just that it will be very difficult.

TABLE 10 GROWING MEDIA PROPERTIES

TYPE	WATER* CAPACITY	AIR* CAPACITY	BUFFERING* CAPACITY	EASE* OF USE	COST*	OVER ALL*
NATIVE SOIL	3	1	5	1	1	1
SAND	3	2	1	3	2	4
GRAVEL	2	5	1	5	2	5
ROCKWOOL	5	3	1	5	5	3
PEAT	5	4	2	5	5	3
COIR	4	3	2	5	5	3

* The scale is from 1 to 5 where 1=worst and 5=best

Since it is difficult to manage the soil found in Amman area, a gravel media is recommended for growing the cut flowers. A gravel media would not only allow with greater ease in the solution of nutrients but would also save an estimated 30 to 50 per cent of water required in flower crop production.

3.1.8 Fertilizers

Plants requires major, minor, and trace elements for growth. Major elements are Nitrogen (N), Phosphorous (P), Potassium (K). Minor elements are Calcium (CA), Magnesium (MG), Sulfur (S). Trace elements are, Iron (FE), Manganese (Mn), Zinc (Zn), Copper (Cu), Boron (B), Molybdenum (Mo). Proper nutrition requires all these elements, in addition to Chlorine & Silicon.

The effect of fertilizers is very important, various formulation must be used to keep the acidity at a proper level. It is recommended to use an injector to apply your fertilization program.

3.1.9 Raised beds

The basic principle is to build a raised bed with solid material as sides and plastic lining the bed. Then put a drain pipe that runs the length of the bed to collect the water. The extra water will run to an under ground water tank and then it will be pumped again to the main water tank for re-use.

3.1.10 Plant Material

One can produce his own starting plants, but doing so is not recommended. This is because there is a possibility that plants may have contracted any number of bacterial, fungal, or viral disease organisms which could reduce the vigor and yields.

In order to assure quality and maximum yields you should purchase the starting plants from a reliable supplier that can guarantee that the plants are culture indexed and free of disease. Such suppliers are available all over the world. Cost can be reduced by purchasing un-rooted cuttings.

3.2 CULTURAL PROCEDURES

3.2.1 Carnations

The following cultural procedures are recommended for the production of high quality year round carnations.

- * It's recommended to plant the routed cuttings on a 15 X 20 cm spacing. This should result in about 10 - 20 stems/plant depending on pinching, growing conditions and other practices.
- * use support wires and place the first support wire at 15 - 25 cm above the ground. Subsequent layers are placed 30 - 40 cm apart.
- * Start pinching one month after planting, and leave 4-6 sets of leaves.
- * Year round production of carnations requires greenhouses with effective environmental controls, as may be found in multispanns with top air ventilation.
- * High light intensity and over all cool temperatures are desirable.
- * Night temperatures of 10-13 C° and day temperatures of 18-24 C° are recommended. Good ventilation and cooling during the summer season as well as heating as required during the winter season.
- * Growing media must be well drained in order to avoid root damage which increases the susceptibility to diseases and to reduce the overall vigor.
- * Use gravel, volcanic tuft, or perlite as your growing media (in Jordan gravel is recommended).
- * Acidity should be between 6 to 6.5 and should never exceed 7.
- * Use a 20-10-20 fertilizer formulation, with supplemental Potassium (K), Calcium (Ca), and Magnesium (Mg) during production.
- * Make tissue analyses in order to monitor the fertility program of the planting media.
- * Choose your cultivars based on market desirability and production economics, taking the following in consideration:

- percentage of long stems
 - amount of heat splitting
 - disease resistance
 - flowers production per plant per year.
-
- * Media sterilization and the use of clean cuttings are essential to control the fungal diseases.
 - * Use the recommended doses by the manufacturer for the spraying program to control diseases and fungus.
 - * Replant beds every 1.5 to 2 years in order to produce higher yields and superior quality flowers.

3.2.2 Roses

The following cultural procedures are recommended for the production of high quality year round roses:

- * The production of roses requires more attention and control of environmental factors , fertility, and pest management than any other type of cut flowers.
- * Roses require as much light as possible.
- * Greenhouses for roses should be situated where there is no shading from outside sources.
- * Use plastic covers that has the highest light transmission, and you should keep it as clean as possible.
- * Use adequate heating and cooling systems.
- * Growing roses requires good ventilation and humidity control.
- * A common practice is that roses are grown in 1.1 meter wide beds, and four plants are spaced across the bed, next row is about 30 cm down the bed. (this is about 10 - 11 plants / meter²).
- * Change the plants every five years.
- * Normally the rose plant can produce about 25 - 30 stems, depending on the cultivar and the cultural practices.
- * It's generally prudent to peak the production around the holidays. You can do this through cutting and pinching.
- * Use an efficient ground level heating system that can keep the minimum air temperatures at 16 C and the soil at 18°C. Day temperature can be between 28 - 30 c, and 80% humidity.
- * Use a good cooling system during the hot season.
- * Use only good rootstock species.
- * Rose planting is generally done between January 1 and June 15. But it is preferable to plant roses in January and February.

- * Keep the bud graft at least 3 cm above the growing media.
- * Keep the ph around 6.5 using fertilizers of various acidity or basicities.
- * It is necessary to develop a very good root structure during the first six weeks. This is done by watering very thoroughly several times and withholding water until the media is dry, but remember to mist the top growth to prevent wilting.
- * Pinch the new growth when the buds appear. Pinch back to the second 5-leaflet leaf.
- * Never take a heavy crop from young plants.
- * Wire supports are necessary to support the plant. Use enough layers up to 1.8 - 2 meters.
- * Water distribution must be even and adequate. Increase watering when you have large top growth.
- * High humidity and chemical sprayers are necessary to control diseases, especially the red spider. use powdery mildew to control fungal disease.
- * Do not spray or fog when the media is dry.
- * Flowers will need to be harvested twice daily during certain times of the year.

3.2.3 Gypsophila

The following cultural procedures are recommended for the production of high quality year round gypsophila:

- * Cuttings can be rooted in 10-14 days, under mist and temperature of around 21 C°.
- * Grow the cuttings under short day conditions (10-12 hours of light) at 10-12 C°, until the plant has at least 12 nodes, (3-5 weeks after transplanting).
- * Stem length and quality are greatest under very long days (16-18 hours of light).
- * If you keep the rooted cuttings at 0-2 C° for 7 days in the dark, plants will become vernalized and it will flower without long day treatment.
- * Vernalizing the plant and the use of continuous lighting will produce more and stronger stems.
- * Temperature should never go below 13 C°.
- * Plants should be spaced 0.46 - 0.51 meter apart in one meter rows.
- * Gypsophila is not a heavy feeder and it does not require high calcium or magnesium. Constant liquid feed of 100-150 part per million (ppm) of nitrogen (N) should be sufficient.
- * Do periodical analysis of plant nutrients in order to maximize yields.
- * Some of the popular cultivars are Flamingo (Europe) and Pink Fairy.
- * Cut the stems when 60-70% of the flower is open (for export) and 80-90% for local market.
- * You can also harvest the plants in tight buds (5-15% open), and open them in a bud opening solution. A plant should produce between 45 to 80 stems/year. (15 to 20 stems /bunch).
- * Use the recommended chemicals and sanitation in the production and post-harvest manual for disease control.

3.3 POST-HARVEST CARE AND HANDLING

BOX 14 ADVANTAGES OF PROPER POST HARVEST

Implementing proper post-harvest floral care will result in substantially more financial returns on investment. In addition it will improve the consumer satisfaction which will result in more orders and thus growth.

Proper care and handling of cut flowers has moved from a process that "I should do" to one that "I must do". The reason comes down to simple economics and plain common sense: today's sophisticated consumers are knowledgeable about quality in flowers and plants. They expect their purchase to be of high quality, and if they are disappointed, they will not come back for more, no matter how cheap the flowers may be.

The term "Post-harvest" refers to all aspects of flower care and handling after harvest. This includes grading, bunching, precooling, storage, packing, chemical treatments and ethylene control.

3.3.1 Checking flower quality

Flower quality is measured by both objective and subjective terms. Subjective terms includes; color and foliage, odor, freshness, sheen and degree of firmness and turgidity. Objective measures includes; flower temperature, cultivar names, growers names, transportation carrier name and bill of lading, stems / bunch, and others. Subjective measures will vary from person to person but the most important subjective measure is the color. Objective terms are objective in nature, thus personal biases are removed. Thus, every person in a firm should be able to inspect incoming flowers and arrive at the same conclusions about quality.

The following is a list of some of the objective quality measurements. These measurements are often taken in consideration at the market destination. As a producer you must be aware of these measurements in order to make sure that the flowers you are shipping are of high quality as measured objectively.

3.3.2 Temperature

Flower temperatures should be recorded by date, time, person taking the readings, grower source, and flower type (cultivar name if available). This data should be recorded for future references, especially if claims are made on these flowers at a later date. The data can determine whether the flowers risked heat, chill or freeze damage before or after shipping the flowers.

Generally, flowers that store best near Zero C° should be between 1 and 3°C at the time of shipping. For chill sensitive flowers and foliage such as heliconia, ginger, croton, anthurium and ti-plant, temperatures under 12°C are too low and may produce injury.

Keep track of flowers that arrive at destination outside of the recommended temperature ranges as damage may not be apparent for 2 or 3 days. Namely, note those that arrive at destination below 1°C or above 10°C for ones that store best near zero, and those that arrive below 10°C or above 25°C for chill sensitive ones.

The temperature measuring device must have a needle-like probe for insertion into the flower base or center of a bunch. This type of temperature probe is available from supply companies for greenhouses, laboratory, chemical or electronics. One way to locate a source is to contact your local refrigeration dealer and ask them for sources.

To use the temperature probe, gently insert the probe tip into the base of a flower or in the middle of a bunch. Remember it is the flower temperature that is important not the stem temperature.

3.3.3 Inventory count

An inventory count should be taken and recorded at destination market. Record and isolate any obviously damaged product.

3.3.4 Name

Are the flowers identified by cultivar name? Remember, not all red cars are the same, just as all red carnations or roses are two very different products.

3.3.5 Bunch Tie location

Is the location of the bunch tie at least 10 CM up from the cut stem ends? The higher the bunch tie, the greater the probability that all of the stems in the bunch will be re-cut by your customer. Any stem not re-cut will lose about 40 to 60% of its potential life.

3.3.6 Cut stem ends

Do all of the stems in a bunch come in contact with a flat surface? If not, re-cutting every stem in the bunch is more difficult. Uneven stems also indicate that the stems were not re-cut after they were bunched. Any possible treatment given to these flowers after bunching was most likely less effective for those stems not re-cut.

3.3.7 Leaves remaining

What percentage of leaves are remaining? Generally, the more leaves remaining on flower stems the less likelihood of wound-induced stem damage, and, with some species, longer expected flower life. It is best if flower processors remove only those leaves that would be under water.

3.3.8 Anti-ethylene treatment

Ethylene is a gas that can kill flowers. Therefore it is important to determine if the flowers are identified as having been treated with an anti-ethylene treatment like Silver Thiosulfate (STS). If so, the question still remains as to whether or not they were treated properly. You may want to occasionally use the "Apple (ethylene) Test for STS Effectiveness". Unless you can prove to yourself using the "Apple test" that the flowers have been properly STS treated prior to arrival, you should not sell the flower.

Flowers treated with Silver thiosulfate (STS) are not allowed to be sold in the Hollands' auctions.

In the apple test we want to use the ethylene produced by apples to determine if ethylene sensitive flowers are being properly protected by STS (for detailed information on performing the apple test refer to the production and post-harvest manual).

3.4 QUALITY AND STANDARDS

3.4.1 Quality and Consistency.

Quality is an absolute requirement to sell your products to the export markets, especially the European Union. Also, consistency and reliability are necessary to produce proper working relationships with your customers. Quality consists of both quantitative and qualitative grades and standards. The following are the quality standards for cut flowers for the Netherlands, a high quality destination market (Regulation 316/68).

3.4.1.1 Definition of produce (flowers)

These standards shall apply to fresh cut flower and flower buds of a kind suitable for bouquets or for ornamental purposes falling within subheadings no . 0603 A of the Harmonized Commodity Description and Coding System (IIS)

3.4.2 Quality requirements

1. Minimum requirements

Produce must have been carefully cut or picked , according to the species , and have reached an appropriate stage of growth .

2. Classification .

2.1 Class I

Produce in this class must be of good quality. It must have the characteristics of the species, and where appropriate, of the variety (cultivar).

All parts of the cut flower must be:

- Whole
- Fresh
- Free of animal or vegetable parasites and from damage caused by such.
- Free of pesticides residues and other extraneous matter affecting appearance.
- Unbruised.

- Free of defects of development : for carnations a split calyx is not considered a defect of development.
- In respect of American carnations , flowers with a split calyx must be ringed , put up separately in uniform lots and the packages marked accordingly.
- Stems must, according to species and variety (cultivar), be rigid and strong enough to support the flower head.

2.2 Class II

This class includes all produce which does not meet all the requirements of class I.

All parts of the cut flower must be:

- Whole
- Fresh
- Free of animal parasites

The flowers may however, have the following defects :

- Slight malformation
- Slight bruising
- Slight damage caused, for example, by disease or by animal parasites.
- Weaker, less rigid stems.
- Small marks caused by treatment with pesticides.

The permitted defects must not impair the keeping quality, appearance or utility of the products .

2.3 Extra class

Produce which qualifies for class I without the aid any quality tolerance may be marked Extra. However, this classification may not be used for American carnations with a split calyx.

3. Sizing

For cut flower, sizing must comply with the scale demonstrated in table 11.

TABLE 11 EXAMPLES OF FLOWER CODS AND STEM LENGTHS

Code	Length (including the flower head)
0	Less than 5 cm or flowers marketed without stems
5	5-10cm
10	10-15cm
15	15-20cm
20	20-30cm
30	30-40cm
40	40-50cm
50	50-60cm
60	60-80cm
80	80-100cm
100	100-120cm
120	more than 120cm

The difference per unit of presentation (bunch, bouquet, box and the like) between the maximum and minimum lengths of the flowers in the unit may not exceed :

- 2.5 cm for flowers in codes 15 below;
- 5.0 cm for flowers in codes 20 to 50 inclusive; and
- 10.0 cm for flowers in codes 60 and above.

This difference may be doubled for flowers presented in fan shape. For chrysanthemums with large flowers presented in fan shape, this difference may go up to 20 cm for flowers in codes 20 to 50 inclusive.

The size scale and the uniform lengths set out above are not applicable to mimosa.

The minimum length for branches of mimosa shall be fixed at 20 cm.

4. Quality tolerances,

Quality tolerances shall be permitted in each unit of presentation as follows :

4.1 Class I

Five percent of the cut flower may have slight defects, on condition that the uniformity of the flowers in a unit of presentation is not affected.

4.2 Class II

Ten percent of the cut flower may vary from the requirements of the class. Half this percentage may have been attacked by parasites of animal or vegetable origin. The defects must not impair the utility of the products.

5. Packing and Presentation

a. Packaging:

Packaging must protect the produce adequately. Paper or other materials in direct contact with the cut flower must be new. The following particulars must accompany the goods:

* Identification

- dispatcher or packer name and address or code mark

* Nature of produce:

- genus;
- species or variety (cultivar) or color of flowers;
- Where appropriate, the word (mixture) (or equivalent term).

* Origin of produce (optional)

- region of origin, national, regional or local name.

* Commercial Specifications:

- class;
 - size (length code) or minimum and maximum lengths (optional);
 - number or net weight.
- * Official control mark (optional)
 - * Presentation (EC regulation 802\71)

If the number of flowers per unit of presentation does not correspond to the provisions of previous section, packages must be marked to show the exact composition of the units of presentation contained therein.

b. Presentation (EC regulation 802 \ 71) :

A unit of presentation (bunch, bouquet, box and the like) must consist of 5 , 10 or a multiple of 10 pieces.

However, this rule does not apply to:

- flowers normally sold singly ;
- flowers normally sold by weight ;
- flowers for which seller and buyer agree expressly to derogate from the provisions concerning the number of flowers in unit of presentation. This derogation is admissible solely for transactions outside wholesale markets on the condition that:-
 - * The goods are the subject of a direct sale , based on a fixed selling price per unit of presentation , at wholesale level to a retailer or a person acting on behalf of a retailer:
 - * The goods are accompanied by a bill, delivery note or similar document showing the above - mentioned selling price ;
- The unit of presentation is in the packaging required by the buyer for the ultimate purchaser. The packaging must be such to permit identification of the goods.

c. Uniformity:

Each unit of presentation (bunch, bouquet, box and the like), must contain flowers of the same genus species or variety (cultivar) and of the same quality class, and must have reached the same stage of development.

Mixtures of flowers or mixtures of flowers with foliage of different genus, species or variety (cultivar) are permitted so long as products of the same quality class are used and they are appropriately marked.

3.4.3 Quantitative Quality Standards

- * Temperature: Plants can be divided into two groups, those that store best at 0-2 C and those that require higher temperatures in the range of 16.5 - 18.5°C. A quality producer will maintain the proper temperatures. Shipping conditions should be such that the customer receives the plants at temperatures between 0 - 10° degrees centigrade or above 12 degrees centigrade respectively.
- * Cultivar names should be on all bunches.
- * Flowers name should be available.
- * Transportation carriers name and bill of lading should be available.
- * The proper number of stems/bunches.
- * The proper number of flowers and flower buds/stems.
- * The proper number of bunches must be received.
- * Zero broken stems and flower heads.
- * No damaged cartons or boxes.
- * The bunch tie should be at least 10 cm up from the cut ends. The higher the bunch tie the greater the probability that all of the stems in the bunch will be re-cut. Any stems not re-cut will shorten the shelf life by 40 - 60%.
- * All of the cut stems ends must be even and a flat surface when stood on the cut end. Uneven stems show that the stems were not re-cut after they were bunched.

- * Only the leaves that would be underwater should be removed.
- * Flowers labeled STS treated must have been properly treated.
- * Stem length's match the length specified . Various quantitative measures for carnations and roses are shown in Tables 12 and 13.

TABLE 12 QUANTITATIVE GRADE MEASUREMENTS FOR CARNATIONS

Feature	Grade			
	1	2	3	4
Minimum Length	60	50	45	38
Minimum Flower Diameter (cm)	6.9	5.6	5	5
Stem strength	20	20	20	20
Stem deviation/curvature (cm)	1.25	2.5	2.5	2.5

TABLE 13 QUANTITATIVE GRADE MEASUREMENTS FOR ROSES

Feature	Grade									
	1	2	3	4	5	6	7	8	9	10
Min. Length	70	65	60	55	50	45	40	35	30	25
Stem strength	20	20	20	20	20	20	20	20	20	20
Stem deviation/curvature (cm)	2.5	2.5	2.5	2	2	2	1.5	1.5	1.5	1.5

3.4.4 Temperature Effects on Post-harvest Performance

Small changes in temperature can have dramatic effects on the rate of physiological processes. In general, a process will be 2 to 4 times faster if the temperature is increased 10°C. On the other hand, a process will be 2 to 4 times slower if the temperature is decreased 10°C. Data in table 14 exemplifies these changes.

TABLE 14 EFFECT OF TEMPERATURE ON FLOWER DETERIORATION RATE AND END USER LIFE

Temperature °C	Relative Deterioration Rate	Relative Life (%)
0	1.0	100
10	3.0	33
20	7.5	13

Using the above data, a carnation held at 10°C instead of its proper storage temperature of 0°C will deteriorate at least 3 times faster.

3.4.5 Transpiration

Most plants contain about 80 to 95% water. Water serves many functions such as plant temperature regulation and nutrient uptake through roots as well as providing the medium in which every biological reaction takes place within plants.

Transpiration is the loss of water vapor by plants. Plants would die because of temperature extremes if water was not lost in this cooling process. Also, if water is not lost from flowers, the nutrient solution cannot be pulled up through the stems.

Transpiration is needed for proper post-harvest performance of plants and flowers but also must be controlled to prevent wilting. When the rate of water loss is greater than water uptake, plants and flowers wilt, a process which indicates serious problems. High temperatures and high air movement can increase transpiration rates and hasten wilting.

3.4.6 Respiration

Even more dramatic are the effects of temperature on respiration. Respiration is the process whereby food and oxygen is converted to energy, heat, water and carbon dioxide. Every living entity respire or it dies.

As respiration rates increase in plants, food reserves are used up and flower and/or plant life can be reduced. Data presented in the table 15 exemplifies temperature effects on respiration rates.

TABLE 15 RELATIVE RESPIRATION RATES (HEAT PRODUCTION) OF CARNATIONS AND ROSES AT DIFFERENT TEMPERATURES

Temperature °C	Relative Rate of Respiration	
	Carnations	Roses
0	1.0	1.0
20	24.6	28.3

Compared to temperature effects on transpiration, the relative rate of respiration (and also heat production) of the carnations and roses represents a much more realistic picture of what happens to flower quality when the temperature is too high.

3.5 ETHYLENE

Regarding ethylene and temperature, data presented in the following table exemplifies how ethylene and temperature interact to influence flower quality. In short, as temperatures increase, low ethylene levels can cause flowers to die prematurely. Thus, it is very important to make sure that your flowers are held at proper temperature to reduce ethylene-induced problems (Table 16).

TABLE 16 CONCENTRATION OF ETHYLENE AND TIME OF EXPOSURE
 RESULTING IN UNACCEPTABLE CARNATION FLOWERS
 AT VARIOUS TEMPERATURES

Temperature °C	Exposure Time	Ethylene (%)
0	4 days	2.6
10	2 days	0.9
20	6 hours	2.8
30	12 hours	3.7

3.5.1 Ethylene Effects and Control Measures

3.5.1.1 Effects on plants/flowers (general)

Countless articles have documented how this gas became known as the "death hormone" of plants or, as many believe, the major post-harvest enemy of the floral industry. Some negative plant responses to ethylene and examples of plant species affected include:

- * Premature loss of foliage (ficus, azalea, rose, citrus)
- * Premature loss of flowers (geranium, snapdragon, impatiens)
- * Premature loss of fruit (holly, pepper, citrus)
- * Premature flower death (carnation, kalanchoe, cattleya)
- * Petals becoming translucent (alstroemeria, gypsophila)
- * Development of adventitious stem roots (tomato, mum)
- * Petiole (leaf stalk) twisting or epinasty (poinsettia, tomato)
- * Stem thickening (pea, mum, petunia, tomato)
- * Foliage yellowing (mum, impatiens, petunia, lily)
- * Premature fruit ripening (apple, pear, banana, kiwi, cucumber)

3.5.1.2 Sources and levels required

While illuminating gas is not a common ethylene source today, there are many sources of ethylene including:

- * Exhaust from internal combustion engines (i.e. cars, trucks and non electric powered forklifts).
- * Many pollutants released into the atmosphere are contaminated with ethylene, even cigarette smoke.
- * Plants commonly grown as floral crops (only when damaged) are capable of producing and releasing ethylene, some more than others.
- * Many fungi such as Botrytis and some bacteria often associated with floral crops produce ethylene.
- * Plants/flowers that are under physical, water, insect, disease and other types of stresses often produce increased amounts of this gas.
- * Incomplete combustion and poorly ventilated heaters located in tight greenhouses (often double-poly or in any greenhouse type during very cold nights due to ice forming over normal air leaks) can produce ethylene.

The ethylene amount required to cause problems depends on numerous factors including temperature, exposure time, plant condition and species susceptibility. Ethylene-induced plant damages occur at very low concentrations, generally in the low (20 to 30) parts per billion range to as "high" as 1 to 3 parts per million.

3.5.1.3 Plant synthesis/physiology

All living plant cells have the capacity to produce or synthesize ethylene, some more than others. Generally, reproductive tissues (flowers and fruits) produce much more ethylene than leaves and stems. However, there are always exceptions such as poinsettia leaf stalks or petioles (vegetative tissue) producing ethylene and other hormonal changes in response to sleeve-induced mechanical stress resulting in petiole epinasty (twisting).

Flowers do not distinguish between ethylene produced within or from the gas coming from one of the many external sources. An important and common flower response to ethylene is the production of even more ethylene.

3.5.1.4 Controlling ethylene-induced disorders

Regardless of the species, cultivar and environmental conditions, there are a number of steps that can be taken to reduce ethylene-induced disorders. These steps are now briefly described:

1. Sanitation:

Since some fungi and bacteria can produce this gas, it is imperative to not only keep the plants disease free but also to keep areas clean where plant materials are grown, stored, shipped or displayed. In addition, discard old or dying plants, flowers and related debris as these items are potential ethylene sources.

2. Temperature:

As noted earlier, the higher the temperature, the less ethylene produced by plants and the less it takes to induce plant disorders. Whenever possible, store and display floral crops at the lowest possible temperature without inducing low temperature (chill or freeze) disorders.

3. Species/cultivar:

Grow and handle only those species and cultivars that are less sensitive to ethylene. Common plant selection and breeding programs have led to the introduction of many cultivars that are ethylene resistant. In addition, recent advancements in genetic engineering have provided renewed hope for the widespread introduction of ethylene resistant plants in the near future.

4. Damaged crops (mechanically- and pest-induced):

Most flowers and plants when damaged, either mechanically and/or by insect and disease attack, respond by producing ethylene as a part of their defensive mechanism. The ethylene produced can in turn shorten the end user life of the damaged flowers and plants as well as other flowers and plants in the same area but not under attack. To minimize these types of damages, it is important to handle flowers and plants gently and to keep them as free of insects and disease organisms as possible.

5. Controlling ethylene "action" sites:

Ethylene by itself will not cause problems unless it is attached to the so called "action" sites at which time the plant disorder is induced. Silver from silver thiosulfate

(STS) products can prevent or "block" ethylene from attaching to these "action" sites and thus prevent the negative disorders from starting.

6. Inhibitors of ethylene synthesis:

Anti-ethylene product types are now on the market which, under the proper conditions, can reduce the ability of some cut flowers to produce ethylene. While these products can be beneficial, inhibitors of ethylene synthesis are generally less effective than STS-based products since they do not protect against external ethylene. However, some fresh cut flowers do perform well in these solutions when external ethylene levels are low, especially species which have numerous flowers on the same stem at different maturity stages such as delphinium, miniature carnation and bouvardia.

7. Scrubbers or filters:

Mostly potassium permanganate-based, these products have been available for about 20 years. Some plant and flower sleeves have also been reported to remove ethylene. In addition, filtering systems have been introduced which utilize ozone and other chemicals to remove ethylene. The cost and chemical effectiveness of these products are marginal. In many cases, exchanging inside (storage) air with fresh outside air has been shown to be more cost effective.

8. Air exchange/circulation systems:

In simple terms, most levels of ethylene in outside air are low enough so as to avoid plant problems. Hence, all one has to do is to devise a system where inside air is exchanged with outside at the rate of about one time per hour during periods when workers are not present. Normal people traffic during working hours generally allows for sufficient air exchanges. The cost of this system is the amount of energy required to cool or heat the incoming air.

3.5.1.5 Positive ethylene effects

It must be remembered that there are positive sides to ethylene and its effects on plant growth and development. As examples, ethylene controls and/or greatly influences numerous plant growth and developmental processes such as: flowering, pigmentation (color) development, fruit ripening, leaf abscission (fall) and cell enlargement. Thus ethylene is needed for plants to properly grow and develop under controlled conditions.

3.6 HYDRATING ("HARDENING OFF") FRESH CUT FLOWER

Hydrating is the process by which water and other ingredients are rapidly introduced into flowers to make them inflated.

3.6.1 Stem anatomy

Xylem, phloem, vascular bundle, vessel, tracheid, pith, sieve plate, pit and stele are some of the terms which describe the food and water conducting systems of plants. Xylem is the principal upward (and horizontal) water conducting tissue in plants. Xylem can be viewed as thousands of tiny straws connected end to end. In general, the length of these straw segments are in the range of few inches or less. What could be described as filters or valves are located at the points where the straws connect to one another. These filters or valves can influence what passes from one straw to the next. Specifically, microorganisms and air bubbles are restricted from movement through these filters or valves.

3.6.2 Role of dirt, debris, microbes and air bubbles (embolisms)

In healthy cut flower species prior to harvest the plant root system provides clean water to the xylem tissue. Once flowers are harvested, any and all of the inhibitors noted above can become a factor in reducing the flower life.

Air bubbles can form immediately upon cutting and they form later as the flower loses water when being held dry. Dirt, debris and microbes can enter xylem tissue at any point in the marketing channel due to normal handling.

Accumulated dirt, debris and microbes in xylem can be greatly reduced by cutting off about one to three inches of stem tissue, either in air or under water. On the other hand, there are four possible ways to rid the xylem of air bubbles in order to allow for the free flow of nutrient solution: 1) cutting stems under water, 2) placing stems in warm water, 3) using a citric acid solution and/or 4) placing flowers into deep holding solutions. Each of these procedures will now be explained.

1. Cutting stems in air:

As noted above, removing from one to three inches of stem tissue can significantly reduce the levels of dirt, debris and microorganisms in xylem. This procedure can be performed using any reasonably sharp instrument (i.e. scissors, knife, paper cutter, pruning shears, etc.).

2. Cutting stems under water:

When one to three inches of stem tissue is removed by cutting the stems under water, most air bubbles are also removed as are the dirt, debris and microbe blockers. The reason is that the filters/valves located at the straw ends prevented the air bubbles from traveling further up the stems. At the same time, no air is allowed to reach the newly cut stem surfaces because the stems are under water. Once recut, the flowers can be immediately removed from the water and placed into fresh flower food. Flowers need only to be cut under water once within a given floral business. Unless flowers are stressed excessively, cutting flowers under water during processing at growers level may not be required.

3. Citric acid solution:

Placing flowers cut in air into a citric acid/water solution (about PH 3.5) has been shown to help overcome air embolisms.

4. Solution depth:

The deeper the holding solution for flowers, the greater the "head" pressure created at the cut stem ends. This greater head pressure can assist the movement of water into the stems.

Cutting stems in air versus under water:

If stems are not recut, either in air or under water, 40 to 60% of the potential life of the flower can be lost.

3.6.3 Hydrating solutions

Commercially available products are on the market which are intended for use as hydrating agents. Many of these product types are either citric acid- or aluminum-based.

- * Citric acid-based products have been shown to be the better performer while aluminum containing solutions were less consistent when used as a rose hydration treatment, especially when stems were not recut later in the marketing channel.

3.7 FRESH FLOWER FOODS

3.7.1 Definition and Benefits

Often called "cut flower preservatives", this product class is now referred to as "fresh flower foods". This change in terminology is in response to consumer perceptions about these products. First, the word "cut" implies death, something "cut" off the mother plant. The substitute word "fresh" relates to today's image of healthy and wholesome items. Second, the word "preservative" often is identified with harsh chemicals and also suggests something artificial whereas the word "food" does not.

Fresh flower foods generally contain a food source (sugar) and substances to control the growth of microorganisms. Additional ingredients such as acids to alter PH, anti-ethylene substances and agents to precipitate out certain salts are also present sometimes.

The benefits of properly using fresh flower food solutions include:

- * Food source for continued flower development.
- * Controlling the growth of microorganisms to reduce stem blockage.
- * Controlling PH (acidity) for maximum solution uptake.
- * Overcoming any potentially negative effects of foam leachates.
- * Providing substances for improved flower and leaf color.
- * Keeping vase solutions looking clean for visual appearance. However, this advantage is not possible with brands which make the water cloudy by intention.

3.8 STORAGE CONSIDERATIONS: ALL FLORAL CROPS

3.8.1 Temperature

The temperature in the cooler should be within plus or minus 1-2 degrees C° of the ideal flower/plant storage temperature. An accurate and easy way to measure the average temperature in the cooler is to measure the water temperature in a five gallon bucket held in the cooler. All coolers should have at least two thermometers to obtain temperature ranges within the cooler and have one thermometer as a control or check for the other.

3.8.2 Relative humidity

Generally, maximum relative humidity possible without having it "rain" in a cooler is best for flowers. For long term storage, it is better and easier to maintain high relative humidity by wrapping the floral crops in plastic after the products are cooled to their proper storage temperature. If so done, it does not matter what the relative humidity is in the cooler.

3.8.3 Precooling

Lowering flower or plant temperature as fast as possible after harvest or at any other time in the marketing channel is referred to as precooling.

Precooling can be accomplished using numerous systems including cold water (hydrocooling), low pressure (vacuum cooling), and cold air (forced air cooling). Forced air precooling is the most common one used for flowers and plants.

3.8.4 Short versus long term storage

Long term storage is defined for fresh cut flower as storage time greater than three days and potted and bedding plants storage greater than five days. Short term storage is defined as three days or less for fresh cut flowers and five days or less for potted and bedding plants. Growers should have cooler facilities designed for long term flower storage.

3.8.5 Wet versus dry (fresh cut flower)

Flowers store best dry if proper relative humidity and temperature conditions are maintained.

3.8.6 Prestorage treatments

Prior to long term storage many fresh cut flower should be treated with either STS if they are ethylene sensitive and with a fungicide registered for the control of Botrytis.

3.9 PACKAGING

The importance cannot be over emphasized of having the flowers and plants at their proper storage temperature before enclosing them in plastic to conserve moisture and maintaining high relative humidity. Flower and plant packing procedures and products serve two main functions: to help protect the crops from being damaged and to make it easier to move them from one location to another. There is no doubt that good packaging is required for the successful transport and marketing of floral crops and that there are many more advantages than disadvantages. However, there are a number of misconceptions that deserve attention. Consider the following factors that can drastically influence floral crop quality:

- * The placement of ventilation holes of any size and/or configuration on cut flower sleeves has not resulted in any appreciable difference in extending the post-harvest life of these floral crops.
- * Light colored shipping containers (boxes) are preferred because if placed in the light, the internal box temperature changes less rapidly as light (and hence heat) is reflected.
- * Placement of ethylene-removing sachets in shipping cartons or the use of ethylene adsorbing sleeves has not always been worth the added costs and also does not mean that end user life will be extended.
- * The benefits of ice or gel ice in fresh cut flower boxes has been shown to be minimal under many shipping conditions.
- * Just because the word "precooled" is on a fresh cut flower box does not necessarily mean the flowers were properly precooled.
- * The insulation effectiveness of flower and plant shipping containers is limited by the tightness of the containers. The best insulation material in the world is rendered ineffective if openings are present between the inside and outside of the container.

3.10 TRANSPORTATION FACTORS: SURFACE AND AIR

Except for very few air freighters, proper storage temperatures are not maintained in air transported floral products. Proper temperatures are frequently maintained in surface transport vehicles (truck trailers and inter-modal containers). The question then becomes, can the "speed" of the air transport overcome the lack of temperature control? Conversely, can proper temperature maintenance in surface transport systems compensate for slower delivery times?

The technically correct answer is that both air and surface systems can work if certain pitfalls are eliminated. The biggest problem for air transport products occurs on the ground at airports as flowers and plants wait for the originating or connecting flights in uncontrolled environments. On the other hand, surface shipments can suffer from improper loading which means that temperature management within the units is compromised.

3.11 DISEASES, INSECTS AND POST-HARVEST CROP PERFORMANCE

Flowers and plants are sometimes shipped infested with insect pests and disease. Flower shipments will be destroyed at most of the destination markets if pests are found by representatives of the importing countries. Therefore, you must be sure that your flowers are free of insect pests and disease before shipping.

3.11.1 Sanitation

As with animals, exposing flowers and plants to contaminated, dirty environments can result in the spread of diseases and shorten lives. The advantages of "keeping the place clean" should be obvious to florists as should the dreadful risks of practicing poor sanitation procedures be. It is recommended that, routinely washing buckets, coolers and the like are tasks well worth the time and effort.

3.11.2 Bunching

All Bunch ties should be placed at least 10 cm up from the cut stem ends. All cut stem ends should be even. After grading and bunching, lower leaves can be removed using almost any leaf stripping device if; 1) the bottom leaves are damaged or discolored. 2) the added leaves interfere with packing. 3) if the leaves have shown an increase water stress.

After flowers have been graded and bunched, they are ready for any possible chemical treatment. If no chemical treatments are deemed appropriate, flowers are ready to be precooled, stored or shipped.

3.12 PRODUCT IDENTIFICATION

All shipping boxes should include the following;

- 1) cultivar name;
- 2) grades and standards;
- 3) growers name & address;
- 4) weight or number of stems; and
- 5) Handling instructions.

PART IV

4. PROFITABILITY ANALYSIS

The profitability analysis will attempt to show the feasibility of establishing a state-of-the-art cut flower project in Jordan with a size of 6 hectares (5-hectare growing area); considering that the flower types grown will be carnations, gypsophila, and roses; these can be successfully produced, and are the most popular cut flower species exported into the European market.

4.1 KEY ELEMENTS OF THE PROPOSED VENTURE

4.1.1 Land Requirements

This analysis is for a six (6) Hectare farm developed utilizing state-of-the-art production-related and post harvest facilities, thereby providing a quality produced and packed end product. A five (5) Hectare cut flower growing range is considered as ideal to produce sufficient product to be attractive as well as providing efficient production, storage and good market impact. An additional to One (1) Hectare is needed for the facilities. Facilities will be positioned at the center of growing area to maximize efficiency by allowing proper flow and movement of materials / personnel throughout the farm.

The primary area chosen for growing cut flowers is around Amman. This is primarily due to good climate conditions for all-year-round production; with close proximity to the airport for prompt delivery, a significant factor required for the expansion of perishable exports.

- (a) Purchased :the land cost for the areas chosen ranges between JD 2,000.00 to JD 3,000.00 per Dunum (1000 square meters); or JD 25,000.00 average per Hectare.
- (b) Rented : land can be rented between JD 30.00 to JD 50.00 per Dunum; or JD 2,880.00 average per Hectare.

4.1.2 Building

- (a) Offices / Housing complex : standard building with total space required of about 300 square meters; at about JD 80.00 per square meter.
- (b) Packing Station : standard building with space of about 200 square meters; also at JD 80.00 per square meter.

- (c) Cold Storage : total cold storage capacity required for production coming from a farm size of 5 hectares is about 175 square meters, able to maintain temperatures between -2 to 2 Celsius; at a cost of JD 145.00 per square meter.
- (d) Nursery : used for handling and maintaining quality of imported planting material used for cut flower production. The nursery can also be used to multiply stocks of planting material. The capital required to build this facility including minor nursery equipment will be about JD 15,000.00.

4.1.3 Fencing

Regular heavy screen fencing assists in keeping out animals or trespassers; at a cost of about JD 2.50 per square meter installed.

4.1.4 Multispan Greenhouse Structures

A multispan greenhouse structure with air vents in the roof was found to be an appropriate design which provides several advantages such as :

- * better aeration control (temperature and humidity);
- * higher net production area and better land use (greater than 60%);
- * easier and greater amounts and of rain water collection.

The specific multispan greenhouse design (presently available locally) used in this Model case consists of 6 bays (each bay is 8 meters x 45 meters length), with a total area per multispan of 2160 square meters or over 4.60 multispan per hectare.

Each multispan greenhouse will also incorporate the following materials / items; cost per span has been included within the initial cash outlay.

- * Metal frame;
- * Polyethylene film covering (200 micron thickness);
- * Wire plant support (varies dependent upon plant variety);
- * Drip-irrigation lines (2 per plant line);

- * Fertilizer injector system, to control amount of fertilizer injected into the drip-irrigation lines; cost is about JD 2500.00 per system, good for 10 spans;
- * Plastic film for beds (for drainage);
- * Substrate gravel (TUFT);
- * Water tanks (for holding water / excess return drainage water);
- * Pumps & fittings (both pumping into houses and return drainage water);
- * Sterilization system (where water sterilization occurs to holding water tanks and excess return water);

4.1.5 Multispan Heating

Since the optimum time for exporting cut flowers such as roses and carnations is the winter, reliable heating systems will be required. Root zone hot water tubes placed at about 0.67 meters apart on the growing area is the best option, where heat is supplied at ground level.

According to meteorological data from the Amman Airport, heating will be required during the winter months starting in November and ending in April.

The cost of installing this system throughout each multispan; including boilers, hot water tubing, pumps and fittings will be approximately JD 20,000.00.

4.1.6 Multispan Cooling

Multispan cooling is important as heating it. Production of quality product during winter and summer requires controlling the temperature inside the multispan. During summer season, temperature reaches to high levels deteriorating the quality of the cut flowers. The most appropriate way to bring the multispan to ambient temperature is by utilizing high pressure fog systems as they are able to:

1. provide greater water efficiency (important due to the high cost of water);
2. remove the need for fans;
3. cool more uniformly;

4. can be adapted to apply pesticides / insecticides.
5. reduced labor costs;

However the cost is higher than the pad and fan system, at an estimated JD 5,000.00 per forger ; with 10 foggers circulated throughout the farm.

4.1.7 Packing Station Equipment

Specially imported equipment suited to handle packing for all exportable quality flowers. The equipment includes thorn / leaf remover, flower stem cutter and bundler. The total cost is expected to be about JD 47,000.00 installed.

4.1.8 Sorting / Grading tables

Ten tables will be required, which can be obtained locally at a cost of about JD 100.00 each.

4.7.9 Field Boxes / Plastic Buckets

Approximately 200 are required between both field boxes and plastic buckets; used within the harvesting and post harvest stages, with an estimated total cost of about JD 2,000.00.

4.1.10 Water Tanks

Two water tanks with a holding capacity of 250 cubic meters each are recommended since most farms do not have running water or well water, requiring water to be trucked to location; providing about 3 days supply. The estimated cost for each tank is JD 20,000.00 installed.

4.1.11 Transport

Two average size pickups to transport goods either to the airport for airfreight or directly to local customers. This is required to maintain the quality of flowers throughout the post harvest stages. The estimated cost of both trucks will be JD 25,000.00.

Two tractors are recommended to handle this size farm; one can also be used as a contingency in case of breakdowns. The average cost of each tractor locally is JD 7,500.00.

4.1.12 Office Equipment

Includes office desks, computers, fax machine, and other related office supplies.

4.1.13 Selling Price

The three cut flower types recommended by Staby and King, and in a previous study entitled "Opportunities for cut flower exports from the Hashemite Kingdom of Jordan" consisting of (1) roses, (2) carnations, and (3) gypsophila; are those being concentrated upon within this model. As the analysis within this report has shown, this is primarily because they are the overall greatest sellers, and have relative price stability. The selling prices for the three flowers were used as follows:

- (a) Europe :the source used to obtain the selling price for the different type cut flowers recommended was the Aalsmeer auction. Only the most recent data (1995) was used in this exercise, both on average annual or monthly basis.
- (b) Jordan :the Amman Flower Association / Exporters are the only source of information for cut flower prices sold locally. This data was compared with selling prices received from different growers when interviewed; showing similar results. A 20% premium is added to the price, due to expected higher quality.
- (c) Gulf : no reliable data or information is available concerning sales prices of cut flowers from Jordan. Much of the cut flowers exported within the region is effected by local traders buying from the Amman Flower Association. The Jordan data was used, adding packing and freight costs plus an additional 20% profit margin for the trader.

Note : premiums of 20% to 30% and higher can be gained by suppliers of good quality; since there is considerable price variation between local growers, dependent upon the quality of the product, the reputation of the grower as well as the importing country.

4.2 COSTS OF PRODUCTION:

The costs of production and revenues are presented on both an annual gross per hectare, for each of the flower types chosen, as well as per export region. A similar analysis is presented on a 12-month basis for cut flower exports to Europe.

Each of the specific categories associated within the calculation of the cost of production shall be explained with greater detail below :

4.2.1 Planting Materials

Roses (Large) :

*	Cost	:	JD 1.50 / plant
*	Density	:	10 plants / square meter
*	Plant yield	:	25 roses / annum
*	Growing area	:	5 x 43 meter growing lines / Span
*	Write-off	:	5 years

Carnations :

*	Cost	:	JD 0.15 / plant
*	Density	:	30 plants / square meter
*	Plant Yield	:	17 carnations / annum
*	Growing area	:	5 x 43 meter growing lines / Span
*	Write-off	:	2 years

Gypsophila :

*	Cost	:	JD 0.4 / plant
*	Density	:	6 plants / square meter
*	Plant yield	:	60 flowers / annum
*	Growing area	:	6 x 43 meter growing lines / Span
*	Write-off	:	1 year

Note : exportable yields used within the model are calculated on the basis that 15 to 20% of the total yield will be below standard grade.

4.2.2 Labor

The cost of basic labor is JD 3.00 per day, with an extra JD 0.50 to cover the cost for supervision, housing, food and other related items.

4.2.3 Agrochemicals / Fertilizers

This cost is reduced with the use of a fertilizer unit which automatically controls the amount of chemicals and fertilizers injected into the drip-irrigation lines. Additional savings occur since excess water (leachate) is recovered containing these substances, and can be re-used after analysis, with appropriate adjustments to the ratios. The average cost of agrochemicals is JD 3334.00 per hectare.

4.2.4 Methyl Bromide

Recommended use is at the start-up of the farm operation and every two years thereafter. Present cost is JD 1.90 per canister; with 50 canisters recommended per span.

4.2.5 Water

Must be obtained from neighboring areas who have licenses to operate wells, at a cost between JD 0.35 to 0.85 per cubic meter; with a median at about JD 0.45 per cubic meter. Utilizing the multispan system proposed; rainwater can be collected, generating over 10,000 cubic meters, providing substantial savings of around JD 5,000.00. Having, a well is a significant advantage for two reasons : 1) secure prompt water supplies all year a round and 2) a much lower cost.

4.2.6 Heating/Cooling

The production related costs including utilities (electricity, telephone, mail,...etc).

4.2.7 Packaging

The recommended export packaging specifications to the EC are (1) attractive appearance, (2) ideal size (100 x 33 x 20cm) with volume rate of about 14 kg, and (3) with fully telescopic lid helping to strengthen the box. The estimated cost will be JD 1.50 per carton.

4.2.8 Cold Storage

The production related costs including utilities (electricity and maintenance).

4.3 MARKETING EXPENSES

- (1) Transport & Clearance :from the farm to the airport or exit point, and including any clearance costs associated; which is a minor expense (about JD 18 per shipment).
- (2) Airfreight :calculated using the basic freight rate of JD 0.60 per KG to most western EC countries; although this rate may be reduced further once actual shipments occur. Carrier space is also readily available with local and other airlines passing through Jordan.
- (3) Auction's commission at the import market: although commission costs can vary upon the channel being used; however for this analysis, 20% was considered (in other words this analysis assumes that all exports are exported to Holland). If exporters choose another channel rather than Holland they can save the 20% commission.
- (4) Import Duties :duties into the EC countries are very high compared to most other cut flower exporting countries; who have higher duty free quota's than Jordan, presently at 54 tons. Since Jordan has a protocol agreement with the EC, these duties have been further reduced to become :

- * 12% from 1st June to 31 st October, and
- * 8.5% from 1st November to 31 st May.

Note : Marketing expenses contribute from 20 to 40% of the direct cost of production. Marketing duties may be reduced by developing niches by selling direct to importers in target markets outside Holland. Import duties can also be reduced or even eliminated by having the Government request a significant increase in the quota. Producers and exporters should lobby the government to negotiate the European Union to increase the quota.

4.4 OVERHEAD OPERATING EXPENSES

- (1) Depreciation is a major part of the overall investment required for development of this project, which will depreciate over different time periods; which are shown within the Initial Cash Outlay.
- (2) Office expenses :include office rental in Amman and employee salaries (secretary and export coordinator), as well as utilities and other office related expenses.
- (3) Management or technical expertise obtained by hiring management from outside while simultaneously training apprentices. A production and marketing expert is expected to be hired to manage the operation. The recommended period is for two years.

4.5 ELEMENTS OF THE PROFITABILITY ANALYSIS

Included in this analysis will be the initial cash outlay required for establishing the above project; the profit-loss statements for each of the flower types on an annual and crop-wise 12-month basis showing the gross margins and revenues associated; and finally the effects of varying inputs to gross margins and overall revenues (the detailed analysis and tables are included in appendix I). Additional information such as rate of return on investment can be calculated, dependent upon the actual breakdown of the three cut flower species produced.

4.5.1 Initial Funding Requirements

The initial cash outlay required for development of an export-oriented project the size of six hectares as specified will be in the region of JD 1.25 Million to JD 1.4 Million depending upon whether land is either rented or purchased. This analysis includes all equipment and materials required for a project of this size. These figures represent the maximum outlay the grower will have to finance for this state-of-the-art project.

The payback time on capital expenditures would be in the region of 3 to 4 years. This is primarily dependent upon the type or breakdown of cut flowers grown. Other important parameters are the selling price received, and the export area chosen.

4.5.2 Destination Selling Prices

One of the more important factors affecting the gross margins and revenues of a cut flowers is the selling price. European selling prices of cut flower are readily available for the primary EC importing countries. Imported cut flower prices recorded at the Dutch auctions are the most reliable and accurate information available and were used in our central case model, on both an annual and 12-month basis. The selling prices shown in the Profit / Loss statements as part of the financial analysis are average price data; premiums of 5 to 15% can be obtained for high quality, and/or lower prices for lower quality.

Jordan and Gulf selling price data is much more difficult to obtain as limited accurate data is available. Pricing information in the case of Jordan was primarily obtained from the Amman Flower Association as well as local producers. A premium of 20% was added to the calculated average prices, due to the expected higher quality product (higher quality means higher prices).

In the case of Gulf market price data, projections had to be made since no related data is readily available. This was done by taking the Jordan selling price data and adding the cost of packaging and freight plus a 20% commission for the exporter. Since much of the exports to the region are done in this manner, we believe the pricing projection to be acceptable for our purposes.

4.5.3 Gross Margins & Revenues

All costs and profits (losses) generated from expected yields; including revenues, production expenses, selling expenses, gross margins, and total operating expenses are provided within the attached tables for the central case models as well as varying input scenarios.

Details of Profit (Loss) outputs are summarized in table 17 for the central case consisting of:

- (a) 100% Sales to Europe,
- (b) 100% Sales within Jordan, and
- (c) 100% Sales to the Gulf Markets (at an estimated minimum export price for the three crops.

TABLE 17 DETAILS OF PROFIT/LOSS OUTPUTS FOR THE CENTRAL CASE ACCORDING TO THE DESTINATION OF THE PRODUCT*

Product Destination	Profit or Loss in JD per Hectare of		
	Carnations	Gypsophila	Roses
100% Europe Sales	30425	106622	68145
100% Jordan Sales	24092	29472	105388

* Figures shown above are under the premise that farm land is purchased. Profits will increase by over JD 4500.00 where land is rented.

Where Gulf market price data is concerned, estimations had to be made because no related data is readily available. Since much of the exports to the Gulf are effected by trading companies buying through the local flower auction; the Jordan price selling data was used and adding the cost of packaging and freight plus a 20% commission for the exporter.

The Gulf selling prices as proposed are only estimates, and do not necessarily reflect the actual selling prices.

TABLE 18 DETAILS OF ESTIMATED PROFIT/LOSS OUTPUTS FOR THE CENTRAL CASE FOR THE GULF MARKETS*

Product Destination	Profit or Loss in JD per Hectare of		
	Carnations	Gypsophila	Roses
100% Gulf Sales	67042	67388	168582

Although the above results (table 18) show that good or even better profits may be realized from 100% sales to the Gulf markets; this may not be the case because :

- (a) the figures shown represent a profit output of 20% for Jordan cut flower produce, and not actual selling prices to the Gulf markets;
- (b) it is recognized (statistical data shows) that the consumption of cut flowers in the Gulf is small, and is therefore not feasible to pursue.

From the above projections, it is assumed that the main crop for export into Europe will be Gypsophila; while Roses and Carnations may perform better within the Gulf markets. However where exports to the EU are concerned, relatively better profits may be obtained when either or both the import duties and marketing costs are reduced or eliminated; which is an unlikely occurrence in the short term.

4.6 THE EFFECT OF VARYING SOME INPUTS ON THE GROSS MARGINS, AND PROFIT

The central case has been re-run with some of the major inputs varied; for sales to each of the export areas (EC and Gulf) markets, as well as Jordan. The results are shown below in tables 19 through 21.

TABLE 19 POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT AFFECT PROFIT/LOSS OUTPUTS FOR THE CENTRAL CASE FOR EXPORTS TO EUROPE.

Key Factors Affecting Profit/Loss Output	% of Increase (+) or Decrease (-)	Profit or Loss in JD per Hectare of		
		Carnation	Gypsophila	Roses
THE CENTRAL CASE		30425	106622	68145
Selling Price	10% (+)	51929	134464	91581
Selling Price	10% (-)	9321	79076	45801
Yield	10% (-)	15710	84100	48801
Airfreight	10% (+)	24665	102107	64673
Marketing Costs	0% **	91865	186172	135105
Import Duty	0% ***	61145	146397	101625
Selling Price and Yield	10% (-) 10% (-)	(3644)	59042	21868

** This means if cut flowers exports bypass the Dutch markets.

*** This means if cut flowers are exported within the quota limits (i.e. no import duty in the EC markets).

TABLE 20 POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT AFFECT PROFIT/LOSS OUTPUTS FOR THE CENTRAL CASE FOR SALES IN JORDAN

Key Factors Affecting Profit/Loss Output	% of Increase(+) or Decrease (-)	Profit or Loss in JD per Hectare of		
		Carnation	Gypsophila	Roses
THE CENTRAL CASE		24092	29472	105388
Selling Price	10% (+)	38492	44522	128638
Selling Price	10% (-)	10092	14722	82638
Yield	10% (-)	10035	14690	82345
Selling Price and Yield	10% (-) 10% (-)	(2925)	1145	61420

TABLE 21 POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT AFFECT PROFIT/LOSS OUTPUTS FOR THE CENTRAL CASE FOR EXPORTS TO GULF.

Key Factors Affecting Profit/Loss Output	% of Increase(+) or Decrease (-)	Profit or Loss in JD per Hectare of		
		Carnation	Gypsophila	Roses
THE CENTRAL CASE		67042	67388	168582
Selling Price	10% (+)	88642	88888	200202
Selling Price	10% (-)	45842	46188	137462
Yield	10% (-)	48665	46533	137458
Airfreight	10% (+)	64642	69265	170032
Selling Price and Yield	10% (-) 10% (-)	29255	27183	109000

These figures show that either increasing or decreasing some inputs will have a big effect on margins; and as a result production costs should be monitored continuously for maximum success.

For Europe, the major factors of choosing appropriate market niches for cut flowers with good selling prices as well as the removal of import duties have the greatest overall effect on margins. This demonstrates the importance of having good and reliable market contacts within the European Union.

As mentioned previously although the projected figures show that good margins can be made primarily on roses and carnations within Jordan and the Gulf markets, some points should be clarified.

There exists very little stability and big fluctuations in price, since most local producers will have lower quality cut flowers. Additionally, a study on the Gulf markets would have to be effected to determine the size of the different types of cut flower markets as well as the selling prices before any serious attempts can be made regarding exports to these markets.

This means that the most appropriate export market at present would be to the EU countries, where good selling prices are present and it has the capacity to easily absorb huge quantities that the Jordan cut-flower industry can produce.

An exercise for the rate of return on investment of the central case for this size project had been calculated for each of the cut flower types exported to the EU (table 22). The table shows that project investment can be recorded during a period of 3 to 5 years.

TABLE 22 RATE OF RETURN ON INVESTMENT OF THE CENTRAL CASE ASSUMING THAT THE PRODUCED CUT FLOWERS ARE EXPORTED TO EUROPE (FARM SIZE IS 5 HECTARES)

% of land occupied by the cut flower	Annual Profit in JD (A)	Annual Investment costs in JD (B)	Annual Rate of Return (A/B)	Pay Back Period (Year)
100% Carnations	350920	1400000	25%	9
100% Gypsophila	537206	1400000	38%	3
100% Roses (Large)	265609	1400000	19%	5
100% Roses (Small)	309693	1400000	22%	5

Given the volumes imported and traded for the recommended flower types, it must be concluded that the EU market is sufficiently large and that exports from Jordan are not going to

affected the prices in Europe. And although Gypsophila would be the most ideal choice for growing purposes due to the greatest profit per hectare there will be stiff competition especially from Israel. However it is expected that the Jordanian Gypsophila will be of better quality in terms of color brightness, thereby selling better and commanding a higher selling price.

PART V

5. THE IMPLEMENTATION STRATEGY OF THE BUSINESS PLAN

Jordan has a climate variation that gives it a significant comparative advantages over some other suppliers of the cut flowers especially in the winter time. Additionally, Jordan enjoys a comparatively low labor cost and airfreight over some other main world suppliers of cut flower such as Israel and Holland. Finally, the location and political stability especially after the peace process and the availability of alternative markets (Regional markets) makes Jordan an excellent place for investment in the cut flower.

- * Some of the barriers have to be eliminated or reduced in their effect. The key barriers on the business are taxing of planting materials and heating and cooling systems for the multispans.
- * Success can be copied. Twenty five years ago, the Columbian cut flower industry, which is one of the largest cut flower producers and exporters in the world, went through the same conditions as Jordan today. The Columbian industry started with entrepreneurs similar to those in Jordan. Another successful model is the Israeli cut flower industry. The Israeli cut flower industry is geared mostly towards the export markets. The industry uses the most advanced production techniques especially for irrigation, heating, cooling and fogging. Israel's annual cut flower exports is approximately one billion dollars worth. Columbian and Israeli cut flower exports are directed mainly to European markets.
- * The market and profitability analysis have shown that the most promising cut flower are carnations, roses, and gypsophila. Recent reports on cut flowers production in Jordan and the included analysis in this report recommend concentrating on three main flower types to establish the industry. The three types are: carnations, gypsophilla, and roses. The recommended crops were chosen also because they can be sold directly to target markets and not only through Holland which will result in higher prices and smaller marketing costs.
- * The market selection analysis, in which production, consumption volumes and price trends in different countries were analyzed, showed that European markets offer the most prospects for the Jordanian cut flower industry. The Gulf markets, especially Saudi Arabia, are limited in scope.

- * Compared to Holland, prices in Germany, France, and United Kingdom, are good especially after removing the 20 percent marketing fee which has to be paid if exports are marketed via Holland. Jordanian exporters and growers should contact wholesalers in European countries other than Holland to avoid paying the 20% marketing fee and avoid other tough restrictions such as the prohibition to use STS to preserve fresh cut flower.

- * The bottom line of the strategy is to produce and market a quality product. Cut flower production should be an export oriented operation. In order to do so, the industry has to go through significant changes to become competitive in the world market. A production and post harvest manual was prepared by a team of highly professional floricultural experts. The manual explains in details all technical information needed to run an export oriented cut flower business. The manual is available separately.

- * It is believed that fifty dunums growing area (five hectares) or its multiples of multispanns is appropriate to produce sufficient product to attract customers and be a force in the market. It is also the optimal land area in terms of cost efficiency.

- * An important role of the government is to negotiate with the EU commission to increase the quota of cut flower exports to Europe. An increase in the quota will improve the competitiveness of Jordanian products in Europe and encourage more investors and entrepreneurs to enter the industry.

The following are the major elements of implementing a cut flower business in Jordan. Critical events and alternatives are mentioned and explained.

1. A critical milestone is to secure project financing in terms of needed capital, sources and conditions of financing. Commercial banks and the Agricultural Credit Corporation (ACC) would be the major sources of financing for such projects. ACC may finance part of the operational costs. Any financial organization will require a detailed financial and marketing analysis of the proposed project. A detailed profitability plan that takes into consideration a sensitivity analysis for the most optimistic and pessimistic scenarios is highly appreciated by these financial institutions especially, for agricultural projects.

2. Another crucial event is the hiring of an expert in flower production and marketing business to supervise the entire operation from the beginning. At the same time hire a Jordanian counterpart who will be responsible for running the business in cooperation with the expert. The cost of the expert should be included in the profitability plan as part of the investment costs.
3. Selecting the location of the farm is also a highly important issue for a successful operation. Cut flower specialists believe that the location of the farm should meet the following criteria:
 - * Land topography: land should be level in order to save the site preparation costs.
 - * Availability of water: the site should be close to water sources in order to secure a consistent supply of water at the lowest possible costs. An artisan well is a significant plus.
 - * Site should be located away from the industrial center and other horticultural activities as much as possible to avoid pollution and disease transmission. Also, it should avoid the area of tall trees or any other light barriers.
 - * Close to power lines in order to secure a constant power supply at a reasonable cost.
 - * Close to main roads and away from city centers (at least one kilometer away from main roads to avoid ethylene, dust, and other pollutants from vehicles on roads).
 - * Wind factor and plenty of sun light intensity should be taken into consideration. The site should be relatively protected from the wind which will affect the heating and cooling costs.
 - * Availability of labor (i.e. to get labor in short notice during intensive operations).
 - * Meteorological data of the site should be available to estimate cooling and heating costs.
 - * The shape and direction of the lot are highly important. Orientation of the multispanns should be east to west in order to maximize land and light utilization.

4. Blue prints for the design of the production infrastructure, farm layout with every item on the farm (roads, locations of plastic houses, grading sheds, chemicals storage place, ...etc). Blue prints should also prepared for central heating and cooling systems.
5. Starting the civil work. According to the detailed blue prints prepared by specialized personal, start construction of the civil works of the farm which might include the following:
 - * administration building
 - * water tanks
 - * roads and main irrigation lines inside the farm lot
 - * packing, cooling, pre-cooling, and grading sites.

 - * Chemicals storage which must be located away for other service facilities on the leered side of the prevailing wind.
6. Shop around before you decide the selection of the multispan, cooling and heating systems,...etc. Refer to recommended specifications in the production manual.
7. Setting up the multispan. Refer to the production manual for specifications regarding heating, ventilation, and cooling systems.
8. Establishing the production site (i.e. the infrastructure inside multispan): planting rows, tubs, and soilless media (tuft).
9. Place the plastic cover of the multispan (i.e inflated double layer polyethylene or a single layer polyethylene). The use of inflated double layer plastic cover can save up to 40% in heating and cooling because of the insulation effect of the inflated air. (Refer to the manual for the thickness of the polyethylene sheets).
10. Hiring the growers, workers, and other personal needed to run the business.
11. Installing the drip irrigation system inside the house (i.e. the computerized irrigation and fertigation systems).

12. Starting production:

1. Establish contacts with growers in export markets in order to know about the new varieties and releases of cut flower (i.e Holland).
2. Visit/consult the export markets, wholesale and retail markets, and growers in the export market to know about the most recommended cultivars. Start at the market level to know what are the plant types, cultivars, popular varieties, and future trends of cut flower in export markets.
3. Determine the source of the planting materials. The producer should take in consideration reliable sources. Quality requirements and crops may be found in the production manual.
4. Based on the profitability and marketing analysis select the types of crops. (Refer to product selection criteria in the report).

13. Start planting:

- * Houses must not be mixed with different crops.
- * Schedule of production should be controlled.
- * Specialize in specific crops.
- * Producer has to have several cultivars of each types. With synchronization of production the producer can sustain constant flow of cut flowers to markets.
- * For detailed information on cultural practices refer to the production manual.

14. Continue careful monitoring of the production (irrigation, fertigation, ventilation, humidity, temperature, husbandry, pest controls, ...etc (refer to the manual).

15. Keep records for all farm activities such as amounts of water used, fertigation, water PH, fertilizer solution PH, temperatures, humidity, yields per house and per cents of export quality. Established computer programs are available to facilitate this process.

16. Quality and Management are the bottom line for a successful cut flower business. Monitor quality classifications (class I, II,...etc) for your produce.
17. Always plant ahead of time, continue to maintain close contact with importers, let them know when are you going to start shipping, volumes, varieties,...etc.
18. Harvesting:
 - * Harvesting should be done according to export market/importer specifications. These include: quality, stem length, number of stems per bunch, number of bunches per box, stage of maturity (for example carnations can be harvested at a closed bud stage or at open bud stage). For or roses follow the appropriate stage requested by the importer.
 - * For harvesting techniques, field handling, packaging, grading, pre-cooling, and cold storage refer to production manual.
19. Packaging:
 - * The modern supply and distribution system network is complicated. This implies that different types of information are necessary at different points in the system. So, marking for package identification is important. The marking on the package should include relevant information concerning :
 - * Product information. International standards require that the species of the produce should be specified on the package if the contents are not visible from the outside.
 - * The name or trade mark of the exporter.
 - * Reference to the specification, and/or quality certification mark of the package, if these exist.

Marking the package is required as a basis for control of quality and package performance. Moreover it facilitates stock control and the administration of reordering.
20. An important event in this business is the preparation of the required documents for shipping. The following are the required documents needed to export cut flower from Jordan (samples are attached in appendix II):

- * Obtain export permit from the Ministry of Agriculture (MOA) which could be used for more than one shipment and valid for six months. The permit costs JD 0.1. It is usually issued in one hour.
- * Prepare an invoice. Include all details of the shipment and its value.
- * Obtain the certificate of origin from the Chamber of Commerce in the area where farm is located. The charged fee depends on the total value of the shipment indicated by the shipper. The fee is one Jordanian dinar per thousand of the invoice value. It takes usually less than an hour to obtain this certificate.
- * Obtain a phytosanitary certificate from MOA office at the airport by the forwarder. No cost is associated with this document. It can be obtained anytime of the day during 8.00 am to 2.00 pm (the office hours). But for night shipments the forwarder has to inform the MOA officer in charge in advance so he can be available at night.
- * Obtain Euro-1 certificate for exports to Europe. It can be obtained from the customs department in the airport by the forwarder (no fees are needed). It is usually issued to the forwarder in less than an hour.
- * The Clearance fee is about JD 18 per shipment paid to forwarder by the exporter.

The success of this strategy relies mainly on Jordanian cut flower producer and exporter and their individual collection efforts to aim for higher quality production and use recommended post-harvest practices..

PART VI

6. APPENDIXES

6.1 APPENDIX I
Profitability Analysis
Statements

**RATE OF RETURN ON INVESTMENT OF THE CENTRAL CASE
 ASSUMING THE CUTFLOWERS ARE EXPORTED TO EUROPE
 (FARM SIZE IS 5 HECTARES)**

CUTFLOWER TYPE	ANNUAL PROFIT	INITIAL INVESTMENT	ANNUAL RETURN	PAYBACK PERIOD
100% CARNATIONS	150102	1400000	11%	9 YRS
100% GYPSOPHILA	537206	1400000	38%	3 YRS
100 % ROSES (L)	265609	1400000	19%	5 YRS
100% ROSES (S)	309693	1400000	22%	5 YRS

**DETAILS OF PROFIT / LOSS OUTPUTS FOR THE
CENTRAL CASE ACCORDING TO THE DESTINATION**

PRODUCT DESTINATION	PROFIT OR LOSS IN JD PER HECTARE		
	CARNATIONS	GYPSOPHILA	ROSES
100% SALES - EUROPE	30425	106622	68145
100% SALES - JORDAN	24092	29472	105388
100% SALES - GULF	67042	67388	168582

**POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT
PROFIT / LOSS OUTPUTS FOR THE CENTRAL CASE FOR EXPORTS TO EUROPE**

Key Factors Affecting Profit / Loss Output	% of increase (+) or Decrease (-)	Profit or Loss in JD per Hectare		
		Carnations	Gypsophila	Roses
CENTRAL CASE		30425	106622	68145
Selling Price	10%(+)	51929	134464	91581
Selling Price	10%(-)	9321	79079	45209
Yield	10%(-)	15710	84100	48801
Airfreight	10%(+)	24665	102107	64673
Marketing	0%	91865	186172	135105
Import Duty	0%	61145	146397	101625
Selling Price and Yield	10%(-) 10%(-)	-3644	59042	21868

**POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT
PROFIT / LOSS OUTPUTS FOR THE CENTRAL CASE FOR EXPORTS TO GULF**

Key Factors Affecting Profit / Loss Output	% of increase (+) or Decrease (-)	Profit or Loss in JD per Hectare		
		Carnations	Gypsophila	Roses
CENTRAL CASE		67042	67388	168582
Selling Price	10%(+)	88642	88888	200202
Selling Price	10%(-)	45842	46188	137462
Yield	10%(-)	48665	46533	137458
Airfreight	10%(+)	64642	69265	170032
Selling Price and Yield	10%(-) 10%(-)	29255	27183	109000

**POSSIBLE SCENARIOS FOR CHANGES IN KEY FACTORS WHICH MIGHT
PROFIT / LOSS OUTPUTS FOR THE CENTRAL CASE FOR SALES IN JORDAN**

Key Factors Affecting Profit / Loss Output	% of increase (+) or Decrease (-)	Profit or Loss in JD per Hectare		
		Carnations	Gypsophila	Roses
CENTRAL CASE		24092	29472	105388
Selling Price	10%(+)	38492	44522	128638
Selling Price	10%(-)	10092	14722	82638
Yield	10%(-)	10035	14690	82345
Selling Price and Yield	10%(-) 10%(-)	-2925	1145	61420

INITIAL CASH OUTLAY
(Land - Purchased)

6 Hectare Farm Model

DESCRIPTION	UNIT	HECTARE	TOTAL	USEFUL LIFE	DEPREC.
Land		25,000	150,000		
Fencing			2,500	30	83
Building Cost					
Offices / Housing			24,000	30	800
Packing Station			16,000	30	533
Cold Storage			25,375	20	1,269
Nursery			15,000	10	1,500
Multi-Span Greenhouse					
	Span cost	per Ha.			
Metal Frame	2,800	77,280	386,400	30	12,880
Polyethylene cover	275	7,590	37,950	2	18,975
Wire Plant Support	500	13,800	69,000	5	13,800
Drip-irrigation lines	50	1,380	6,900	5	1,380
Fertilizer Unit	250	6,900	34,500	10	3,450
Plastic Film for Beds	380	10,488	52,440	3	17,480
Substrate (TUF)	750	20,700	103,500		
Water Tanks	180	4,968	24,840	30	828
Pumps & Fittings	50	1,380	6,900	10	690
Sterilization System	100	2,760	13,800	10	1,380
Civil Work / Other	700	19,320	96,600		
Packing Station Equipment			47,000	10	4,700
Field Boxes & Plastic Buckets			2,000	2	1,000
Sorting Tables			1,000	5	200
Water Tanks			40,000	30	1,333
Tractor (2)			15,000	10	1,500
Transport			25,000	10	2,500
Cooling System / Sprayer					
Foggers (each)			50,000	10	5,000
Heating System					
Boiler			13,000	10	1,300
Plastic Tubing			4,500	5	900
Pumps & Fittings			2,500	10	250
Office Equipment			7,000	10	700
Planting Material			71,000		
Chem./Fert./Methyl Bromide			51,000		
TOTAL INITIAL CASH OUTLAY			1,394,705		94,432

INITIAL CASH OUTLAY
(Land - Rented)

6 Hectare Farm Model

DESCRIPTION	UNIT	HECTARE	TOTAL	USEFUL LIFE	DEPREC.
Land		480	2,880		
Fencing			2,500	30	83
Building Cost					
Offices			24,000	30	800
Packing Station			16,000	30	533
Cold Storage			25,375	20	1,269
Nursery			15,000	10	1,500
Multi-Span Greenhouse					
	Span cost	per Ha.			
Metal Frame	2,800	77,280	386,400	30	12,880
Polyethylene cover	275	7,590	37,950	2	18,975
Wire Plant Support	500	13,800	69,000	5	13,800
Drip-irrigation lines	50	1,380	6,900	5	1,380
Fertilizer Unit	250	6,900	34,500	10	3,450
Plastic Film for Beds	380	10,488	52,440	3	17,480
Substrate (TUF)	750	20,700	103,500		
Water Tanks	180	4,968	24,840	30	828
Pumps & Fittings	50	1,380	6,900	10	690
Sterilization System	100	2,760	13,800	10	1,380
Civil Work / Other	700	19,320	96,600		
Packing Station Equipment			47,000	10	4,700
Field Boxes & Plastic Buckets			2,000	2	1,000
Sorting Tables			1,000	5	200
Water Tanks			40,000	30	1,333
Tractor (2)			15,000	10	1,500
Transport			25,000	10	2,500
Cooling System / Sprayer					
Foggers (each)			50,000	10	5,000
Heating System					
Boiler			13,000	10	1,300
Plastic Tubing			4,500	5	900
Pumps & Fittings			2,500	10	250
Office Equipment			7,000	10	700
Planting Material			71,000		
Chem./Fert./Methyl Bromide			51,000		
TOTAL INITIAL CASH OUTLAY			1,247,585		94,432

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE ,

	CARNATIONS Standard	GYP SOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.128	0.185	0.227	0.18	0.133
Exportable Yeild - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	307200	397750	299640	334800	323190
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	52439	52078	55669	56919	56794
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	57600	45150	27720	34720	34020
Marketing Costs (20%)	61440	79550	59928	66960	64638
Import Duties (10%)	30720	39775	29964	33480	32319
<i>Total Selling Expenses</i>	150010	164725	117862	135410	131227
<i>Total Expenses</i>	202449	216803	173531	192329	188021
Gross Margin	104751	180948	126109	142471	135169
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
<i>Total Operating Expenses (Land - Rented)</i>	69766	69766	69766	69766	69766
<i>Total Operating Expenses (Land - Purchased)</i>	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	34985	111182	56343	72705	65403
PROFIT / LOSS (Land - Purchased)	30425	106622	51783	68145	60843

PROFIT / LOSS STATEMENT

(100% Sales - Jordan)

PER HECTARE

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.060	0.070	0.125
Yeild - Jordan	2400000	2150000	1860000
Revenue - Jordan	144000	150500	232500
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD0.5 per carton	3429	2688	2067
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>45582</i>	<i>46703</i>	<i>52786</i>
<i>Total Selling Expenses</i>	<i>0</i>	<i>0</i>	<i>0</i>
Total Expenses	45582	46703	52786
Gross Margin	98418	103798	179714
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	28652	34032	109948
PROFIT / LOSS (Land - Purchased)	24092	29472	105388

PROFIT / LOSS STATEMENT
(100% Sales - Region)

PER HECTARE

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Region	0.090	0.100	0.170
Exportable Yeild - Region	2400000	2150000	1860000
Revenue - Region	216000	215000	316200
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD1.2 per carton	8229	6450	4960
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>50382</i>	<i>50465</i>	<i>55679</i>
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	24000	22571	17363
<i>Total Selling Expenses</i>	<i>24250</i>	<i>22821</i>	<i>17613</i>
Total Expenses	74632	73286	73292
Gross Margin	141368	141714	242908
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	71602	71948	173142
PROFIT / LOSS (Land - Purchased)	67042	67388	168582

MODEL
BASE CASE
Land - Rented

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	34985	111182	72705
PROFIT - JORDAN	28652	34032	109948
PROFIT - REGION	71602	71948	173142

MODEL
BASE CASE
Land - Purchased

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	30425	106622	68145
PROFIT - JORDAN	24092	29472	105388
PROFIT - REGION	67042	67388	168582

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
10% Exportable Yeild Reduction (Waste)

	CARNATIONS Standard	GYPSOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.128	0.185	0.227	0.18	0.133
Exportable Yeild - Europe	2160000	1935000	1188000	1674000	2187000
Revenue - Europe	276480	357975	269676	301320	290871
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	9257	7256	4455	5580	5468
Cold Storage costs	360	360	360	360	360
Total Production Expenses	51410	51271	55174	56299	56187
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	51840	40635	24948	31248	30618
Marketing Costs (20%)	55296	71595	53935	60264	58174
Import Duties (10%)	27648	35798	26968	30132	29087
Total Selling Expenses	135034	148278	106101	121894	118129
Total Expenses	186444	199549	161275	178193	174316
Gross Margin	90036	158426	108401	123127	116555
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	20270	88660	38635	53361	46789
PROFIT / LOSS (Land - Purchased)	15710	84100	34075	48801	42229

PROFIT / LOSS STATEMENT
(100% Sales - Jordan)

PER HECTARE
10% Exportable Yeild Reduction (Waste)

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.060	0.070	0.125
Yeild - Jordan	2160000	1935000	1674000
Revenue - Jordan	129600	135450	209250
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD0.5 per carton	3086	2419	1860
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	45239	46434	52579
<i>Total Selling Expenses</i>	0	0	0
Total Expenses	45239	46434	52579
Gross Margin	84361	89016	156671
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	14595	19250	86905
PROFIT / LOSS (Land - Purchased)	10035	14690	82345

PROFIT / LOSS STATEMENT
(100% Sales - Region)

PER HECTARE
10% Exportable Yeild Reduction (Waste)

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Region	0.090	0.100	0.170
Exportable Yeild - Region	2160000	1935000	1674000
Revenue - Region	194400	193500	284580
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD1.2 per carton	7406	5805	4464
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>49559</i>	<i>49820</i>	<i>55183</i>
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	21600	22571	17363
<i>Total Selling Expenses</i>	<i>21850</i>	<i>22821</i>	<i>17613</i>
<i>Total Expenses</i>	<i>71409</i>	<i>72641</i>	<i>72796</i>
Gross Margin	122991	120859	211784
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	53225	51093	142018
PROFIT / LOSS (Land - Purchased)	48665	46533	137458

MODEL

10% Exportable Yield Reduction (Waste)

Land - Rented

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	20270	88660	53361
PROFIT - JORDAN	14595	19250	86905
PROFIT - REGION	53225	51093	142018

MODEL

10% Exportable Yield Reduction (Waste)

Land - Purchased

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	15710	84100	48801
PROFIT - JORDAN	10035	14690	82345
PROFIT - REGION	48665	46533	137458

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
10% Selling Price Reduction

	CARNATIONS Standard	GYP SOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.115	0.167	0.204	0.162	0.120
Exportable Yield - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	276480	357975	269676	301320	290871
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45 per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	200	100	500	500	500
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	52039	51778	55169	56419	56294
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	57600	45150	27720	34720	34020
Marketing Costs (20%)	55296	71595	53935	60264	58174
Import Duties (10%)	27648	35798	26968	30132	29087
<i>Total Selling Expenses</i>	140794	152793	108873	125366	121531
<i>Total Expenses</i>	192833	204570	164042	181785	177825
Gross Margin	83647	153405	105634	119535	113046
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
<i>Total Operating Expenses (Land - Rented)</i>	69766	69766	69766	69766	69766
<i>Total Operating Expenses (Land - Purchased)</i>	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	13881	83639	35868	49769	43280
PROFIT / LOSS (Land - Purchased)	9321	79079	31308	45209	38720

PROFIT / LOSS STATEMENT
(100% Sales - Jordan)

PER HECTARE
10% Selling Price Reduction

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.054	0.063	0.113
Yeild - Jordan	2400000	2150000	1860000
Revenue - Jordan	129600	135450	209250
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	200	100	500
Packaging @ JD0.5 per carton	3429	2688	2067
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	45182	46403	52286
<i>Total Selling Expenses</i>	0	0	0
<i>Total Expenses</i>	45182	46403	52286
Gross Margin	84418	89048	156964
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	14652	19282	87198
PROFIT / LOSS (Land - Purchased)	10092	14722	82638

PROFIT / LOSS STATEMENT
(100% Sales - Region)

PER HECTARE
10% Selling Price Reduction

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Region	0.081	0.090	0.153
Exportable Yeild - Region	2400000	2150000	1860000
Revenue - Region	194400	193500	284580
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	200	100	500
Packaging @ JD1.2 per carton	8229	6450	4960
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>49982</i>	<i>50165</i>	<i>55179</i>
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	24000	22571	17363
<i>Total Selling Expenses</i>	<i>24250</i>	<i>22821</i>	<i>17613</i>
<i>Total Expenses</i>	<i>74232</i>	<i>72986</i>	<i>72792</i>
Gross Margin	120168	120514	211788
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	50402	50748	142022
PROFIT / LOSS (Land - Purchased)	45842	46188	137462

MODEL

10% Selling Price Reduction

Land - Rented

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	13881	83639	49769
PROFIT - JORDAN	14652	19282	87198
PROFIT - REGION	50402	50748	142022

MODEL

10% Selling Price Reduction

Land - Purchased

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	9321	79079	45209
PROFIT - JORDAN	10092	14722	82638
PROFIT - REGION	45842	46188	137462

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
10% Exportable Yield Reduction
10% Selling Price Reduction

	CARNATIONS Standard	GYPSOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.1152	0.1665	0.2043	0.162	0.1197
Exportable Yield - Europe	2160000	1935000	1188000	1674000	2187000
Revenue - Europe	248832	322178	242708	271188	261784
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45 per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	9257	7256	4455	5580	5468
Cold Storage costs	360	360	360	360	360
Total Production Expenses	51410	51271	55174	56299	56187
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	51840	40635	24948	31248	30618
Marketing Costs (20%)	49766	64436	48542	54238	52357
Import Duties (10%)	24883	32218	24271	27119	26178
Total Selling Expenses	126740	137538	98011	112854	109403
Total Expenses	178150	188810	153185	169153	165590
Gross Margin	70682	133368	89524	102035	96194
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	916	63602	19758	32269	26428
PROFIT / LOSS (Land - Purchased)	-3644	59042	15198	27709	21868

PROFIT / LOSS STATEMENT

(100% Sales - Jordan)

PER HECTARE

10% Exportable Yeild Reduction

10% Selling Price Reduction

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.054	0.063	0.113
Yeild - Jordan	2160000	1935000	1674000
Revenue - Jordan	116640	121905	188325
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD0.5 per carton	3086	2419	1860
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	45239	46434	52579
<i>Total Selling Expenses</i>	0	0	0
Total Expenses	45239	46434	52579
Gross Margin	71401	75471	135746
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	1635	5705	65980
PROFIT / LOSS (Land - Purchased)	-2925	1145	61420

PROFIT / LOSS STATEMENT

(100% Sales - Region)

PER HECTARE

10% Exportable Yeild Reduction

10% Selling Price Reduction

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Region	0.081	0.090	0.153
Exportable Yeild - Region	2160000	1935000	1674000
Revenue - Region	174960	174150	256122
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD1.2 per carton	7406	5805	4464
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>49559</i>	<i>49820</i>	<i>55183</i>
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	21600	22571	17363
<i>Total Selling Expenses</i>	<i>21850</i>	<i>22821</i>	<i>17613</i>
<i>Total Expenses</i>	<i>71409</i>	<i>72641</i>	<i>72796</i>
Gross Margin	103551	101509	183326
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	33785	31743	113560
PROFIT / LOSS (Land - Purchased)	29225	27183	109000

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MODEL

10% Exportable Yield Reduction

10% Selling Price Reduction

Land - Rented

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	916	63602	32269
PROFIT - JORDAN	1635	5705	65980
PROFIT - REGION	33785	31743	113560

MODEL

10% Exportable Yield Reduction

10% Selling Price Reduction

Land - Purchased

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	-3644	59042	27709
PROFIT - JORDAN	-2925	1145	61420
PROFIT - REGION	29225	27183	109000

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
10% Airfreight Increase

	CARNATIONS Standard	GYPSOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.128	0.185	0.227	0.18	0.133
Exportable Yeild - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	307200	397750	299640	334800	323190
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	52439	52078	55669	56919	56794
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	63360	49665	30492	38192	37422
Marketing Costs (20%)	61440	79550	59928	66960	64638
Import Duties (10%)	30720	39775	29964	33480	32319
<i>Total Selling Expenses</i>	155770	169240	120634	138882	134629
<i>Total Expenses</i>	208209	221318	176303	195801	191423
Gross Margin	98991	176433	123337	138999	131767
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
<i>Total Operating Expenses (Land - Rented)</i>	69766	69766	69766	69766	69766
<i>Total Operating Expenses (Land - Purchased)</i>	74326	74326	74326	74326	74326
<i>PROFIT / LOSS (Land - Rented)</i>	29225	106667	53571	69233	62001
<i>PROFIT / LOSS (Land - Purchased)</i>	24665	102107	49011	64673	57441

PROFIT / LOSS STATEMENT

(100% Sales - Jordan)

PER HECTARE

10% Airfreight Increase (not applicable)

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.060	0.070	0.125
Yeild - Jordan	2400000	2150000	1860000
Revenue - Jordan	144000	150500	232500
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD0.5 per carton	3429	2688	2067
Cold Storage costs	360	360	360
Total Production Expenses	45582	46703	52786
Total Selling Expenses	0	0	0
Total Expenses	45582	46703	52786
Gross Margin	98418	103798	179714
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	28652	34032	109948
PROFIT / LOSS (Land - Purchased)	24092	29472	105388

PROFIT / LOSS STATEMENT
(100% Sales - Region)

PER HECTARE
10% Airfreight Increase

	CARNATIONS Standard	GYPHOPHILA	ROSES Medium
Selling Price - Region	0.090	0.100	0.170
Exportable Yield - Region	2400000	2150000	1860000
Revenue - Region	216000	215000	316200
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD1.2 per carton	8229	6450	4960
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	<i>50382</i>	<i>50465</i>	<i>55679</i>
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	26400	20694	15913
<i>Total Selling Expenses</i>	<i>26650</i>	<i>20944</i>	<i>16163</i>
<i>Total Expenses</i>	<i>77032</i>	<i>71409</i>	<i>71842</i>
Gross Margin	138968	143591	244358
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	69202	73825	174592
PROFIT / LOSS (Land - Purchased)	64642	69265	170032

MODEL

10% Airfreight Increase

Land - Rented

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	29225	106667	69233
PROFIT - JORDAN	28652	34032	109948
PROFIT - REGION	69202	73825	174592

MODEL

10% Airfreight Increase

Land - Purchased

	CARNATIONS	GYPSOPHILA	ROSES
PROFIT - EUROPE	24665	102107	64673
PROFIT - JORDAN	24092	29472	105388
PROFIT - REGION	64642	69265	170032

**PROFIT / LOSS STATEMENT
(100% Sales - Europe)**

**PER HECTARE '
10% Selling Price Increase**

	CARNATIONS Standard	GYP SOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.141	0.204	0.250	0.198	0.146
Exportable Yeild - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	337920	437525	329604	368280	355509
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	52439	52078	55669	56919	56794
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	57600	45150	27720	34720	34020
Marketing Costs (20%)	67584	87505	65921	73656	71102
Import Duties (10%)	33792	43753	32960	36828	35551
<i>Total Selling Expenses</i>	159226	176658	126851	145454	140923
<i>Total Expenses</i>	211665	228735	182520	202373	197717
Gross Margin	126255	208790	147084	165907	157792
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
<i>Total Operating Expenses (Land - Rented)</i>	69766	69766	69766	69766	69766
<i>Total Operating Expenses (Land - Purchased)</i>	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	56489	139024	77318	96141	88026
PROFIT / LOSS (Land - Purchased)	51929	134464	72758	91581	83466

PROFIT / LOSS STATEMENT

(100% Sales - Jordan)

PER HECTARE

10% Selling Price Increase

	CARNATIONS Standard	GYPSOPHILA	ROSES Medium
Selling Price - Jordan	0.066	0.077	0.138
Yeild - Jordan	2400000	2150000	1860000
Revenue - Jordan	158400	165550	255750
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD0.5 per carton	3429	2688	2067
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	45582	46703	52786
<i>Total Selling Expenses</i>	0	0	0
<i>Total Expenses</i>	45582	46703	52786
Gross Margin	112818	118848	202964
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	43052	49082	133198
PROFIT / LOSS (Land - Purchased)	38492	44522	128638

PROFIT / LOSS STATEMENT
(100% Sales - Region)

PER HECTARE
10% Selling Price Increase

	CARNATIONS Standard	GYPHILIA	ROSES Medium
Selling Price - Region	0.099	0.110	0.187
Exportable Yeild - Region	2400000	2150000	1860000
Revenue - Region	237600	236500	347820
Planting Material / Year	8958	17200	17916
Land Preparation	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580
Chemicals & STS	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556
Methyl Bromide	1320		528
Water @ JD0.45per cubic meter	5670	5670	5670
Heating / Cooling	600	400	1000
Packaging @ JD1.2 per carton	8229	6450	4960
Cold Storage costs	360	360	360
<i>Total Production Expenses</i>	50382	50465	55679
Transport & Clearance	250	250	250
Air Freight @ JD0.25/Kg	24000	22571	17363
<i>Total Selling Expenses</i>	24250	22821	17613
<i>Total Expenses</i>	74632	73286	73292
Gross Margin	162968	163214	274528
No. of flowers per Box	350	400	450
Volumetric weight per Box	14	14	14
Depreciation	18886	18886	18886
Office Expenses	1680	1680	1680
Management	10000	10000	10000
Other Operating Expenses	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326
PROFIT / LOSS (Land - Rented)	93202	93448	204762
PROFIT / LOSS (Land - Purchased)	88642	88888	200202

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MODEL

10% Selling Price Increase

Land - Rented

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	56489	139024	96141
PROFIT - JORDAN	43052	49082	133198
PROFIT - REGION	93202	93448	204762

MODEL

10% Selling Price Increase

Land - Purchased

	CARNATIONS	GYPHOPHILA	ROSES
PROFIT - EUROPE	51929	134464	91581
PROFIT - JORDAN	38492	44522	128638
PROFIT - REGION	88642	88888	200202

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
Import Duties Removed (only EC)

	CARNATIONS Standard	GYP SOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.128	0.185	0.227	0.180	0.133
Exportable Yeild - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	307200	397750	299640	334800	323190
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	<i>52439</i>	<i>52078</i>	<i>55669</i>	<i>56919</i>	<i>56794</i>
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	57600	45150	27720	34720	34020
Marketing Costs (20%)	61440	79550	59928	66960	64638
Import Duties (10%)	0	0	0	0	0
<i>Total Selling Expenses</i>	<i>119290</i>	<i>124950</i>	<i>87898</i>	<i>101930</i>	<i>98908</i>
<i>Total Expenses</i>	<i>171729</i>	<i>177028</i>	<i>143567</i>	<i>158849</i>	<i>155702</i>
Gross Margin	135471	220723	156073	175951	167488
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
<i>Total Operating Expenses (Land - Rented)</i>	<i>69766</i>	<i>69766</i>	<i>69766</i>	<i>69766</i>	<i>69766</i>
<i>Total Operating Expenses (Land - Purchased)</i>	<i>74326</i>	<i>74326</i>	<i>74326</i>	<i>74326</i>	<i>74326</i>
PROFIT / LOSS (Land - Rented)	65705	150957	86307	106185	97722
PROFIT / LOSS (Land - Purchased)	61145	146397	81747	101625	93162

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

PER HECTARE
Marketing Costs Removed (only EC)

	CARNATIONS Standard	GYPSOPHILA	ROSES Large	ROSES Medium	ROSES Small
Selling Price - Europe	0.128	0.185	0.227	0.180	0.133
Exportable YIELD - Europe	2400000	2150000	1320000	1860000	2430000
Revenue - Europe	307200	397750	299640	334800	323190
Planting Material / Year	8958	17200	17916	17916	17916
Land Preparation	1775	1775	1775	1775	1775
Labour @ JD3.5 per day	14580	9720	14580	14580	14580
Chemicals & STS	3334	3334	3334	3334	3334
Fertilizers & Micro elements	5556	5556	5556	5556	5556
Methyl Bromide	1320		528	528	528
Water @ JD0.45per cubic meter	5670	5670	5670	5670	5670
Heating / Cooling	600	400	1000	1000	1000
Packaging @ JD1.50 per carton	10286	8063	4950	6200	6075
Cold Storage costs	360	360	360	360	360
<i>Total Production Expenses</i>	52439	52078	55669	56919	56794
Transport & Clearance	250	250	250	250	250
Air Freight @ JD0.60/Kg	57600	45150	27720	34720	34020
Marketing Costs (20%)	0	0	0	0	0
Import Duties (10%)	30720	39775	29964	33480	32319
<i>Total Selling Expenses</i>	88570	85175	57934	68450	66589
<i>Total Expenses</i>	141009	137253	113603	125369	123383
Gross Margin	166191	260498	186037	209431	199807
No. of flowers per Box	350	400	400	450	600
Volumetric weight per Box	14	14	14	14	14
Depreciation	18886	18886	18886	18886	18886
Office Expenses	1680	1680	1680	1680	1680
Management	10000	10000	10000	10000	10000
Other Operating Expenses	1200	1200	1200	1200	1200
Loan Financing (Land Rent) (10 years)	38000	38000	38000	38000	38000
Loan Financing (Land Purchase) (10 years)	42560	42560	42560	42560	42560
Total Operating Expenses (Land - Rented)	69766	69766	69766	69766	69766
Total Operating Expenses (Land - Purchased)	74326	74326	74326	74326	74326
PROFIT / LOSS (Land - Rented)	96425	190732	116271	139665	130041
PROFIT / LOSS (Land - Purchased)	91865	186172	111711	135105	125481

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PROFIT / LOSS STATEMENT
(100% Sales - Europe)

CARNATIONS - GROWING AREA: 5 HECTARES
STANDARD

	TOTAL	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
		33.33	34.8	29.75	23.25	26.2	30.5	27	34.75	37.5	36.75	21.4	21.5
Selling Price - Europe	0.128	0.143	0.149	0.128	0.100	0.112	0.131	0.116	0.149	0.161	0.158	0.092	0.092
Exportable Yieid - Europe	12000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Revenue - Europe	1531030	143047	149356	127682	99785	112446	130901	115880	149142	160944	157725	91845	92275
Planting Material / Year	44790	3733	3733	3733	3733	3733	3733	3733	3733	3733	3733	3733	3733
Land Preparation	8875	740	740	740	740	740	740	740	740	740	740	740	740
Labour @ JD3.5 per day	72900	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075
Chemicals & STS	16670	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389
Fertilizers & Micro elements	27780	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Methyl Bromide	6600	550	550	550	550	550	550	550	550	550	550	550	550
Water @ JD0.45per cubic meter	28350	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363
Heating / Cooling	3000	250	250	250	250	250	250	250	250	250	250	250	250
Packaging @ JD1.5per carton	51429	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286
Cold Storage costs	1800	150	150	150	150	150	150	150	150	150	150	150	150
Total Production Expenses	262194	21851	21851	21851	21851	21851	21851	21851	21851	21851	21851	21851	21851
Transport & Clearance	1250	104	104	104	104	104	104	104	104	104	104	104	104
Air Freight @ JD0.60/Kg	288000	24000	24000	24000	24000	24000	24000	24000	24000	24000	24000	24000	24000
Marketing Costs (20%)	306206	28609	29871	25536	19957	22489	26180	23176	29828	32189	31545	18369	18455
Import Duties (8.5 / 12%)	155148	12159	12695	10853	8482	9558	15708	13906	17897	19313	18927	7807	7843
Total Selling Expenses	750604	64872	66671	60493	52543	56151	65992	61186	71829	75606	74576	50280	50402
Total Expenses	1012798	86723	88521	82344	74394	78002	87843	83036	93680	97457	96427	72131	72253
Gross Margin	518232	56324	60835	45338	25392	34444	43058	32844	55462	63487	61299	19715	20022
No. of flowers per Box	350	350	350	350	350	350	350	350	350	350	350	350	350
Volumetric weight per Box	14	14	14	14	14	14	14	14	14	14	14	14	14
Depreciation	94430	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869
Office Expenses	8400	700	700	700	700	700	700	700	700	700	700	700	700
Management	50000	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167
Other Operating Expenses	2500	208	208	208	208	208	208	208	208	208	208	208	208
Loan Financing (Land Rent) (9% / 10 years)	190000	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833
Loan Financing (Land Purchase) (9% / 10 years)	212800	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733
Total Operating Expenses (Land - Rented)	345330	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777
Total Operating Expenses (Land - Purchased)	368130	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677
PROFIT / LOSS (Land - Rented)	172902	27547	32058	16561	-3385	5667	14281	4067	26685	34710	32522	-9062	-8755
PROFIT / LOSS (Land - Purchased)	150102	25647	30158	14661	-5285	3767	12381	2167	24785	32810	30622	-10962	-10655

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

GYPSOPHILA GROWING AREA : 5 HECTARES

		45	52	31.25	41	37.8	33.5	33.2	31.75	59.8	45.5	47.8	58
	TOTAL	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Selling Price - Europe	0.185	0.193	0.223	0.134	0.176	0.162	0.144	0.142	0.136	0.257	0.195	0.205	0.249
Exportable Yield - Europe	10750000	895833	895833	895833	895833	895833	895833	895833	895833	895833	895833	895833	895833
Revenue - Europe	1986212	173015	199928	120149	157636	145333	128800	127647	122072	229918	174937	183780	222997
Planting Material / Year	86000	7167	7167	7167	7167	7167	7167	7167	7167	7167	7167	7167	7167
Land Preparation	8875	740	740	740	740	740	740	740	740	740	740	740	740
Labour @ JD3.5 per day	48600	4050	4050	4050	4050	4050	4050	4050	4050	4050	4050	4050	4050
Chemicals & STS	16670	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389
Fertilizers & Micro elements	27780	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Methyl Bromide	6600	550	550	550	550	550	550	550	550	550	550	550	550
Water @ JD0.45per cubic meter	28350	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363
Heating / Cooling	500	42	42	42	42	42	42	42	42	42	42	42	42
Packaging @ JD1.5per carton	40313	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359	3359
Cold Storage costs	1800	150	150	150	150	150	150	150	150	150	150	150	150
Total Production Expenses	265488	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125
Transport & Clearance	1250	104	104	104	104	104	104	104	104	104	104	104	104
Air Freight @ JD0.60/Kg	225750	18812	18812	18812	18812	18812	18812	18812	18812	18812	18812	18812	18812
Marketing Costs (20%)	397242	34603	39986	24030	31527	29067	25760	25529	24414	45984	34987	36756	44599
Import Duties (8.5 / 12%)	196246	14706	16994	10213	13399	12353	15456	15318	14649	27590	20992	15621	18955
Total Selling Expenses	820489	68226	75896	53159	63843	60336	60133	59763	57979	92490	74896	71294	82471
Total Expenses	1085976	90351	98021	75284	85968	82462	82258	81889	80105	114616	97022	93419	104596
Gross Margin	900236	82664	101907	44865	71668	62871	46542	45758	41967	115302	77916	90361	118401
No. of flowers per Box	400	400	400	400	400	400	400	400	400	400	400	400	400
Volumetric weight per Box	14	14	14	14	14	14	14	14	14	14	14	14	14
Depreciation	94430	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869
Office Expenses	8400	700	700	700	700	700	700	700	700	700	700	700	700
Management	50000	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167
Other Operating Expenses	2500	208	208	208	208	208	208	208	208	208	208	208	208
Loan Financing (Land Rent) (9% / 10 years)	190000	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833
Loan Financing (Land Purchase) (9% / 10 years)	212800	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733
Total Operating Expenses (Land - Rented)	345330	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777
Total Operating Expenses (Land - Purchased)	368130	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677
PROFIT / LOSS (Land - Rented)	554906	53887	73130	16088	42891	34094	17765	16981	13190	86525	49139	61584	89624
PROFIT / LOSS (Land - Purchased)	532106	51987	71230	14188	40991	32194	15865	15081	11290	84625	47239	59684	87724

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PROFIT / LOSS STATEMENT
(100% Sales - Europe)

ROSES - GROWING AREA: 5 HECTARES
LARGE

	TOTAL	65	85.6	65	45.6	47.2	38.5	34	37.25	55.4	51	54.8	54.5
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
Selling Price - Europe	0.227	0.279	0.367	0.279	0.196	0.203	0.165	0.146	0.160	0.238	0.219	0.235	0.234
Exportable Yield - Europe	6600000	550000	550000	550000	550000	550000	550000	550000	550000	550000	550000	550000	550000
Revenue - Europe	1496212	153433	202060	153433	107639	111416	90880	80258	87929	130773	120386	129356	128648
Planting Material / Year	89580	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465
Land Preparation	8875	740	740	740	740	740	740	740	740	740	740	740	740
Labour @ JD3.5 per day	72900	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075
Chemicals & STS	16670	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389
Fertilizers & Micro elements	27780	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Methyl Bromide	6600	550	550	550	550	550	550	550	550	550	550	550	550
Water @ JD0.45per cubic meter	28350	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363
Heating / Cooling	2500	208	208	208	208	208	208	208	208	208	208	208	208
Packaging @ JD1.5per carton	24750	2063	2063	2063	2063	2063	2063	2063	2063	2063	2063	2063	2063
Cold Storage costs	1800	150	150	150	150	150	150	150	150	150	150	150	150
Total Production Expenses	279805	23318	23318	23318	23318	23318	23318	23318	23318	23318	23318	23318	23318
Transport & Clearance	1250	104	104	104	104	104	104	104	104	104	104	104	104
Air Freight @ JD0.60/Kg	138600	11550	11550	11550	11550	11550	11550	11550	11550	11550	11550	11550	11550
Marketing Costs (20%)	299242	30687	40412	30687	21528	22283	18176	16052	17586	26155	24077	25871	25730
Import Duties (8.5 / 12%)	145036	13042	17175	13042	9149	9470	10906	9631	10552	15693	14446	10995	10935
Total Selling Expenses	584128	55383	69241	55383	42331	43408	40736	37336	39791	53501	50178	48521	48319
Total Expenses	863933	78700	92559	78700	65649	66725	64053	60654	63109	76819	73495	71838	71636
Gross Margin	632279	74733	109501	74733	41991	44691	26827	19604	24820	53954	46891	57518	57012
No. of flowers per Box	400	400	400	400	400	400	400	400	400	400	400	400	400
Volumetric weight per Box	14	14	14	14	14	14	14	14	14	14	14	14	14
Depreciation	94430	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869	7869
Office Expenses	8400	700	700	700	700	700	700	700	700	700	700	700	700
Management	50000	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167
Other Operating Expenses	2500	208	208	208	208	208	208	208	208	208	208	208	208
Loan Financing (Land Rent) (9% / 10 years)	190000	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833
Loan Financing (Land Purchase) (9% / 10 years)	212800	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733
Total Operating Expenses (Land - Rented)	345330	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777	28777
Total Operating Expenses (Land - Purchased)	368130	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677	30677
PROFIT / LOSS (Land - Rented)	286949	45956	80724	45956	13214	15914	-1950	-9173	-3957	25177	18114	28741	28235
PROFIT / LOSS (Land - Purchased)	264149	44056	78824	44056	11314	14014	-3850	-11073	-5857	23277	16214	26841	26335

PROFIT / LOSS STATEMENT
(100% Sales - Europe)

ROSES - GROWING AREA: 5 HECTARES
SMALL

	TOTAL	38 JAN	55.2 FEB	42 MAR	30.8 APR	34.2 MAY	21.5 JUNE	17.4 JULY	16.5 AUG	27 SEPT	26 OCT	31.8 NOV	29.5 DEC
Selling Price - Europe	0.133	0.163	0.237	0.180	0.132	0.147	0.092	0.075	0.071	0.116	0.120	0.136	0.127
Exportable Yield - Europe	12150000	1012500	1012500	1012500	1012500	1012500	1012500	1012500	1012500	1012500	1012500	1012500	1012500
Revenue - Europe	1616089	165129	239871	182511	133841	148616	93428	75612	71701	117328	121674	138187	128192
Planting Material / Year	89580	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465	7465
Land Preparation	8875	740	740	740	740	740	740	740	740	740	740	740	740
Labour @ JD3.5 per day	72900	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075	6075
Chemicals & STS	16670	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389	1389
Fertilizers & Micro elements	27780	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Methyl Bromide	6600	550	550	550	550	550	550	550	550	550	550	550	550
Water @ JD0.45per cubic meter	28350	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363	2363
Heating / Cooling	2500	208	208	208	208	208	208	208	208	208	208	208	208
Packaging @ JD1.5per carton	30375	2531	2531	2531	2531	2531	2531	2531	2531	2531	2531	2531	2531
Cold Storage costs	1800	150	150	150	150	150	150	150	150	150	150	150	150
<i>Total Production Expenses</i>	285430	23786	23786	23786	23786	23786	23786	23786	23786	23786	23786	23786	23786
Transport & Clearance	1250	104	104	104	104	104	104	104	104	104	104	104	104
Air Freight @ JD0.60/Kg	170100	14175	14175	14175	14175	14175	14175	14175	14175	14175	14175	14175	14175
Marketing Costs (20%)	323218	33026	47974	36502	26768	29723	18686	15122	14340	23466	24335	27637	25638
Import Duties (8.5 / 12%)	154159	14036	20389	15513	11377	12632	11211	9073	8604	14079	14601	11746	10896
<i>Total Selling Expenses</i>	648726	61341	82642	66295	52424	56635	44176	38475	37223	51824	53215	53662	50814
<i>Total Expenses</i>	934156	85127	106429	90081	76210	80421	67962	62261	61009	75610	77001	77448	74600
<i>Gross Margin</i>	681933	80002	133443	92430	57631	68195	25466	13351	10691	41718	44673	60738	53592
No. of flowers per Box	600	600	600	600	600	600	600	600	600	600	600	600	600
Volumetric weight per Box	14	14	14	14	14	14	14	14	14	14	14	14	14
Depreciation	100000	8333	8333	8333	8333	8333	8333	8333	8333	8333	8333	8333	8333
Office Expenses	8400	700	700	700	700	700	700	700	700	700	700	700	700
Management	50000	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167	4167
Other Operating Expenses	2500	208	208	208	208	208	208	208	208	208	208	208	208
Loan Financing (Land Rent) (9% / 10 years)	190000	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833	15833
Loan Financing (Land Purchase) (9% / 10 years)	212800	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733	17733
<i>Total Operating Expenses (Land - Rented)</i>	350900	29241	29241	29241	29241	29241	29241	29241	29241	29241	29241	29241	29241
<i>Total Operating Expenses (Land - Purchased)</i>	373700	31141	31141	31141	31141	31141	31141	31141	31141	31141	31141	31141	31141
<i>PROFIT / LOSS (Land - Rented)</i>	331033	50761	104202	63189	28390	38954	-3775	-15890	-18550	12477	15432	31497	24351
<i>PROFIT / LOSS (Land - Purchased)</i>	308233	48861	102302	61289	26490	37054	-5675	-17790	-20450	10577	13532	29597	22451

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6.2 APPENDIX II

Required Documents for Shipping
Cut Flowers From Jordan

Export Permit

وزارة الزراعة

بشوية الاقتصاد الزراعي والتجارت

التصديق الزراعي

تلاوي ٦٣٨٢٩١

رقم ب ٢٠٩٧

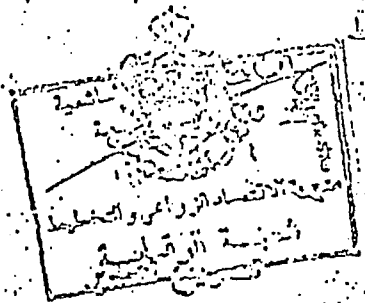
عمان - الأردن

REF: 036-077

رقم ٦٢٢٠٤

رقم الوصل التالي -

تساريف



الوزن كقوائم طن	الرسوم ذاتي وشار	الاسم
		١- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٢- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٣- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٤- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٥- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٦- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٧- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٨- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		٩- بردي - ارضان - حبات - لاصف - لاصف - لاصف
		١٠- بردي - ارضان - حبات - لاصف - لاصف - لاصف

مادة التصديق: ارضان - حبات - لاصف - لاصف - لاصف

ملحوظات عامة

يجب ان تكون الارسالية المصدرة شاملة من الاراضي والاشجار الزراعية في الحدود التي يحددها في التصديق عليها في التصديق واللائحة المرجعية وان تكون مستوفية لاشتراطات والبررات والانظمة الصادرة والتي تصدقها عن وزارة الزراعة ويتم تصديقها على كافة الشواهد المترتبة على ذلك

رئيس الوزارة

اسم كاتب التصديق وتوقيده

٢٩٩٦١/١/١٩

Invoice

Co. Flowers Producers Cooperative Association
 « Cooperative Action of Jordan Flowers »

جمعية منتجي ازهار المتكثف التعاونية
 « بورسة زهور الاردن التعاونية »

Date: 1966-1-9 التاريخ

١٠ تموز ١٩٦٦

REF: 505-2135

ببينات

السادة / معرض البحرين الدولي / البحرين

الكمية	النوع	الوصف
1000	عرق	1- آرثفل
1000	عرق	2- جريبوا
300	عرق	3- ورد سعودي
300	عرق	4- جلابولا
50	بنفس	5- زهور جالة
20	بنفس	6- خضار اباراجيس
5	بنفس	7- جيسونيل
200	عرق	8- المستورميا

الكمية المذكورة أعلاه هي عشرة وثلاثون

إنتاج أردني

جمعية منتجي ازهار المتكثف التعاونية
 الزواجر: مقعد الاقراص م. م. م.
 ح. ح. ح. ح. ح.
 تاريخ: 1/3/1966

Tel. 655 911 - P. O. Box 928 507
 Amman - Jordan

تلفون 655 911 - م. ب. 928 507
 عمان - الاردن

Certificate of Origin



رقم - TAY -
٧٧٧١٥١ - ٧٧٧١٥١
تبدأ من ٧٧٧١٥١
تنتهي ٧٧٧١٥١
تاريخ - الأهر

شهادة منشأ

RECEIVED	10 JAN 1966
Serial: 0219	
Dep: Can	

الرقم: ١٠٠٠
تاريخ: ١٩٦٦/٠١/٠٩

شهادة منشأ تجارة عمان بان البضاعة البينة مرادفاتها في الفناء ردة المرزونة رقم ١٠ تاريخ ١٩٦٦/٠١/٠٩ المصدرة من هذه الترخية والصادرة عن السيد/السادة جمعية منتجي ازهار الشفب الشعاعونية في عمان

والمرزونة الي السيد/السادة معمر بن المرحوم السيد/السادة
سني البحرين
يبلغ اجمالي قدره عشرة دنانير
حي من منشأ اردني ومن المنتجات العربية الاردنية
شهادة تجارة عمان

نفسه ونفس التصدير ونفس البضاعة التجارية رقم تاريخ
ونفس الشحن (١) على الكمية (٢)
ونفس
اسم موطنك الجمرك العسولي وشركه

- ١ - يدرك البضاعة التي من مائة او مائة او رقم لوحة السيارة
- ٢ - يدرك عدد الطرود المصدرة صدة وعلاتها
- ٣ - يدرك المصنف الذي له به شمس البضاعة بربطه شمس رقم تاريخ

Phytosanitary Certificate

The Hashemite Kingdom of Jordan
Ministry of Agriculture
Phytosanitary Certificate
of the International
Plant Protection Convention 1951

المملكة الأردنية الهاشمية
وزارة الزراعة
شهادة صحية لرواحية
رقم ٩٠٦ / ١١٠١

No. ١١٠١ / ٩٠٦ رقم

أن نباتات أو أجزاء النباتات أو متوجباتها المبيته في أودانها أو البساتين المثلثة لها قد نعتت جيداً بتاريخ ١٨/١٠/١٩٥٦
ويعرفها المبيد كيميائي الحبوب (القمح) الموضف الشمس والمشرق من قبل قسم رقابة النباتات وقد وجدت
حالياً لأموات أنها خالية نسبياً من الأمراض والآفات الزراعية الضارة وأنه يعتقد أن الإرسالية تتفق مع أنظمة الشهادات
تجزاعية المعول بها من قبل البلاد المستوردة كما هو مبين هنا أو في أي مكان آخر.

This is to certify
that the plants, parts of plants or plant products described below or representative samples of them were
thoroughly examined; on (date) 18/10/1956 by (name) [Signature] an authorized officer of the
Jordanian Plant Protection Service and were found to the best of his knowledge substantially free from
injurious diseases and pests; and that the consignment is believed to conform with the current phytosanitary
regulations of the importing country both as stated in the additional declaration hereon and otherwise.

التفتيش أو عمليات التفتيش (حسب رغبة البلاد المستوردة)

Fumigation or disinfection treatment (if required by importing country)

تاريخ: ١٨/١٠/٥٦ رقم المعاملة: ١١٠١ / ٩٠٦
رقم المعاملة: ١١٠١ / ٩٠٦
Chemical and concentration: Vacuum Pressure: Duration of exposure:

RECEIVED
10 JAN 1956
Serial: 1233
Date: 5/1/56

المملكة الأردنية الهاشمية
وزارة الزراعة
مركز التفتيش
بعمان

إجراءات أخرى:
Additional declaration:
تاريخ: ١٨/١٠/٥٦
التوقيع: [Signature]
الوظيفة: [Title]
الرقم: [Number]

(Stamp of Service)

وصف البضاعة
Description of Consignment

اسم وعنوان المصدّر: [Name and address of exporter]
اسم وعنوان المستورد: [Name and address of consignee]
عدد ومواصفات الطرود: [Number and description of packages]
الكمية: [Quantity]
اسم المنتج: [Name of produce]
النشأ (حسب رغبة الدول المستوردة): [Origin (if required by importing country)]
وسائل النقل: [Means of conveyance]
مركز الدخول / المروح: [Point of entry/exit]
رقم المعاملة: ١١٠١ / ٩٠٦
رقم المعاملة الجركية: [Number]
الاسم التجاري (حسب رغبة الدول المستوردة): [Name]

