

APIP

Agricultural Policy Implementation Project

General Directorate for Development Planning and Agricultural Investments (DGPDI)
Ministry of Agriculture, Republic of Tunisia

STUDY OF THE POTENTIAL FOR EXPORT DIVERSIFICATION IN TUNISIA: CUT FLOWERS

Final Report 91-3

July 1991

by

**Jerry Martin
Charlie Stathacos
Abdallah Omezzine
Nancy Laws
Cheri Rassas
Nicola Katz
Maiko Chambers**

In collaboration with

Abt Associates Inc., Washington, D.C.

Sponsored by

US AID/Tunis Special Mission for Economic and Technical Cooperation

AID Contract No. 664-33430C-00-8016-00

Agricultural Policy Implementation Project

Ministry of Agriculture, General Directorate for Development Planning and Agricultural Investments (DGPDI/A)
Project Office: Boite Postale 24, 1003 Cité El Khadra, Tunis, Republic of Tunisia • Telephone: (216-1) 681-570/573

STUDY OF THE POTENTIAL FOR EXPORT DIVERSIFICATION IN TUNISIA: CUT FLOWERS

Final Report 91-3

July 1991

by

**Jerry Martin
Charlie Stathacos
Abdallah Omezzine
Nancy Laws
Cheri Rassas
Nicola Katz
Maiko Chambers**

Prime Contractor: Abt Associates Inc., 4800 Montgomery Lane, Suite 500, Bethesda, Maryland 20814 • (301) 913-0500
Subcontractors: Institut Supérieur de Gestion, 41, Avenue de la Liberté, Cité Bouchoucha, Le Bardo, Tunis,
Republic of Tunisia • (216-1) 260-378/261-854
Ithaca International Limited, 707 Cayuga Heights Road, Ithaca, New York 14850 • (607) 257-2541
University of Wisconsin International Agriculture Programs, 240 Agriculture Hall, Madison, Wisconsin
53706-1562 • (608) 262-1271

Supported by USAID/Tunis Special Mission for Economic and Technical Cooperation

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1. INTRODUCTION	1
1.1 Study Objectives	1
1.2 Methodology and Study Limitations	2
1.3 Background	3
2. WORLD TRADE IN CUT FLOWERS AND THE EUROPEAN MARKET ..	5
2.1 The World Market for Cut Flowers	5
2.1.1 Important Exporters of Cut Flowers	5
2.1.2 Important Importers of Cut Flowers	10
2.2 Market Trends and Preferences	13
2.2.1 Consumer Preferences	13
2.2.2 Market Trends for Roses and Carnations	14
2.2.3 Market Trends for Other Flowers	15
2.3 The French Market	16
3. TUNISIAN CUT FLOWER MARKETING SECTOR	21
3.1 Domestic Flower Marketing Sector	24
3.2 Operation of the Cut Flower Export Sector	25
3.2.1 Input Purchases	25
3.2.2 Production Strategies	25
3.2.3 Marketing Strategies	26
3.2.4 Transport	27
4. FINANCIAL ANALYSIS OF PRODUCING CUT FLOWERS FOR EXPORT IN TUNISIA	29
4.1 Enterprise Budgets for Roses, Carnations, and Gladiola	30
4.2 Cash Flow Analysis	34
5. TUNISIAN GOVERNMENT AGENCIES AND POLICIES	44
5.1 CEPEX - Centre de Promotion des Exportations	44
5.2. Agence de Promotion des Investissements Agricoles (APIA)	45
5.3. Customs	46

TABLE OF CONTENTS (continued)

5.3.1	Import Issues	46
5.3.2	Export Issues	47
6.0	CONCLUSIONS AND RECOMMENDATIONS	48
6.1.	Conclusions: Assets and Constraints	48
6.2.	Recommended Actions	49
6.2.1	Flower Exporters Association	49
6.2.2	Government Actions	50
6.3	Tunisian Marketing Strategy	51
	BIBLIOGRAPHY	53
	ANNEXES	55
Annex 1	Roundtable on Floriculture	
Annex 2	Notes to Enterprise Budget Cost Estimate for Selected Flowers Production/Revenue Assumptions	
Annex 2-A	Assumptions for Calculations of Pesticide/Fungicides Application Rates and Costs	
Annex 2-B	Detailed Enterprise Budgets	
Annex 3	Issues Related to Post-Harvest Handling and Shipping	
Annex 4	Information on Selected Flower Varieties	
Annex 5	Quality Required by the CEE	
Annex 6	Cost of Analysis	
Annex 7	List of Participants at Round Table on Cut Flowers	
Annex 8	List of Persons Contacted in Paris	

LIST OF EXHIBITS

Exhibit 2.1	Major Exporting Countries - Percent of World Exports of Cut Flowers and Potted Plants	6
Exhibit 2.2	Chrysanthemums: Value of Imports For Selected Importing Countries, By Supplier, 1985	8
Exhibit 2.3	Carnations: Value of Imports For Selected Importing Countries, By Supplier, 1985	8
Exhibit 2.4	Roses: Value of Imports For Selected Importing Countries, By Supplier, 1985	8
Exhibit 2.5	Total Cut Flower Exports, Selected Years Egypt, Morocco, and Tunisia	9
Exhibit 2.6	Value of World Imports of Cut Flowers by Country, 1985 and 1988	11
Exhibit 2.7	Value of World Imports of Cut Flowers and Market Share of the Four Importing Countries 1984-1988	12
Exhibit 2.8	France: Value of Imports and Exports of Fresh Cut Flowers and Cuttings, 1988	16
Exhibit 2.9	1990-91 Prices of Selected Cut Flowers as Reported by Wholesales and Importers at Rungis Market in Paris in French Francs, Converted into Tunisian Dinars	20
Exhibit 3.1	List of Selected Growers	22
Exhibit 3.2	Map	23
Exhibit 4.1	Summary Enterprise Budget	32
Exhibit 4.2	Sensitivity Analysis of Net Revenue Per Hectare for Roses Using Different Price-Yield Assumptions	33
Exhibit 4.3	Cash Flow Analysis for Roses, Carnations and Gladiolus	35

EXECUTIVE SUMMARY

International floricultural trade has dramatically increased over the past 10 years from US\$1.18 billion in 1981 to over US\$2.4 billion in 1988. While Colombia built its floriculture industry in the 1970s and became a major exporter in the 1980s, other countries like Morocco, Kenya, and Costa Rica have entered the industry in the 1980's and are now successful exporters. Major factors which have helped such countries enter the world cut flower trade include the increasing globalization of markets and the greater competitiveness of low-cost producers. In order to enter the world market, countries did the following:

- Improved flower production techniques and worker training,
- Upgraded handling, packaging, and quality control techniques,
- Invested in cold storage facilities and better transport systems,
- Streamlined phytosanitary and customs clearance procedures,
- Promoted the local industry through increased publicity and participation at international trade fairs

Development of floriculture exports offers potential for increasing export and foreign exchange earnings for Tunisia and revenue for producers. Experience in other countries has shown that due to multiplier effects the revenue generated in the general economy can be two to three times greater than the agricultural revenue generated. In addition to the much-needed export earnings, countries that develop floriculture industries benefit from increased entrepreneurial activity and the creation of new talents necessary for viable and profitable production-for-export operations. There are benefits that carry to other sectors of the economy. For example, transporters and shippers are compelled to learn how to handle cut flowers, which requires greater attention to packing and timing than other agricultural commodities. An effective market entry strategy for Tunisia should encompass analysis of other countries' successes or failures and identify new techniques available to Tunisian producers for production, packing and shipping. In this way, Tunisia can borrow from the experiences other countries.

The Agricultural Policy Implementation Project (APIP), in collaboration with the Tunisian Center for the Promotion of Exports (CEPEX) and the Tunisian Agency for the Promotion of Agricultural Investments (APIA) undertook this study to document the current status of the Tunisian cut flower export marketing system and to propose a strategy to take advantage of the consistent growth in world cut flower trade. The study addresses the following topics: world trade in cut flowers, the Tunisian cut flower marketing system, the Tunisian cut flower production system and the role of the GOT in promoting cut flower production and export. The study includes a set of conclusions and recommended actions for Tunisian cut flower exporters and government officials.

Cut flower exports represent an excellent opportunity for Tunisia to diversify its agricultural enterprises, generate revenues, and increase employment opportunities for several

reasons. First, world imports of cut flowers increased by over 20 percent during the last half of the 1980s, and the greatest growth was recorded in Europe. Second, Tunisia's climatic conditions and soils are suitable for flower production, although growers have insufficient experience to be able to determine the best set of crops. Third, Tunisia's proximity to the lucrative European market makes it more competitive with respect to international shipping costs than the Latin American and Sub-Saharan African countries, even though 1992 EC single market may affect market access. Finally, the Government of Tunisia is actively encouraging growth of the sector by providing a wide range of incentives.

World Trade in Cut Flowers

Importers. Except for Japan, the major importers of the world's cut flowers are located in Western Europe and North America. Germany is the largest importer (35%) followed by the United States (21%), France (6%) and the Netherlands (5%). Two other countries which represent potentially lucrative markets for Tunisia are the United Kingdom and Switzerland. Between 1984 and 1988 the United Kingdom registered the largest growth (in percentage terms) of world imports moving from \$73 million to \$230 million of imports. Switzerland has the second highest per capita spending on flowers in the world.

Exporters. The Netherlands is the major exporter of cut flowers accounting for over 65% of the world market. Other important exporters with a significant share of the world market include Colombia (10%), Israel (6%) and Italy (5%) and Spain (4%), while countries as diverse as Kenya, Costa Rica, Canada, Israel, Ecuador, Peru, Thailand, and Cote d'Ivoire have developed reliable export markets for their cut flower production. Of the North African countries, Morocco has increased its cut flower exports from \$2.5 million in 1985, to \$6.2 million in 1987 and approximately \$7.0 million in 1989. Morocco has captured a niche market, exporting mostly roses to Europe in the winter months when European production is costly.

Tunisian Exports. Tunisian flower exports have shown important growth over the last five years, although different sources report varying results, especially for 1990. According to CEPEX trade data drawn from customs records, Tunisian exports of cut flowers increased five times in quantity and ten times in value¹ from 1985 to 1990. Data collected by the phytosanitary service at Tunis-Carthage airport is shown along with the CEPEX data as follows:

Quantity of Cut Flower Exports, 1985-1990

CEPEX DATA	1985	1986	1987	1988	1989	1990
	89	89	52	257	218	396*

¹ Much of the increase in value in dinar terms can be attributed to depreciation of the dinar relative to the French franc as well as other European currencies.

Quantity of Cut Flower Exports from Tunis-Carthage Airport, 1987-1990

PHYTO-SANITARY DATA	1987	1988	1989	1990
Quantity in Tons	77	110	25	5
Number of Stems	--	--	2,153,659	842,890

Value of Cut Flower Exports, 1985-1990 -- Thousand Dinar --

CEPEX DATA	1985	1986	1987	1988	1989	1990
Value in Dinars	217	272	481	482	1082	2000*

* forecast estimate

The CEPEX forecast for 1990 appears overly optimistic showing an increase in exports from 218 mt in 1989 to 396 mt in 1990, compared with phytosanitary service inspection reports which indicate a decline in exports from 25 mt and 2,153,659 stems in 1989 to 5 tons and 842,890 stems in 1990. The phytosanitary service inspects exports of fresh products at Tunis-Carthage airport and compiles data on flowers by type of flower, quantity shipped, and destination. Exporters reported that almost all air shipments go out from Tunis-Carthage airport. As with any new and growing industry, data on production and marketings are difficult to obtain and must be interpreted with care. There are also producers going in and out of the industry each year, which complicates data collection and can distort statistics substantially in an industry with a small number of producers. Discrepancies between data provided by CEPEX for 1990 and inspections by phytosanitary service indicate that it would be valuable to improve reporting methods and data collection.

Consumer Preferences. Roses are the most important (by value) fresh cut flower traded in the world. Roses account for almost 20% of all flower imports and in the major markets of Europe and North America they represent almost 50% of retail sales. Carnations are the second most traded flower. Standard and miniature carnation imports are growing at 20% per year, with Colombia as the dominant exporter of standard carnations and Kenya and Israel as the major exporters of the miniatures. The other principal traded flowers are chrysanthemums, tulips, orchids and gladioli. Consumers preferences for flowers varies greatly among countries and consumer often require very specific quality, size, color and shape. The lack of up-to-date information on trends in cut flower consumption led the study team to examine the market trends for imported cut flowers by interviewing importers and wholesalers of cut flowers at the Rungis market in Paris.

The French Market. Since the mid-1970s, France has shifted from being a net exporter of cut flowers to one of the largest importers in the world. Roses, chrysanthemums, carnations, orchids, gladioli and tulips are the major imports. The import season is from September to mid-June, although some countries (Kenya and Thailand) start exporting around the end of August. The developing countries that are well-known at Rungis for their flowers include:

- Colombia: carnations and spray carnations
- Kenya: mini-carnations, statice, and astromeria
- Peru: gypsophila
- Morocco: roses (80 percent); mini-carnations (10-20 percent)

As discussed earlier, roses are the most important imported flower and the most popular flower in France. Popular red roses include first Vega and Samantha, and second, Madelon, Cardinale, Royal Red, and Red Success. Popular pink roses include Omega and Sonia, although the latter is losing ground to newer varieties. Figure A shows the market window at Rungis for the Sonia rose.

The French market demands high quality, although even second quality Moroccan roses have found a sizable market. It appears that gladioli may be an important niche market for Tunisian growers. Gladioli are heavy flowers and Tunisia may have a significant geographical advantage given the shipping costs inherent in gladioli transport. Figure A shows the market window at Rungis for gladiola.

The Tunisian Cut Flower Marketing Sector

The Tunisian cut flower marketing sector is divided into two segments. The first consists of producers who grow flowers exclusively for the domestic market. The second consists of a small group who produce primarily for the export market.

Floriculture production in Tunisia is by and large limited to small-scale growers producing for the domestic market. The regions known for flower production are Mornag, Béjaoua, Sidi Thabet, Soliman, Manouba, Soukra, Bizerte, Cap-Bon, Sousse, and Djerba. Little information is available on domestic production of cut flowers and ornamental plants. A draft paper prepared in late 1988 by the Division of Horticultural Crops in the Ministry of Agriculture reported 28.6 hectares in flower production and 50.6 hectares in ornamental plants. Of the 22 cut flower growers listed, 14 had less than one hectare in production, seven had between one and three hectares in production, and one had 10 hectares in production. No estimates of actual production were available.

Domestic Marketing Segment. Domestic cut flower marketing is dominated by two large producers who sell only in Tunisia. Their principal clients are tourist hotels, restaurants, embassies and small retailers in Tunis. Though the number of Tunis retailers has increased in the past five years, producers do not see the domestic market as a source of significant growth in the future.

Export Marketing Segment. This study identified only 5 active producer/exporters of cut flowers in Tunisia. Growers are in an experimental stage, trying different varieties, production systems and marketing arrangements. These producer/exporters depend heavily on European partners and contacts for production techniques and market information. Inexperienced labor means that time consuming on-the-job training is required from the earliest stage of production all the way through the postharvest handling and distribution stages.

Export marketing strategies are closely tied to the type and level of foreign involvement in these enterprises. In most cases the European partners or contacts guarantee the sale of all production at a price fixed at the beginning of the planting season. This appears to be an effective strategy. Those Tunisian growers who have no European partner find that their production decisions are not well coordinated with market requirements.

Costs and Returns to Cut Flower Production for Export. Enterprise budgets for three important cut flower varieties -- roses, carnations, and gladioli -- were prepared in order to assist growers in analyzing factors affecting the profitability of producing alternative crop in their own operations. Growers need guidelines to organize and plan the combination of crops they choose to produce, and enterprise budgets can help growers understand the factors affecting costs and possibly construct budgets for their own operations. Growers may have difficulty estimating their costs due to:

- inexperience with cost calculation methods,
- absence of published recommended guidelines on cut flower production, and
- lack of good records.

Other factors that influence production decisions among Tunisian growers are their experience in previous years, their willingness to experiment with new flowers, and their knowledge of what the European market will purchase (often this information is provided by European partners or buyers). Quality is of utmost importance, because there is no market "niche" for low-cost, low-quality flowers. How yield, price and cost factors affect the profitability of operations producing quality flowers is illustrated by the enterprise budgets. Estimated returns are sensitive to seasonal variation as flowers must arrive on the market on-time for particular holidays after which prices drop off.

The results of the analysis shown in Exhibit 8 reveal that cut flower production for export can be potentially very profitable, assuming that high yields of quality flowers are obtained, losses in transit are minimized and flowers arrive on the market in a timely manner.

Initial investment costs for cut flower export production are about 201,100 DT, or about 67,000 DT per hectare not including land for a model three-hectare Tunisian farm. Under the medium yield assumption, net revenues per hectare for roses are 26,602.9 DT, while gladiola show 7,805.3 DT, and carnations actually show a loss of 667.1 per hectare. Under the high

yield scenario, the gross margin per hectare is highest for roses at 52,852.9 DT, followed by 17,555.3 DT per hectare for gladiola and 12,232.9 for carnations.

A sensitivity analysis was conducted to illustrate how sensitive net revenues are to changes in price and yield. Overall, the analysis shows that the effect of price changes on net revenue shows with a 20 percent decrease in price and a 20 increase in price, and indicates that:

- roses and gladiola are profitable cut flower enterprises
- carnations are less profitable except at higher price levels
- growers have to be concerned with quality since net revenues become negative at a 20 percent discount for carnations and gladiola under all scenarios.

If flower quality does not meet accepted standards, discounts can be substantial, and make all the difference between profitability and loss. The issue of quality was emphasized by all wholesalers in the Rungis market in Paris emphasized the importance of quality.

Cash-flow analyses were done for all three flowers under low-medium-high yield scenarios and average price assumptions. Estimates of capital investment costs and operating expenditures are estimated based on the figures presented in the enterprise budgets. Cash inflows are the projected revenues (using constant prices) over a 15-year period assuming that 80 percent of production is actually sold. Cash outflows include the initial investment of 201,100 DT, plus replacement costs in later years, as well as operating expenditures. Even under low yield scenarios, positive cash flows are registered for roses and gladiola but not for carnations which show a negative internal rate of return of 23.8 percent. Positive rate of return are shown for all flowers under the medium and high yield scenarios. The highest internal rate of return is for roses, 196.9 percent under the high yield scenario, while gladiola show a 96.1 percent with high yields. Overall, therefore, the return on capital investment in flower production appears to be high under these simplified models. However, much caution should be exercised in drawing conclusions from these. The analysis here reflects a simplified model of existing production systems, and more farm survey work should be done, especially of agronomic practices, so the investment analysis can be more rigorous.

Government Promotion of Cut Flower Production and Export

Export policies and procedures have been streamlined in the past few years to be more responsive to exporters' needs. In addition, several government agencies responsible for export promotion activities have been established. The Center for the Promotion of Exports (CEPEX), supported by the Ministry of Economy and Finance, promotes Tunisia's foreign trade and assists exporters and foreign importers in initiating business contacts. An export promotion fund (FOPRODEX) managed by CEPEX helps exporters access market research and promotes Tunisian products abroad. Another agency in the Ministry of Agriculture, (the Agency for the Promotion of Agricultural Exports), provides information on the agricultural investment code for Tunisian and foreign investments, assists in identifying investment opportunities, and helps potential investors apply for financing from the National Agriculture Bank.

Conclusions and Recommendations

Conclusions

The two major conclusions drawn from this review of the Tunisian cut flower export sector are:

1. Tunisia has the natural, physical and human resources to develop a competitive cut flower export sector if a concerted effort is made to remove the constraints identified in this study. Countries like Morocco and Kenya have developed market niches by becoming reliable suppliers of specific flower varieties.
2. Most constraints that affect the Tunisian cut flower sector can be attributed to its very small scale. Economies of scale must be developed by collaboration among current producer/exporters and by cooperation between them and the relevant agencies of the Tunisian Government.

Recommendations

The report recommends that three interrelated actions be undertaken. The first addresses the private sector, the second deals with GOT actions and the third identifies the most promising foreign market for Tunisian flowers.

1. A private trade association of Tunisian flower exporters should be formed. This Tunisian Flower Exporters Association should promote the organized growth of the sector by representing growers' interests with the government and foreign investors and buyers. Similar successful associations in countries such as Colombia, Kenya and Morocco could serve as models for the Tunisian Association. The association can help to organize promotion of the sector and develop basic marketing materials, including brochures, press kits, and video tapes.
2. The GOT should consider either simplifying or eliminating the procedures for reimbursing export and TVA taxes on flowers. A study should be done on the short and long-term economic impacts of trade and fiscal reforms on both the floriculture sector and the economy as a whole.
3. In the area of research and extension, the Government should examine the feasibility (economic and technical) of establishing a research farm and laboratory devoted to cut flowers, which might even be a public/private venture since the raw material will probably come from commercial sources anyway. Funding for this facility should not be considered until the stability and viability of the export sector is more certain. In the area of promotion, APIA should be encouraged to

follow-up more closely on the results of partnerships or joint ventures which it has helped to arrange. Likewise, CEPEX needs to develop a better understanding of the production systems and capabilities of current flower exporters so that it can accurately represent Tunisia's potential at international fairs and provide feedback to Tunisian exporters.

4. Tunisian flower exporters should target the French market. The common language, proximity to the market and frequent air connections make France an attractive option for Tunisian exporters. Several factors make gladioli a particularly interesting possibility for Tunisian growers. The demand for gladioli in France has been rising steadily over the past decade. They are heavy flowers with high shipping costs. Off-season production in France is expensive because of gladioli's long growing season and high greenhouse heating costs. Other flowers which grow in Tunisia and are in high demand in France include roses, chrysanthemums and carnations. Rigid adherence to French quality standards will be required for Tunisia to compete successfully with Morocco, Colombia, Kenya and Israel which currently supply France.

1. INTRODUCTION

1.1 Study Objectives

A recent study of the Tunisian agriculture and food sector revealed a number of excellent investment opportunities for products destined for export and recommended a close examination of the cut flower in this regard. It is within this context that the present study was undertaken by the Agricultural Policy Implementation Project (APIP) in collaboration with CEPEX and APIA.² The overall goal of this study is to assess the potential for expanding Tunisian cut flower exports.

In order to accomplish this goal, the study was divided into two phases. Phase I, conducted in Tunisia over a three-week period, documented the current status of the cut flower export marketing system, identified organizational and operational constraints to its development, assessed the production system and its cost structure, and examined the Tunisian Government's role in promoting investments in the flower sector. Phase II, carried out in the United States and France, identified promising European flower markets for Tunisian exports, evaluated likely changes in the European flower market in the next few years, identified trade and tariff constraints, and evaluated price structures at wholesale and retail markets for high potential flowers.

The authors found that since the Tunisian cut flower sector was small-scale, it would be inaccurate to characterize export marketing activities as a "system." Interviews were conducted with five of the six Tunisian cut flower exporters who had actually exported within the past four years and it was evident that these growers benefit from a number of "natural" advantages; i.e. good climate, adequate soils, sufficient irrigation water and proximity to the export market. In addition to these assets, it is clear the Government of Tunisia has begun to make important policy and regulatory changes which are making agricultural exports, including flowers, more attractive to investors. These positive factors, while holding potential for the industry, are balanced by numerous problems. There are constraints on the development of the industry in the areas of infrastructure, market information, government procedures, and inadequate technical knowledge. The principal constraints identified in this study are:

- Lack of organized air cargo shipments for flowers;
- Inadequate air cargo capacity, especially during peak season;
- Lack of cold storage at the Tunis airport;
- Little technical information available from extension services;
- Insufficient knowledge of the European flower market;
- Inadequate postharvest handling procedures;

²CEPEX is the Center for the Promotion of Exports (Centre de Promotions des Exportations) and APIA is the Agency for the Promotion of Agricultural Exports (Agence de Promotion des Investissements Agricoles). Both are discussed in detail in Chapter 5.

- An inexperienced labor force;
- Delayed reimbursement of export tax payments;
- Very limited access to credit, short and long-term;
- Restrictions on import of special pesticides for flowers; and
- Difficulties in linking up with foreign partners.

Based on the findings of the study, a set of recommendations was developed to identify and implement solutions to constraints and problems in the Tunisian cut flower sector.

1.2 Methodology and Study Limitations

This study employed a modified rapid appraisal (RA) approach³ as defined in the Operational Guidelines for Rapid Appraisals of Agricultural Marketing Systems. The study began with an initial desktop survey of the world market and the collection of background information in Tunisia prior to the arrival of the study team. The study team interviewed growers at their farms as well as relevant private sector and government officials in Tunis. Information and data gathered during these interviews gave the team a greater understanding of the advantages and disadvantages of floriculture production for export in Tunisia. They had anticipated that actual data on production and exports would be readily available; however, it was found that the data are limited and the accuracy of some official data is suspect. Therefore, growers became the main sources of information on marketing and production. Given the small number of producer-exporters, and their relatively recent entry into the sector, it was difficult to project trends and prospects for the flower export industry with any certainty. Therefore, to speak of a Tunisian flower export system per se may imply a level of complexity and organization which does not yet exist.

In 1987, the International Trade Centre (ITC) published a market study on floriculture products,⁴ which remains the best overall reference on world market trends for cut flowers. Unfortunately, it was published in 1987 and uses 1985 data. For more up-to-date information, it is necessary to examine national sources published by individual countries. Trade data on cut flowers by specific flower are not published on an annual basis, although individual countries may collect data on imports of cut flowers by flower and source. The ITC study covered seven major importing countries (Germany, France, the United Kingdom, the Netherlands, Switzerland, the United States, and Canada) and three types of flowers (carnations, roses, and chrysanthemums). The ITC study gave information on market trends and consumer preferences for specific cut flowers based on consumer surveys conducted in individual countries. Detailed

³Holtzman (1986) defines rapid appraisal as a broad and preliminary overview of the organization, operation and performance of a commodity system or components thereof, designed to identify system constraints and opportunities.

⁴International Trade Centre UNCTAD/GATT, Floriculture Products: A Study of Major Markets, Palais des Nations, 1211 Geneva 10, Switzerland, 1987.

market research information (i.e. consumer purchasing trends) is typically collected on a national basis. In Germany, for example, the ITC study relied on data from the Centrale Marketinggesellschaft de Deutschen Agrarwirtschaft (CMA), which surveys 5,000 households for data on purchases of floriculture products.⁵ In France, CNIH/SOFRES⁶ has been conducting an ongoing survey of 10,000 households for several years, which provides information on trends in consumer preferences and purchasing habits. Apart from the 1987 ITC study, data sources for market research information must be obtained from national sources in individual countries.

1.3 Background

Cut flower exports represent an excellent opportunity for Tunisia to diversify its agricultural enterprises, generate revenues, and increase employment opportunities for several reasons. First, world imports of cut flowers increased by over 20 percent during the last half of the 1980s, and the greatest growth was recorded in Europe. Second, Tunisia's climatic conditions and soils are suitable for flower production, although growers have insufficient experience to be able to determine the best set of crops. Third, Tunisia's proximity to the lucrative European market makes it more competitive with respect to international shipping costs than the Latin American and Sub-Saharan African countries. Finally, the Government of Tunisia is actively encouraging growth of the sector by providing a wide range of incentives.

Chapter 2 of this study gives an overview of the world cut flower market, including data on exports and imports and more details on market trends for specific cut flowers. In addition, the French cut flower market is analyzed based on several days of interviews at the Rungis Market in Paris.

Chapter 3 outlines the Tunisian flower marketing system and its organization, including freight capacity and available infrastructure, and provides an inventory of the important issues and factors that influence the export potential. The importance and difficulty of meeting and maintaining post-harvest quality standards are discussed.

Existing Tunisian flower production is described in Chapter 4. The advantages and disadvantages of growing specific kinds of flowers in Tunisia and factors affecting costs are discussed. Enterprise budgets for roses, carnations, and gladioli have been prepared to provide benchmark estimates for assessing the profitability of the industry and comparing Tunisian growers to other producers in terms of competitiveness. Sensitivity analysis of net revenue under different price-yield scenarios was conducted to determine the range of profitability under different scenarios. Cash flow analyses based on costs and returns from the enterprise budget analysis were also calculated.

⁵ITC, p. 19.

⁶Comité National Interprofessionnel de l'Horticulture et des Pépinières, 13, Rue du Pont des Halles - B.P. 309 94152 Rungis Cedex, Paris.

Chapter 5 addresses the role of the Government of Tunisia in encouraging flower production. Existing institutions are described and the effect of laws and policies on the development of the flower export industry is considered. Chapter 6 examines the assets and constraints that face the industry and makes recommendations for managing them. Also discussed is a Tunisian marketing strategy that represents a first step toward developing and implementing a plan of action for Tunisia's flower industry.

2. WORLD TRADE IN CUT FLOWERS AND THE EUROPEAN MARKET

2.1 The World Market for Cut Flowers

International floricultural trade has dramatically increased over the last 10 years. World imports of cut flower imports rose from US\$1.18 billion in 1981 and US\$1.3 billion in 1985, to US\$2.47 billion in 1988.⁷ The market for imported cut flowers is expected to remain strong over the next several years, as demand continues to rise in the principal markets for cut flowers, namely Western Europe, North America, and Japan, while local production declines.

Germany, for example, relies increasingly on imported flowers to meet domestic demand, now importing as much as 75 percent of its cut flowers.⁸ The demand for cut flower imports in France and Germany, as well as in the United Kingdom, Switzerland, Holland, Japan, and the United States, will likely continue to rise.⁹ Oil-exporting nations which have also increased fresh cut flower imports during the last decade, appear to be a good future market. The most important exporters of cut flowers are the Netherlands and Colombia, followed by Israel and Italy. These four countries account for about 90 percent of the market. Countries such as Spain, Kenya, Costa Rica, the Canary Islands, and Morocco are also important exporters of fresh cut flowers, accounting for much of the remaining 10 percent.

2.1.1 Important Exporters of Cut Flowers

The major exporting countries are shown in Exhibit 2.1. The Netherlands is clearly the leading exporter of cut flowers and potted plants in the world, holding 68 percent of the world cut flower and potted plant market share in 1989. Colombia is a distant second with 10 percent of the export market in 1989, a slight increase from the 1988 level of 9.2 percent but declining from a 13 percent market share in 1985. Israel and Italy lost market share declining from 8 and 7 percent in 1985 to 6 and 5 percent in 1989.

While the Netherlands produces the majority of the flowers it exports, it also imports flowers from a large number of exporters around the world and re-exports them. In 1988, for example, the Netherlands imported \$130.0 million worth of cut flowers, which is less than 10 percent of total exports of \$1.53 billion,¹⁰ but if re-exported would still represent a significant

⁷ Doyle C. Johnson, USDA, ERS, *Floriculture and Environmental Horticulture Products*, Statistical Bulletin Number 817, September 1990.

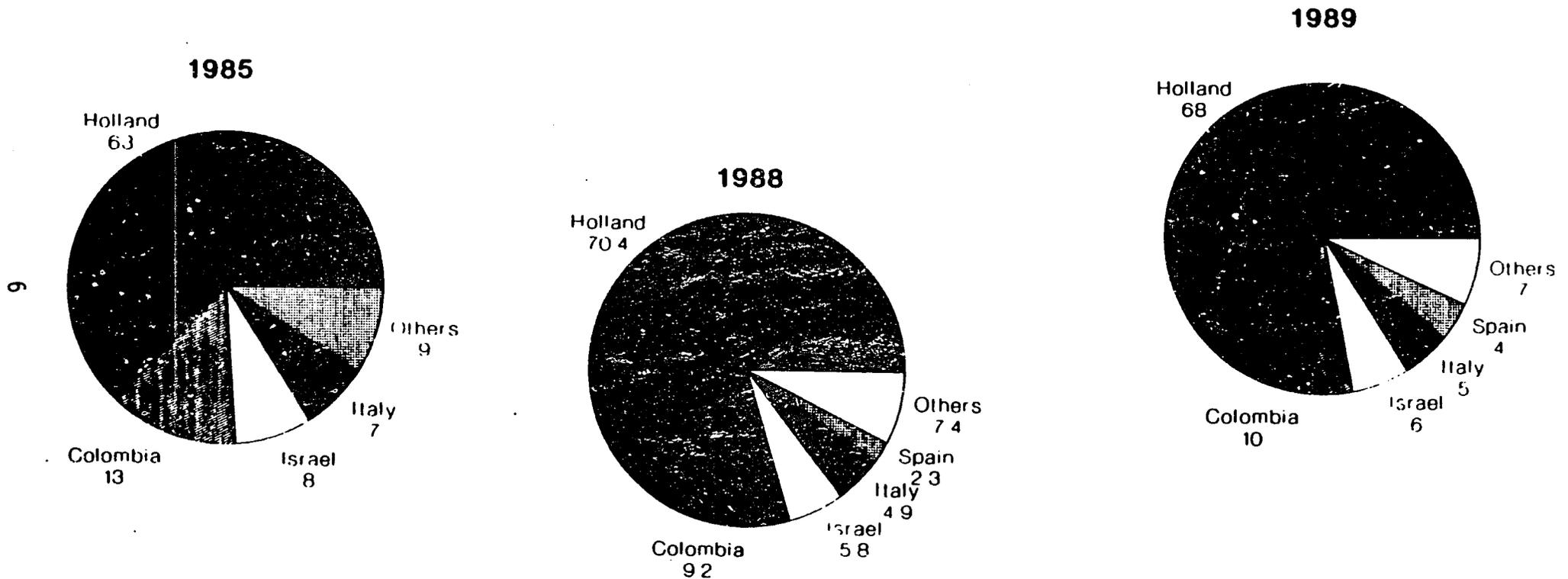
⁸ *Le marché des fleurs*, p. 11.

⁹ *Ibid.*, p.10.

¹⁰ Floriculture and Environmental Horticulture, pp. 219-222.

Exhibit 2.1

Major World Exporting Countries of Cut Flowers and Potted Plants



Source: Flower Council of Holland

percentage of world exports.¹¹ The Netherlands is the major supplier of traded cut flowers to all the major importing countries in Europe and since during the winter months domestic production of cut flowers declines throughout Europe, the market for non-European production improves substantially. Wholesalers interviewed in Rungis Market in Paris reported that a considerable proportion of the cut flower shipments arriving from the Netherlands consisted of third-country production that had been re-exported.

The ITC study of the major markets for floricultural products compiled import-export data for roses, chrysanthemums, and carnations, the three most important cut flowers traded. Exhibits 2.2-2.4 show 1985 data¹² by exporting country in order of importance and by selected importing countries for all three flowers. The Netherlands and Colombia are the two most important suppliers for all three flowers, and have over 90 percent of the chrysanthemum market. Israel is the third leading supplier of roses and carnations, with 8.4 and 12.7 percent of the market respectively, but has less than 2 percent of the chrysanthemum market, for which it ranks a distant third place. The United States is Colombia's primary customer while the Netherlands is the major supplier to Germany, the United Kingdom, France and Switzerland

Italy ranks fourth as an exporter of roses and carnations, with Germany as its most important customer. The Canary Islands are fourth for chrysanthemum exports, with the United Kingdom as the main customer, and sixth for roses, with Germany taking two-thirds of their exports. Spain is the fifth most important exporter of roses and carnations and the sixth in chrysanthemums. Other exporters include Kenya, the sixth in carnations; Costa Rica, the fifth in chrysanthemums; and Morocco, the seventh in roses, which is their major crop. Morocco has captured a niche market, exporting mostly roses to Europe in the winter months when European production is costly.

Exhibit 2.5 compares three North African flowers exporters, Morocco, Egypt, and Tunisia, and shows that Morocco is the most important, increasing from about \$2.5 million in 1985 to about \$6.5 million in 1987, while Egypt and Tunisia are both well below the \$1 million mark. Because of Tunisia's growth potential a number of producer-exporters tried to enter the market in the 1980s. The trade statistics on Tunisian cut flowers exports do not tell very much because the customs service does not collect detailed records on export shipments by type of flower. However, the Plant Protection Service inspects exports of fresh products at Tunis-Carthage Airport and compiles data on flowers by type of flower, quantity shipped, and destination. An examination of this database shows that quantities of flowers and ornamental plants exported increased from 77.5 tons in 1986 and 109.8 tons in 1987 to 570.5 tons and 1.6

¹¹ No data available on re-exports

¹² The 1987 ITC report is presently being updated with 1988 market data by specific flowers.

EXHIBIT 2.2

CHRYSANTHEMUMS: VALUE OF IMPORTS FOR SELECTED IMPORTING COUNTRIES, BY SUPPLIER,
(THOUSANDS OF US DOLLARS)

Suppliers	Germany	United States	United Kingdom	France	Netherlands	GRAND TOTAL	% of Total
Netherlands	49,751	670	17,136	7,165		74,722	59.2%
Colombia		42,078				42,078	33.3%
Israel	259	18	1,811		24	2,112	1.7%
Canary Islands	163		1,404		214	1,781	1.4%
Costa Rica		1,228				1,228	1.0%
Spain	124	10	222	155	354	865	0.7%
Mexico		618				618	0.5%
Italy	554				57	611	0.5%
Other Countries	384	1,091	485	142	169	2,271	1.8%
Total Imports	51,235	45,713	21,058	7,462	818	126,286	100.0%
% of Imports	40.6%	36.2%	16.7%	5.9%	0.6%		

EXHIBIT 2.3

CARNATIONS: VALUE OF IMPORTS FOR SELECTED IMPORTING COUNTRIES, BY SUPPLIER, 1985
(THOUSANDS OF US DOLLARS)

Suppliers	Germany	United States	United Kingdom	Netherlands	Canada	France	Switzerland	GRAND TOTAL	% of Total
Colombia	8,103	47,091	10,475	1,959	2,515	126	322	70,591	33.2%
Netherlands	48,403	1,033	13,345		310	2,040	596	65,727	30.9%
Israel	7,312	2,241	6,952	9,893	33	498	72	27,001	12.7%
Italy	13,946	143	2,314	1,019	17	106	793	18,338	8.6%
Spain	2,819	63	1,983	3,524	10	196	256	8,851	4.2%
Kenya	6,055	172	1,003	592		549	92	8,463	4.0%
United States					3,692			3,692	1.7%
France	1,856	11	169	24	10		21	2,091	1.0%
Other Countries	547	3,871	1,190	1,895	360	42	15	7,920	3.7%
Total Imports	89,041	54,625	37,431	18,906	6,947	3,557	2,167	212,674	100.0%
% of Imports	41.9%	25.7%	17.6%	8.9%	3.3%	1.7%	1.0%		

EXHIBIT 2.4

ROSES: VALUE OF IMPORTS FOR SELECTED IMPORTING COUNTRIES, BY SUPPLIER, 1985
(THOUSANDS OF US DOLLARS)

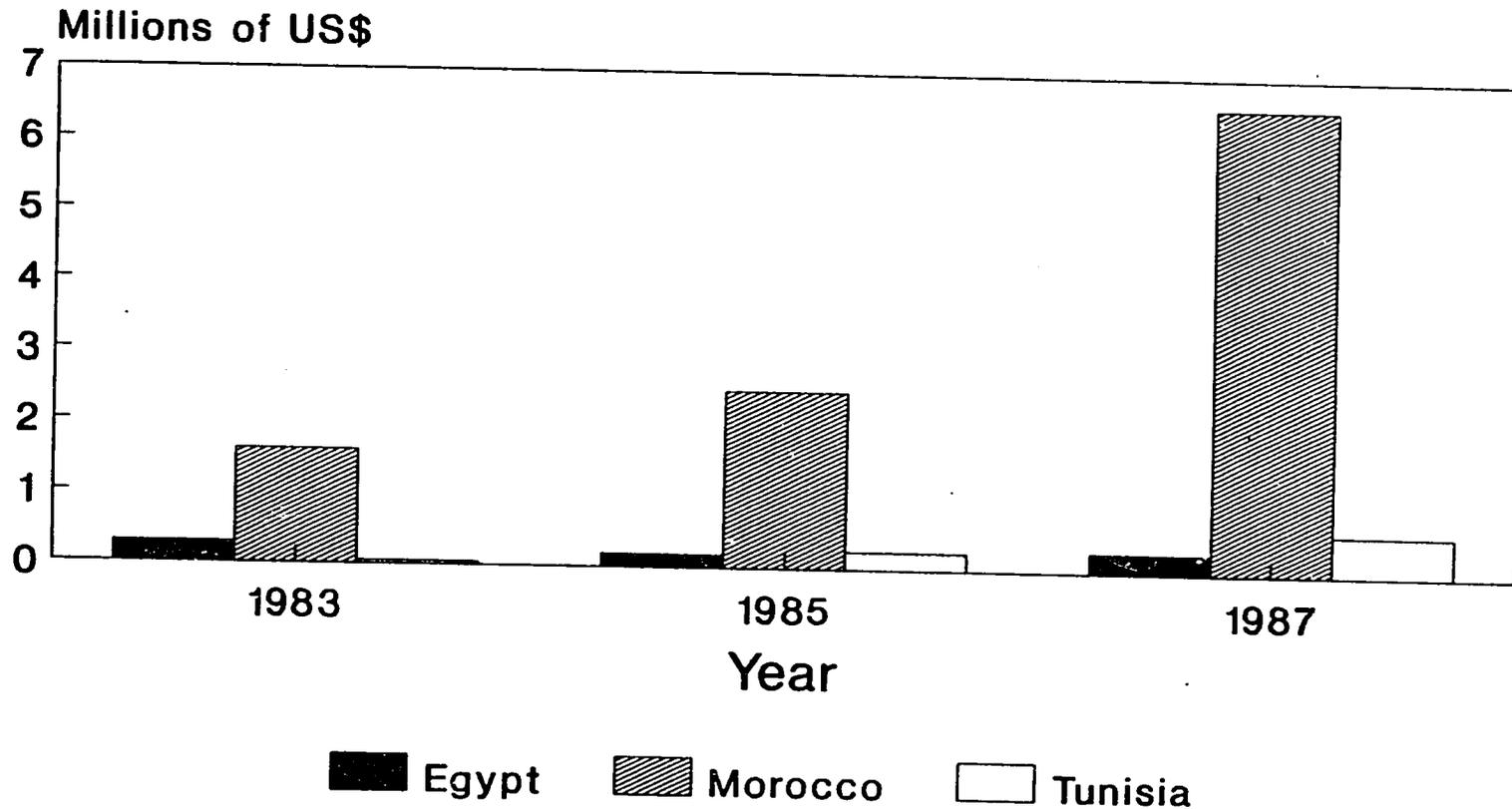
Suppliers	Germany	United States	Switzerland	United Kingdom	France	Holland	Canada	GRAND TOTAL	% of Total
Netherlands	79,932	1,782	10,080	5,645	4,353			102,807	57.6%
Colombia	284	35,384	537	16			1,015	36,610	20.5%
Israel	5,513	1,104	1,286	3,873	266	2,727	389	15,035	8.4%
Italy	2,130	10	2,275	161	48		266	4,624	2.6%
Spain	331	133	3,569	9	104	71	78	4,295	2.4%
Canary Islands	2,578			219	147	935		3,879	2.2%
Morocco		9	95		1,695	157	84	2,040	1.1%
France	168	23	1,671	2		30	53	1,947	1.1%
Other Countries	705	3,921	121	46	242	341	2,018	7,394	4.1%
Total Imports	91,641	42,366	19,634	9,971	6,855	4,261	3,903	178,631	100.0%
% of Imports	51.3%	23.7%	11.0%	5.6%	3.8%	2.4%	2.2%		

SOURCE: USDA

Exhibit 2.5

Cut Flower Exports

1983, 1985, and 1987



Source: UN Trade Matrices

million stems in 1989 and 843,000 stems in 1990.¹³ The most important cut flowers exported were ammi majus, anemones, carnations, chrysanthemums, irises, and statice. Further analysis of the data base would be required to calculate the value of exports for specific flowers by destination. A listing of quantity of cut flowers shipped by destination was done for 1988 and showed that most of the Tunisian cut flower exports in that year were to France, Belgium, the Netherlands, and Switzerland, in that order.

The comparison of Tunisia with Morocco is important since Morocco is a relatively newcomer to the cut flower export business and is a good example of the kind of market growth that Tunisia should likely expect. Also, Morocco is a "niche" producer, that is, it concentrates mostly on one product, roses, and one market, France. As an established exporter of roses to France, it is now in a position to expand to other markets and possibly produce other kinds of flowers. By concentrating on one or two flowers, and exporting to one or two markets, Tunisia can increase its chances for successfully entering the cut flower export business.

2.1.2 Important Importers of Cut Flowers

The value of world imports of cut flowers in 1985 and 1988 is shown in Exhibit 2.6, which indicates that West Germany is by far the most important importing country, followed by the United States and France. The U.S. share market of world imports of cut flowers declined in recent years, from 21.8 percent in 1985 to 14.6 percent in 1988, although the value of U.S. imports increased from \$283.6 million to \$367.4 million, or about 11 percent annually. Japan, the United Kingdom, and France made dramatic increases in their imports, increasing by 75.8, 46.2 and 42.9 percent per year on average between 1985 and 1988.

Except for Japan, the major importers of the world's cut flowers are located in Western Europe and North America. Exhibit 2.7 shows trends in market share for the top 4 importing countries between 1984 and 1988. Germany maintained between 35 and 40 percent of the world cut flower import market from 1984-1988, while the United States dropped from over 20 percent of the market share in 1984 and 1985 to just over 14 percent in 1987 and 1988. France's share of world imports increased steadily from 6.4 percent in 1984 to 9.6 percent in 1988. The Netherlands continued to hold around 5 percent of the market during those same years. The market share of other countries increased by about 25 percent from 1984 to 1988, from 28.3 percent to 35.6 percent of total world cut flower imports.

The major supplier of cut flowers to West Germany is the Netherlands, followed by Italy. West Germany's greatest import demand is for roses and carnations. The Netherlands is also the primary supplier of cut flowers to France, although the latter is also an important producer of cut flowers. Nevertheless, imports have grown substantially in the French market:

¹³ In 1987 and 1988 data were recorded only in kilos (converted to tons here), while in 1989 and 1990 data were recorded by kilograms, number of stems and bouquets. The category "bouquet" was used mostly for jasmine exports.

Exhibit 2.6

Value of World Imports of Cut Flowers by Country, 1985 and 1988.

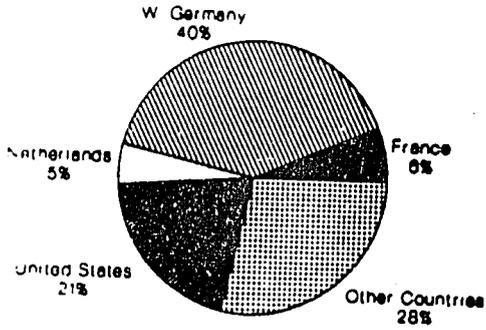
	1985		1988		Average Annual Growth
	Mil. \$	%	Mil. \$	%	
West Germany	516.0	39.9	881.2	35.0	+19.5%
United States	266.7	20.6	367.4	14.6	+11.3%
France	83.2	6.4	242.7	9.6	+42.9%
United Kingdom	73.7	5.7	230.3	9.1	+46.2%
Netherlands	61.8	4.8	130.7	5.2	+28.4%
Switzerland	63.3	4.9	127.4	5.1	+26.3%
Japan	18.8	1.5	102.1	4.0	+75.8%
Italy	22.9	1.8	81.2	3.2	+52.5%
=====					
Subtotal	1,106.4	85.6	2,163.0	85.8	+25.1%
Other countries	186.8	14.3	357.3	14.2	+24.1%
=====					
Total	1,293.2	100.0	2,520.3	100.0	+24.9%

Source: USDA, Floriculture and Environmental Horticulture Products, 1990.

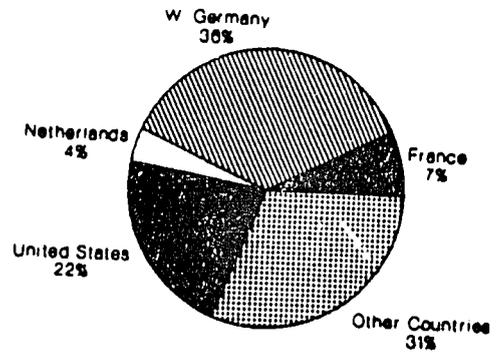
Exhibit 2.7

Value of World Imports of Cut Flowers and Market Share of the Top Four Importing Countries 1984-1988

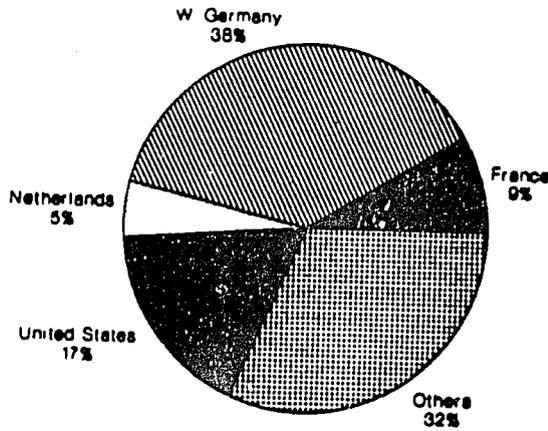
1984 Imports - \$1.29 Billion



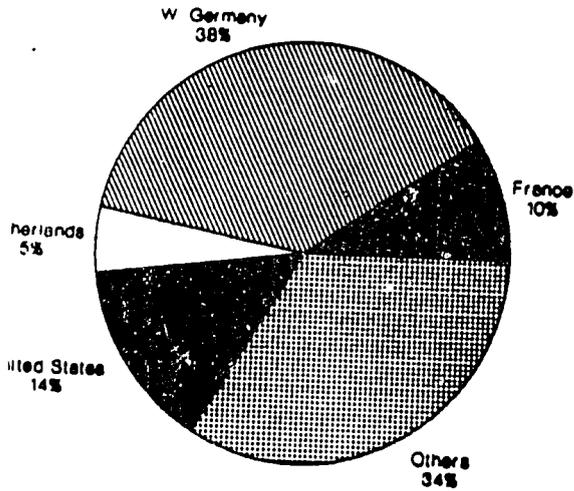
1985 Imports - \$1.30 Billion



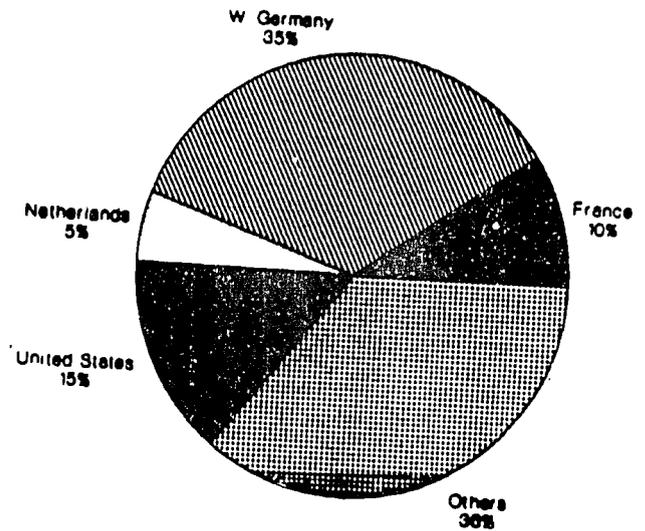
1986 Imports - \$1.74 Billion



1987 Imports - \$2.22 Billion



1988 Imports - \$2.52 Billion



They [imports] increased over the period 1981 to 1985 by as much as 62% by volume and 95% by value. There was a threefold increase in the volume and value of imports of roses, chrysanthemums, and orchids and a sevenfold increase in the volume of gladioli imports. Significant rises in the level of imports were also recorded for carnation and other flowers in terms of both volume and value. Although much of this increase is attributable to the Netherlands, there remain clear opportunities for developing country suppliers able to compete with the reliability of service and quality provided by traders in the Netherlands.¹⁴

The United States is the only major importer whose primary supply of cut flower imports is from a developing country, namely Colombia, which shipped \$175.6 million worth of cut flowers, or 62 percent of total U.S. imports of \$283.5 million in 1988. The Netherlands is the second most important supplier with \$63.6 million of U.S imports, or 22 percent of the market, followed by Mexico, Canada, Costa Rica, Israel, Ecuador, Peru, and Thailand with a total of \$32.7 million, or 11.5 percent.

Other countries that represent potentially lucrative markets are the United Kingdom and Switzerland. The United Kingdom has registered the greatest growth in its share of world imports, from \$73.7 million, or 5.7 percent of world imports in 1984, to \$230.3 million, or 9.1 percent in 1988. With the second highest per capita spending on cut flowers in the world after Japan,¹⁵ Switzerland is an important importer of roses and carnations, primarily from the Netherlands and Italy. The ITC report states, "In spite of strong competition, some developing countries have been successful in entering the Swiss market in recent years."¹⁶ Morocco, for example, has increased the value of its rose exports to Switzerland from \$95,000 in 1985 to \$669,000 in 1988.

2.2 Market Trends and Preferences

2.2.1 Consumer Preferences

One of the most important factors determining market demand for cut flowers is the celebration of special occasions, such as religious holidays. In France, for example, chrysanthemums are purchased for All Saints Day (November 1), all flowers for Christmas and New Year's, roses for Valentine's Day (February 14), lilies of the valley for May 1, and roses

¹⁴ ITC report, p. 68.

¹⁵ The Flower Council of Holland.

¹⁶ ITC, p. 201.

and other flowers for Mother's Day (last Sunday of May). The most popular cut flowers in France are roses, carnations, tulips, chrysanthemums, and gladioli, in that order¹⁷.

Winter demand for flowers tends to be very strong in other European countries also because of special occasion purchases. In the Netherlands, where per capita consumption is high, consumers purchase flowers year-round (especially chrysanthemums, followed by roses, carnations, freesias, and tulips) and often on impulse; however, as in other European countries, peak sales coincide with special occasions.¹⁸ In Germany, the most popular cut flowers are roses, followed by carnations, although the latter are losing popularity as consumers become interested in a wider selection of flowers.¹⁹

2.2.2 Market Trends for Roses and Carnations

Roses are the most important fresh cut flower traded in the world according to value. Import figures indicate that roses account for about 20 percent of the world cut flower imports of \$2.47 million. In the major markets of Europe and North America roses comprise almost half of retail sales of fresh flowers. Rose imports into Europe increased by 50 percent between 1981 and 1988. Imports into selected European countries in 1988 were as follows, according to data updated from the 1987 ITC report:

(Millions of U.S. dollars)

	Germany	Switzerland	U.K.	France	Netherlands
Roses	175.3	39.4	22.7	19.6	11.5
Carnations	89.0	37.4	18.9	3.5	2.2

In Germany, the preferred roses have big blooms and long stems; shades of red/pink are most popular, but demand for white and assorted pastels has recently risen. All colors of carnations and chrysanthemums are in demand. Many developing nations such as Colombia, Morocco, Ecuador, Guatemala, Kenya, and Brazil are important rose exporters to Europe. In the last seven years Morocco's rose exports have risen from less than \$.5 million per year to over \$6 million per year, a ten-fold increase.

¹⁷ L'Or Vert, No. 160, October 1990, p. 7.

¹⁸ ITC study, p. 148.

¹⁹ ITC Report, p. 24.

Carnations are the second most important flower traded in the world. Generally they are separated into two categories: standard carnations sold in bunches of 20 and spray (miniature) carnations which are packed 10 stems to the bunch.

Trade in both types of carnation is growing by about 20 percent per year. Much of the production is switching from Europe to developing nations, which can grow them less expensively due to more favorable climate conditions and less costly labor.²⁰ Colombia is a leading producer of high quality standard carnations, marketing the product to Europe, North America, and Japan. Over 20 percent of the flower imports in Sweden and Finland come from Colombia. Israel and Kenya are the top exporters of spray carnations to Europe.

Many of the European countries, such as Italy, are themselves large producers of carnations, but rely on Colombian imports for the most part from November through May. This seasonality is further sensitive to surges of demand prior to Christmas, Mother's Day, and other holidays. Growers must cooperate with their distributors in all phases of planning and guarantee cargo space on the airlines during these peak periods if they want to satisfy their clients' demands for flowers on important holidays.

2.2.3 Market Trends for Other Flowers

Other important traded cut flowers include chrysanthemums, tulips, orchids, gladioli, gypsophila, and gerbera. As indicated earlier, the best source of information on the world cut flower market is the ITC market study.²¹ However, it treats these flowers less comprehensively than roses, carnations, and chrysanthemums, although much useful information on imports, consumer preferences and market opportunities for specific flowers is included. For example, the ITC study notes gypsophila is becoming popular for bouquets in Switzerland and that the principal exporters are Israel, Peru, and Colombia, although opportunities for developing countries are limited due to increased production in southern Europe.²² The lack of up-to-date information on trends in cut flower consumption led the study team to examine the market for a limited number of specific flowers by interviewing importers and wholesalers of cut flowers in Paris.

²⁰ Carnation growing and packing is labor-intensive, particularly when an elastic rubber band is put on each bud. Because developing nations generally have comparative advantage in cost of labor, carnation growing has become a profitable export crop for them.

²¹ The ITC study presents for each of the seven major importing countries (a) general market data, characteristics, and opportunities, (b) product studies, and (c) selected addresses of importers and other organizations. In addition to roses and carnations, the market study focused on chrysanthemums, for which substantial information and data are provided (synthesized from national sources).

²² ITC Study, p.209.

2.3 The French Market

The principal production zones for cut flowers in France are the Côte d'Azur province along the southern coast of France and the area around Paris. Cut flower production in France is declining, a trend that has been attributed to three factors: traditional producers are getting older and their families are not taking over operations; obsolete facilities and equipment are costly to replace; and urbanization and increased land values make the opportunity cost of continued operations very high.²³ The area in flower production declined from 3,250 hectares in 1981 to 2,030 hectares in 1988, or over 35 percent.²⁴ Area in roses declined from 430 hectares in 1981 to 390 hectares 1988, and area in all major cut flowers also declined except for gladioli which increased from 360 hectares to 455 hectares, or almost one-fourth of total production area.

Exhibit 2.8 shows that imports of cut flowers in 1988 totaled FF 1.38 billion, of which FF 301 million went to roses, chrysanthemums, carnations, orchids, gladioli and tulips. French cut flower exports, on the other hand, totaled only FF 118.5 million, or less than one-tenth of imports.

Exhibit 2.8

France: Value of Imports and Exports of Fresh Cut Flowers and Cuttings, 1988
(in thousands of French Francs)

Flower	Imports	Exports
Roses	116.0	15.5
Chrysanthemums	81.4	0.6
Carnations	59.0	7.1
Orchids	33.8	0.2
Gladioli	8.3	0.7
Tulips	2.8	6.3
Subtotal	301.3	30.4
Other Flowers	1,080.4	88.1
Total	1,381.7	118.5

Source: Centre Français du Commerce Extérieur

²³ CNIH, L'Horticulture Française, Synthèse Economique, July 1990, p. 14.

²⁴ *Ibid.*, p. 19

The number of wholesalers of cut flowers totaled 680 in 1989,²⁵ with about one-third located at the Rungis Market in Paris.²⁶ Rungis is a public market, organized as a "Marché d'Intérêt National" and sales are made through privately negotiated contracts²⁷ in contrast with the auction system used in Nice and Ollioules, catering more to producers themselves. Because Rungis is a central distribution point located close to Orly Airport, it is the major market for French importers of cut flowers (although Nice also is an important port of entry for imported flowers). There are two kinds of importers, those who physically receive shipments of flowers and those who act only as brokers and rely exclusively on freight forwarders and transport companies. An executive for the largest importer of cut flowers at Rungis Market, Florimex, reported that they imported almost 100,000 boxes of cut flowers in 1989. Florimex has its own separate office and warehouse complex at Rungis. Another importer visited is located on the other side of Paris in suburban offices, which suits the firm because it does not physically handle flowers but only brokers sales. Another category of importer is the importer-wholesaler which takes part in both activities. Finally, there are wholesalers who never import although they may purchase from an importer.

The flower market at Rungis is located in warehouse C-1, a huge facility that houses the booths of between 75 to 100 wholesalers. Most wholesalers are very interested in discussing potential imports because they are always looking for new sources of flowers, especially high quality flowers. One interesting trend among French wholesalers is that they are targeting a growing "niche" market for high quality French flowers, especially roses, at premium prices. The increase on the market of lower-cost lesser quality imported roses has aroused the market for high-quality French roses, which French growers are actively promoting.

The import season is from September to mid-June, although some countries (Kenya and Thailand) start exporting around the end of August. The developing countries that are well-known at Rungis for their flowers include:

- Colombia: carnations and spray carnations
- Kenya: mini-carnations, statice, and astromeria
- Peru: gypsophila
- Morocco: roses (80 percent); mini-carnations (10-20 percent)

As discussed earlier, roses are the most important imported flower and the most popular flower in France. Popular red roses include first Vega and Samantha, and second, Madelon, Cardinale, Royal Red, and Red Success. Popular pink roses include Omega and Sonia. One

²⁵ Ibid., p. 27.

²⁶ As pointed out in the ITC Study (p. 66), one-third are in southern France at Nice, Antibes, Hyères, or Ollioules, and the remaining third are in Bordeaux, Lyon, Lille, and other locations.

²⁷ This is known in French as "gré à gré".

rose that is popular but not imported is Mme. Delbard. One wholesaler asserted that it is too expensive to import a 60 cm. rose that costs 70-75 FF CIF Rungis (per bunch of 20). This price can be contrasted with that of the Vega, as reported by one wholesaler: a 60 cm. "extra" quality is 48FF (per bunch of 20) in Morocco, 51FF CIF at Rungis to wholesalers, and 60FF at Rungis to retailers. Apparently, an expensive imported rose like Mme. Delbard would have to be of extremely high quality to compete well with French and European roses. Quality-price differentiation is very important and in Morocco different rose growers produce according to different quality standards. One wholesaler cited the price/quality differences among three growers she was importing from:

- Grower 1: 42FF/bunch of 20 for "1ere choix", 38FF for "2eme choix"
- Grower 2: 46FF/bunch of 20 for "extra" quality
- Grower 3: 48FF/bunch of 20 for "extra" quality

Price differences among flowers from different growers can be significant, as illustrated in the example above where a 10FF difference between growers 1's "2eme choix" and grower 3's "extra" flowers represents a discount of about 20 percent for lower quality. Demand for Moroccan roses was very strong at Rungis but they receive mixed reviews for quality. Several wholesalers indicated that Moroccan roses were actually flooding the market and that while in general quality was mediocre, a number of growers were able to regularly supply the market with roses of consistently excellent quality. One wholesaler said he worked with one Moroccan grower "like a partner," although they had no written contract. In fact, most of the importer-wholesalers indicated that they avoid taking equity positions in operations although they often develop close and long-term working relationships with growers. Tunisians would have to develop such relationships with wholesalers in order to successfully enter the market and in the sale of roses they would be competing directly with the Moroccans. However, other flowers could be good market opportunities for Tunisians.

Of the seven wholesalers interviewed, five mentioned that shortages of gladioli are common during the winter months, and two suggested outright that Tunisia might consider this to be a high potential "niche" export. Market demand would be strongest between November and April. Prices for gladioli at Rungis are expected to average around 30FF/bunch of 10, although anything less than top quality gets discounted heavily. A good balance of colors would be necessary (one wholesaler recommended an export mix for Tunisia of one-third each of red, salmon, and pink). At present, gladioli are produced in the "Midi" region of France, and the volume of imports is low because they are heavy relative to other flowers and therefore expensive to ship. Tunisia would have a geographic advantage over countries such as Morocco and Israel, both of which concentrate on producing other more profitable cut flowers.

Wholesalers on the French market are not familiar with Tunisian flowers because the number of flower shipments have been few. In their professional opinion, the potential for Tunisia lies in the ability of growers to supply quality merchandise at a reasonable price. Most felt that the best way to enter the market was to send a test shipment of probably between 5 and 10 cartons. All wholesalers emphasized the importance of quality and packaging of flowers for

successful sales and good prices on the French market. Prices for selected flowers at Rungis for 1990-91 as reported by wholesalers and importers are shown in Exhibit 2.9 converted from French Francs to Tunisian Dinars.

These prices are for "extra" quality flowers; in general, wholesalers expect top-grade quality flowers and discount heavily for quality problems. The wholesalers sell flowers to retailers with an added margin of about 30-40 percent above the C.I.F price, and retailers add a margin of about 25 percent.

Exhibit 2.9

1990-91 Prices of Selected Cut Flowers as Reported by Wholesales and Importers at Rungis Market in Paris in French Francs, Converted into Tunisian Dinars

	<u>C.I.F. Price</u>	<u>Unit Sold</u>	<u>C.I.F. Price Per Stem</u>
Carnations	15-17 FF	bunch of 10	1.5-1.7 (240-272 millimes)
Chrysanthemums	2.8-3.2 FF	per stem	2.8-3.2 (448-512 millimes)
Spray Carnations	6-10 FF	bunch of 10	0.6-1.0 (96-116 millimes)
Gladioli	30-35 FF	bunch of 10	3.0-3.5 (480-560 millimes)
Gypsophila	45-60 FF	bunch of 25	1.8-2.4 (288-384 millimes)
Liatrus	20 FF	bunch of 10	2.0 (320 millimes)
Roses			
40 cm	22-32 FF	bunch of 20	1.1-1.6 (176-256 millimes)
50 cm	32-40 FF	bunch of 20	1.6-2.0 (256-320 millimes)
60 cm	40-50 FF	bunch of 20	2.0-2.5 (320-400 millimes)
70 cm	50-60 FF	bunch of 20	2.5-3.0 (400-480 millimes)
80 cm	60-70 FF	bunch of 20	3.0-3.5 (480-560 millimes)
Statice	5 FF	bunch of 5	1.0 (116 millimes)
Strelitzia	6-7 FF	per stem	6.0-7.0 (960-1120 millimes)

3. TUNISIAN CUT FLOWER MARKETING SECTOR

The Tunisian cut flower marketing system is divided into two segments. The first consists of producers who grow flowers exclusively for the domestic market. The second consists of a small group (the study team identified five active enterprises)²⁸ who produce primarily for the export market but also sell on the domestic market. These "producer-exporters" have less than four years of experience with cut flower exports.

Floriculture production in Tunisia is largely limited to small-scale growers producing for the domestic market. The regions known for flower production are Mornag, Béjaoua, Sidi Thabet, Soliman, Manouba, Soukra, Bizerte, Cap-Bon, Sousse, and Djerba. The largest grower of flowers and ornamental plants in the country is the Bahri family who produce ornamentals for landscaping and are the primary supplier of flowers to the Tunis flower market. Little information is available on domestic production of cut flowers and ornamental plants. A draft paper prepared in late 1988 by the Division of Horticultural Crops in the Ministry of Agriculture reported 28.6 hectares in flower production and 50.6 hectares in ornamental plants. Of the 22 cut flower growers listed, 14 had less than one hectare in production, seven had between one and three hectares, and one had 10 hectares.

The growers do not fit a pattern or profile in terms of their background or reasons for entering flower production. Two growers (Bahri and Gandouz) are family operations that manage related agricultural enterprises (horticulture, floriculture, nursery production, sale of garden supplies, etc.) and that have established positions in the market. Some of the new growers are landowners interested in starting new agricultural ventures in order to make their land holdings more productive. One grower is part of a joint venture between a Tunisian construction contractor and a Swiss architect who saw flowers as an opportunity for a profitable enterprise. Another flower grower is a trained agronomist with substantial experience in agricultural production in general and a good knowledge of agronomic and cultural practices. One potential exporter of ornamental plants is an experienced technician who left a farm to start his own operation and has joined with a European partner.

While cut flowers and ornamental plants are sold throughout Tunisia (in over 100 retail locations in the Tunis area alone, according to one grower), the volume of exports continues to be very limited. Exhibit 3.1 provides basic information on growers who are either well established in the local market or have entered floriculture recently to capture the export market. Their location is shown on the map in Exhibit 3.2.

²⁸ These are HortiUtica, Société Taffeloune Flowers, Florasol, Azza Flowers, and Tunis Fleurs.

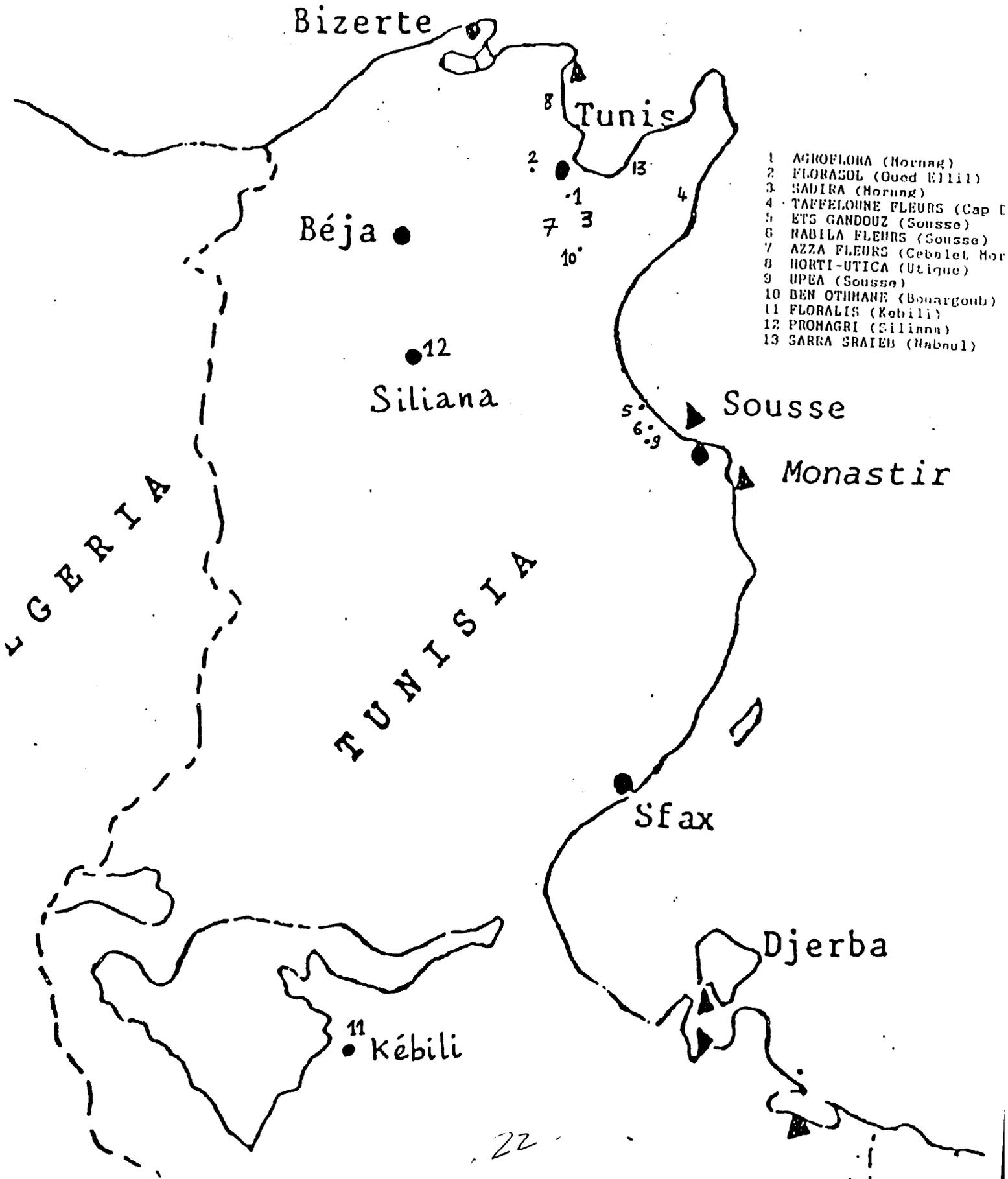
Exhibit 3.1

List of Selected Growers

Growers	Status	Size	Produce	Market	Address
Ets Bahri	Private (Tunisian)	Large (10+ha)	Flowers & Ornamentals	Local	Tunis Mornag
Ets Gandouz	Private (Tunisian)	Large (5ha)	Flowers & Ornamentals	Local	Chott Meriem
Taffeloune Fleurs	Private (Tunisian)	Large (10ha)	Flowers	Export	Nabeul
Florasol	Joint Venture	Medium	Flowers	Export	Oued Billi
Tunis Fleur	Joint Venture	Medium (3ha)	Flowers	Export Local	Chott Meriem
HortiUtica	Private (Tunisian)	Small (3ha)	Flowers & Eucalyptus	Local Export	Utica
Azza Fleurs	Private	Small	Dried Flowers	Export	
Floralis	Private	Small (1ha)	Flowers	Export	Kebili
UPA	Private	Small (Belgium)	Ornamentals (1ha)	Local	Chott Meriem

REPARTITION GEOGRAPHIQUE DES PROJETS DE FLORICULTURE

AGREES PAR L'A.P.I.A



Given the very small scale of Tunisian cut flower production and marketing, it is inaccurate to characterize either the domestic or export activities as a "system." The description in this chapter is based on contact with five of the six Tunisian cut flower exporters who have exported within the past four years.

3.1 Domestic Flower Marketing Sector

Two major producers, Ets. Bahri (Agro Flora) and Gandouz Fleurs, dominate the domestic flower marketing sector. Their principal clients are tourist hotels, restaurants, embassies and retailers in Tunis. The market chain is short. The producers establish contracts with institutional buyers for certain quantities per week or month. Ets. Bahri (Agro Flora) and Gandouz supply the major retail flower markets in Tunis several times a week. In addition to these deliveries, retail sellers often drive to the farmgate to purchase flowers from smaller producers. Some retailers also have their own family farms where they grow flowers to sell in their stalls. They supplement their own production with small purchases from Gandouz or Bahri. From time to time export-oriented producers sell excess or second quality flowers directly to retailers in Tunis.

Retail prices on the Tunis market are about the same as in Europe, with roses selling from 500m to 1 DT each.²⁹ Other types such as dahlias, carnations, and lilies sell for 300m to 700m each. Since all retailers buy from the same producers, the domestic wholesale market has little or no price competition. Most flower stalls have the same variety of flowers. The only major differences among stalls appear to be in the quality and elaborateness of the displays. The quality of flowers varies greatly even within individual bunches. It is not uncommon to see diseased or wilted roses or dahlias in the same bucket as fresh and healthy ones.

High retail prices probably result from very uneven demand coupled with the high perishability of the product. Retailers buy on consignment from the wholesaler/producer. It appears that this system depends on strong personal relationships between the retailer and the wholesaler. This is probably a thin market which depends on purchases for marriages and other special events for the bulk of its sales. Though the number of Tunis retailers has increased in the past five years (from 10 in 1985 to 27 in 1990 according to one retailer), producers do not see the domestic market as a source of significant growth in the future.

The growing cut flower export sector may have some effect on the domestic market. Several new Tunisian flower exporters are selling on the local market as part of their start-up strategy. The experimental nature of most export-oriented enterprises means that these producers have second quality flowers which they sell locally. For example, in the case of strelitzias, a plant which takes several years to reach export quality production, the local market is an attractive alternative. Likewise, after the end of the European export season in May, other exporters may have supplies which they sell locally.

²⁹ A 40 cm red rose sells for between 2.5 to 5 francs per flower.

The highest domestic demand occurs at the end of the year (December 1 - January 15) and during tourist season (March 15 - October 15). The only off-peak seasons, therefore, are January 15 - March 15 and October 15 - December 1.³⁰ The capacity of the domestic market to absorb new supplies of cut flowers is simply not well understood since it has not been studied.

3.2 Operation of the Cut Flower Export Sector

As noted earlier, the Tunisian cut flower export sector is very small. In 1990 only five producer/exporters exported flowers, none of whom had been in this business in 1986. Tunisia is in an early phase in the development of a full-scale cut flower marketing system. Thus, a description of how the cut flower production and marketing system operates is really an analysis of how five entrepreneurs have attempted to enter this highly competitive and risky international market. This section will cover input purchasing, production strategies, postharvest handling practices, transport and marketing, and sales strategies.

3.2.1 Input Purchases

Input purchases can be divided into two categories: those specific to cut flower production, such as seeds, bulbs, and special plows, and those used in other agricultural enterprises. Almost all inputs in the first category must be imported from Europe, while most of the latter are available from local manufacturers.

Most Tunisian growers depend on their European contacts to select and arrange for their imports of inputs. Growers complain of time-consuming import procedures, particularly those which expose bulbs to excessive heat. The reduction or elimination of import duties on these commodities would be an important step in facilitating essential imports. It appears that despite some bottlenecks at customs, all growers are able to import what they need, though they pay high unit costs because of the small quantities they purchase.

Whenever possible, growers use locally available materials to construct improvised elements of their flower production and processing operations. Drip irrigation systems have been modified for specific varieties of flowers, low cost drying methods have been adopted, and rainwater collection systems have been built to provide salt-free water. The unavailability of locally produced inputs has not been cited as a constraint.

3.2.2 Production Strategies

Tunisian growers depend heavily on their European buyer or partner to advise them on what types of flowers to grow. Each enterprise contacted was involved in experimenting with a variety of flowers. The experimental nature of their production strategies cannot be

³⁰ European Floral Market, p.17.

overemphasized. These growers and their European colleagues are searching for flowers which: (a) are in high demand in Europe, (b) are suitable for Tunisian climatic and soil conditions, and (c) can be harvested during the European counter-season.

Production strategies are also tied to such factors as labor requirements, infrastructure needs (greenhouses or open air production), farming practices (weeding, tying, pruning), and training requirements for the growers and their workers. Most growers obtain periodic technical advice from specialists who are identified, and sometimes paid for, by their European contacts. It is clear, however, that Tunisian growers currently involved in cut flower export production are learning by doing, with the concomitant successes and failures.

The wide variety of flowers which Tunisians are growing for export is noteworthy. They range from roses, which require sophisticated production techniques in greenhouses, to gypsophila, a filler flower for bouquets which grows relatively easily in open air. Some of the growers report that their flowers were well received on the European market, an indication that with the proper quality control, Tunisian growers are capable of producing marketable flowers. Tunisian growers' willingness to experiment with new varieties is a real strength at this stage.

The principal production constraints are also tied to the experimental nature of the sector. Few of the Tunisian growers have acquired technical know-how and experience to be considered expert in the production of any one flower. The reliance on periodic technical assistance from expatriates is a short-term solution. Although there appears to be a group of well-trained Tunisian horticulturalists, their knowledge of cut flower production is more theoretical than practical. The Tunisian growers need assistance in managing their irrigation systems, making planting decisions, undertaking plant protection measures, and applying fertilizer.

A second problem concerns the training and competence of workers. No Tunisian laborers have more than three years of experience in the care and maintenance of cut flowers. In most cases this lack of an experienced labor force is exacerbated by the seasonal, transient nature of the work. As a result, growers incur high costs in time and resources in the process of training and supervising their workers.

3.2.3 Marketing Strategies

Export marketing strategies are closely tied to the type and level of foreign involvement in the flower growing enterprises. At the present stage of the export flower sector growers rely greatly on their European partners or contacts to market their production. In most cases this involves the guaranteed sale of all production at a price fixed at the beginning of the planting season. This appears to be a useful way for Tunisian growers to share risk. This strategy reflects the realities of efforts to break into a new market with which Tunisian growers are not familiar. They have neither the time nor the resources to seek out European markets on their own.

The difficulties facing a Tunisian producer/exporter who has no European partner are illustrated by the case of a Tunisian enterprise which had a falling out with its two European partners over payment for earlier deliveries. This dispute over payments that were late and lower than expected has threatened the viability of the largest Tunisian flower exporter. Faced with what appeared to be irreconcilable differences, the Tunisian firm had to arrange for sales contacts in Europe on its own. The principal problem of this approach is that production decisions (i.e. what type and variety to grow) were not linked to the market. As a result, the firm ended up selling to a number of buyers, which in turn exacerbated the task of meeting varying quality and packing standards.

This case also illustrates the importance of mutual interest between the producer and the buyer. Since most Tunisian growers know little or nothing about the operation of the European flower market, they must rely on their buyer/partner to make critical decisions regarding planting time, colors of varieties, and packing and quality standards. One Tunisian firm lost an entire year's production of gypsophila because it planted two weeks too late and missed the critical Easter market. The grower cited the incident as an example of the learning process that he and his European buyer were experiencing. He now knows the exact growing period for gypsophila and expects to hit the market right on time this year. Although the grower asserted that his loss was the result of his buyer's poor judgment, he had enough confidence in the relationship to not only try again, but to expand production for the coming year.

Cut flower export marketing strategies are fluid. Several growers are admittedly in an experimental stage, trying different varieties, production systems, and marketing arrangements. For example, one grower lost two hectares of carnations from rain damage because he did not grow them under plastic cover. As a group, Tunisian growers suffer from a lack of information about new trends in the European flower market. The preliminary research on the French flower market is a starting point for more extensive study on market entry strategies. In time, it is important for Tunisian growers to consolidate their efforts and develop a coherent marketing strategy based on market information identifying the best varieties and markets for Tunisian production.

3.2.4 Transport

Because of the low volume of Tunisian cut flower exports, the transport industry (air and sea) has not adapted its operations to accommodate the special needs of flower exporters. Tunis Air lists flower shipments in a miscellaneous category because they make up such a small percentage of the airline's cargo. The quantities exported have not yet reached a level where grower/exporters have the leverage to demand the services needed to protect their investments. According to some growers, airlines other than Tunis Air refuse flower shipments because flowers have a high volume to low weight ratio which makes them a low profit cargo. Tunis Air which flies 727s with limited cargo space, sometimes has to cancel cargo shipments in April and May because planes are full of tourists and their baggage. Uncertainty and limited cargo space characterize air transport conditions for flower exporters.

Airline freight capacity is already a periodic problem. If Tunisia is to become a major flower exporter, then new shipping arrangements will have to be developed. Though there are as many as 30 daily flights to Europe from Tunis alone, the number of flights and the cargo capacity available to important flower markets such as the Netherlands is limited (e.g. one Tunis Air flight and two KLM flights per week). The timing of the flight also needs closer examination. Ideally flowers should be loaded at night and flown during the coolest part of the day, reaching the European market early in the morning before flower markets open. Passenger flights from Tunisia do not meet this timing criterion.

One Tunisian grower has experimented with sea shipments from Tunis to Marseilles. In 1988 this grower shipped 21 refrigerated semitrailer truckloads (capacity 60m³) to France. However, he no longer ships by sea and uses his expensive refrigerated trucks to deliver flowers to the Tunis airport. It appears that sea shipment may be too slow (24-36 hours) to ensure high quality standards.

The extremely high perishability of flowers places a premium on well coordinated customs, plant inspection, and loading procedures. Since flower exports began so recently, Tunis Airport has no system that is specifically designed for flower shipment. Some of the missing elements are infrastructural, such as the lack of a cold storage facility. Others involve the timing and coordination of loading and unloading flowers so that they spend the absolute minimum time on the tarmac or in the plane. Administrative procedures need to be streamlined and routinized.

4. FINANCIAL ANALYSIS OF PRODUCING CUT FLOWERS FOR EXPORT IN TUNISIA

Analysis using crop budgets based on best estimates shows that under a variety of price, yield, and cost scenarios, roses and gladioli remain profitable, while carnations require higher yields or prices to be profitable. The reliability of this analysis for individual producers hinges on their ability to produce and ship high quality, as calculations assume that producers actually paid full price for 80 percent of production, with the rest lost in transit or to shrinkage. While there are risks due to their relatively new experience in flower exports, and high initial investment of 67,000 DT/ha, the potential of returns approaching 200 percent for roses and 100 percent for gladioli is extremely attractive.

This chapter presents enterprise budgets for three important cut flowers--roses, carnations, and gladioli--in order to assist growers in analyzing factors affecting the profitability of producing alternative crops in their own operations. The enterprise budgets for each flower include (1) production and revenue estimates based on planting density, yield and producer prices, and (2) cost estimates based on input requirements specific to each flower and fixed costs for a three-hectare operation. These budgets can help growers organize and plan the appropriate combination of crops. The objective of the analysis was not to calculate actual cost figures representative of a particular group of growers but rather to help growers understand the factors affecting costs and possibly construct budgets for their own operations. Growers may have difficulty estimating their costs due to:

- Absence of published recommended input requirement guidelines on cut flower production,
- Inexperience with cost calculation methods, and
- Lack of good records.

The enterprise budgets are calculated under three yield scenarios--low, medium, and high--so that growers can compare how varying yields affect the profitability of different crops. The budgets are not precise estimates of production costs which require detailed farm survey work beyond the scope of this study. To compensate for data limitations and account for uncertainty in price and yield assumptions, a sensitivity analysis was undertaken to show how net revenue is affected by changes in prices and yields. The range of estimates formulated here represent an attempt to provide growers with a better idea of what quantities of flower production must be sold at different price levels to remain profitable. Cash flow analyses based on the enterprise budgets are presented for each flower under low-medium-high yield scenarios in order to demonstrate the return on investment.

The three types of analyses outlined above can be used by growers to help them determine what to grow. Other factors that influence production decisions among Tunisian

growers are their experience in previous years, their willingness to experiment with new flowers, and their knowledge of what the European market will purchase (often this information is provided by European partners or buyers). Tunisia does not have a particular flower or set of flowers that distinguish it in the market (unlike Morocco which is known for its roses). Flowers exported by Tunisian growers in the past few years include carnations, chrysanthemums, gladioli, gypsophila, irises, roses, strelitzia, and statice. However, relative to other countries, the quantities have been too small for Tunisia to be considered a flower exporter.

The important issue for Tunisians is how to enter into large-scale and profitable production for export. What flowers should growers produce for export and how can they select among the hundreds of varieties of different flowers? Many new varieties are introduced each year on the export market. It is important for growers to monitor trends in demand for certain varieties since like most commercial products, flower varieties have product life cycles that (in the case of roses) last approximately 10 years. While some of the rose varieties that are grown in Tunisia are still popular on the French market, many of the newly popular flowers are not.

Once a grower has determined which varieties are popular in the market, he or she must ensure that they are suited to the Tunisian environment. Testing is an important way a grower can help guarantee successful production of a particular flower. For example, many hundreds of spray carnation varieties are purchased by the major flower markets. However, they tend to be quite sensitive to soil and micro climates which affect their productivity, making it incumbent on the grower to test them on the farm before going into large-scale production. Growers can then test the market with a sample of their test production to determine whether or not they are meeting standards.

One wholesaler at Rungis market in Paris received a test shipment of strelitzia from Tunisia which he said did not meet the standards of the French market. He suggested that it would be difficult for Tunisia to sell strelitzia because of the extremely high quality of production in France and other countries. Quality is a critical factor in the flower business because the discounting is heavy on flowers that are slightly less than "extra" or "super" quality. Practically speaking, there is no secondary market for medium or poor quality flowers because they simply cannot be sold. Therefore, quality is of utmost importance; there is no market "niche" for low-cost, low-quality flowers. The enterprise budgets illustrate how yield, price, and cost factors affect the profitability of operations producing quality flowers.

4.1 Enterprise Budgets for Roses, Carnations, and Gladiola

In order to analyze the costs and returns of cut flower export production, enterprise budgets³¹ for roses, carnations and gladioli were prepared based on interviews with growers, cost estimates obtained from unpublished production guidelines and private sector operators, and

³¹ A detailed explanation of assumptions used to calculate production/revenue and costs are given in Annex 2.

price information gathered in the Rungis market in Paris. A summary of the results of the analysis shown in Exhibit 4.1 reveals that cut flower production for export can be potentially very profitable, assuming that high yields of quality flowers are obtained, losses in transit are minimized, and flowers arrive on the market in a timely manner. The value of production and net revenue for low-medium-high production scenarios are given for each flower, based on yield estimates minus 20 percent for shrinkage and losses in transit.

Initial investment costs for cut flower export production are about 201,100 DT, or about 67,000 DT per hectare not including land for a model three-hectare Tunisian farm. These are shown as the depreciation line item in the enterprise budget analysis and are assumed for purposes of this analysis to be the same for all three flowers studied. Of the variable costs, the most significant cost item was for cuttings, bulbs, and seeds. Carnations appear to be the least profitable enterprise probably due to the proportionate costs of cuttings which come to 75 percent of variable costs (including labor) and about 60 percent of total costs per hectare.

Under the medium yield assumption, net revenues per hectare for roses are 26,602.9 DT, while gladiolas show 7,805.3 DT, and carnations actually show a loss of 667.1 per hectare. Per stem, the gross margin for roses is 59 millimes, while carnations show a slight negative margin of 1 millime. This can be attributed to the fact that while costs per stem sold under a medium yield assumption are relatively close between the two flowers (141 millimes per rose and 121 millimes per carnation), prices received for roses are greater than for carnations. The gross margin for gladiola is 26 millimes per stem, under the medium yield scenario. Under the high yield scenario, the gross margin per hectare is highest for roses at 52,852.9 DT, followed by 17,555.3 DT per hectare for gladiola and 12,232.9 for carnations.

Exhibit 4.2 displays the results of a sensitivity analysis which illustrates how net revenues are affected by changes in price and yield. For example, a 20% decrease in rose prices (from 200 to 160 millimes per stem) results in almost 70% reduction in net revenue (from 26,602 to 8,602 DT) under the medium yield scenario. The profitability of various combinations of prices and yields is emphasized by this type of analysis. Raising yields from low to medium for roses has tremendous impact on net revenue (e.g., from 352 DT per hectare for low yield to 26,602 DT for medium yield at 220 millimes per stem).

The sensitivity analysis shows that roses have a positive net revenue on all but one price and yield combination - low yield at 160 millimes per stem. Carnations, on the other hand, have positive net revenue under only three combinations - high yield at 120 and 144 millimes per stem and medium yield at 144 millimes per stem. In the case of gladiola, net positive revenue is achieved at all yield levels when the price is above 300 millimes.

Several conclusions can be drawn from this analysis. First, roses and gladiola can be profitable enterprises under a variety of conditions. Secondly, carnations are unlikely to be a profitable enterprise except under the best price and yield conditions. Finally, growers must be

Exhibit 4.1

Summary Enterprise Budgets
Scenarios, Per Hectare, 1990-1991 Season

Carnations	Low	Medium	High
Yield (Stems/m2)	32.0	32.0	32.0
Producer Price/stem	0.120	0.120	0.120
Value of Prod. (DT/ha)	86400.0	115200.0	129600.0
Total Variable Costs	79594.1	82594.1	84094.1
Total Fixed Costs	33273.0	33273.0	33273.0
Total Costs Per Ha (DT)	112867.1	115867.1	117367.1
Net Revenue/ha	-26467.1	-667.1	12232.9
Gross Margin (DT/Plant)	-0.037	-0.001	0.011
Gladiolus	Low	Medium	High
Yield (Stems/m2)	40.0	50.0	60.0
Producer Price/stem	0.300	0.300	0.300
Value of Prod. (DT/ha)	72000.0	90000.0	108000.0
Total Variable Costs	36571.8	44821.8	53071.8
Total Fixed Costs	33623.0	33623.0	33623.0
Total Costs Per Ha (DT)	70194.8	78444.8	86694.8
Net Revenue/ha	1805.2	11555.2	21305.2
Gross Margin (DT/Plant)	0.008	0.039	0.059
Roses	Low	Medium	High
Yield (Stems/m2)	50.0	75.0	100.0
Producer Price/stem	0.200	0.200	0.200
Value of Prod. (DT/ha)	60000.0	90000.0	120000.0
Total Variable Costs	33024.1	36774.1	40524.1
Total Fixed Costs	26623.0	26623.0	26623.0
Total Costs Per Ha (DT)	59647.1	63397.1	67147.1
Net Revenue/ha	352.9	26602.9	52852.9
Gross Margin (DT/Stem)	0.001	0.059	0.088

Exhibit 4.2

Sensitivity Analysis of Net Revenue Per Hectare
for Roses Using Different Price-Yield Assumptions

Producer Price (DT)	DT Per Ha. for Each Yield Scenario		
	LOW	MEDIUM	HIGH
160 MILLIMES PER STEM	-11647.1	8602.9	28852.9
200 MILLIMES PER STEM	352.9	26602.9	52852.9
240 MILLIMES PER STEM	12352.9	44602.9	76852.9

Sensitivity Analysis of Net Revenue Per Hectare
for Carnation Using Different Price-Yield Assumptions

Producer Price (DT)	DT Per Ha. for Each Yield Scenario		
	LOW	MEDIUM	HIGH
96 MILLIMES PER STEM	-43747.1	-23707.1	-13687.1
120 MILLIMES PER STEM	-26467.1	-667.1	12232.9
144 MILLIMES PER STEM	-9187.1	22372.9	38152.9

Sensitivity Analysis of Net Revenue for Gladiola
Using Different Price-Yield Assumptions

Producer Price (DT)	DT Per Ha. for Each Yield Scenario		
	LOW	MEDIUM	HIGH
240 MILLIMES PER STEM	-12594.7	-6444.7	-294.7
300 MILLIMES PER STEM	1805.3	11555.3	21305.3
360 MILLIMES PER STEM	16205.2	29555.2	42905.2

extremely concerned with quality (both in terms of the type of flower grown and postharvest handling) because a 20% discount in price for poor quality can have catastrophic consequences for profitability.

4.2 Cash Flow Analysis

Exhibit 4.3 shows cash-flow analyses³² for all three types of flowers under low-medium-high yield scenarios and average price assumptions. Estimates of capital investment costs and operating expenditures are estimated based on the figures presented in the enterprise budgets. Cash inflows are the projected revenues (using constant prices) over a 15-year period assuming that 80 percent of production is actually sold. Cash outflows include the initial investment of 201,100 DT, plus replacement costs in later years. The incremental net benefit represents the working capital before financing is considered. The estimates of loan receipts and financing requirements show how much the grower is expected to borrow (100,000 DT in this case), and what the repayment schedule (debt service) is expected to be given an interest rate of 9.5 percent. It is assumed here that the grower will provide about one-half of the initial investment costs (100,000 DT) and finance future capital investments with working capital generated, as represented by the incremental net benefit after financing.

Even under low yield scenarios, positive cash flows are registered for roses and gladiola but not for carnations which show a negative internal rate of return of 23.8 percent. Positive rates of return are shown for all flowers under the medium and high yield scenarios. The highest internal rate of return is for roses, 196.9 percent under the high yield scenario, while gladiola show a 96.1 percent with high yields. Overall, therefore, the return on capital investment in flower production appears to be high under these simplified models. However, much caution should be exercised in drawing conclusions from these. First, while exporting cut flowers appears to be a very profitable enterprise, there are substantial short-term capital requirements. More importantly, as emphasized earlier in this report, flowers must be carefully packed and shipped, and need to arrive at the wholesalers in excellent condition. This requires a considerable degree of experience, expertise, and reliance on a smoothly functioning infrastructure. Timing is critical and shipping delays can result in disastrous losses to growers. Finally, the analysis reflects a simplified model of existing production systems, and more farm survey work should be done, especially of agronomic practices, to render a more rigorous investment analysis.

³² The format used draws mostly on J. Price Gittenger's Economic Analysis of Agricultural Projects, Chapter 4.

CASH FLOW ANALYSIS FOR CARNATION PRODUCTION, LOW YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0
Price	DT/stem	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
Value of Total Production	1000 DT/farm	0.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0	378.0
Production Sold (80% of Total)	1000 DT/farm	0.0	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4	302.4
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3	277.3
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	25.1	1.1	22.1	1.1	-37.0	-1.9	-4.9	1.1	22.1	-31.0	25.1	-1.9	25.1	1.1
FINANCING																
Interest Rate		9.5%														
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	9.1	-14.9	6.1	-14.9	-53.0	-17.9	-20.9	-14.9	6.1	-47.0	25.1	-1.9	25.1	1.1

Internal Rate of Return	-23.8%
-------------------------	--------

(1) Capital Investment (1000 DT)	Life of Product	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1					17.1				
Greenhouses																
-Frames	15 years	81.0														
-Plastic	2 years	24.0		24.0		24.0		24.0		24.0		24.0		24.0		24.0
-Accessories	3 years	3.0			3.0			3.0			3.0			3.0		
Machinery & Implements	5 years	30.0					30.0									
Packing/Cooling Rooms	7.5 years	30.0							30.0							
Vehicles	5 years	15.0					15.0					15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on enterprise budgets.

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0
Price	DT/stem	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
Value of Total Production	1000 DT/farm	0.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0	432.0
Production Sold (30% of Total)	1000 DT/farm	0.0	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6	345.6
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3	286.3
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	59.3	35.3	56.3	35.3	-2.8	32.3	29.3	35.3	56.3	3.2	59.3	32.3	59.3	35.3
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	43.3	19.3	40.3	19.3	-18.8	16.3	13.3	19.3	40.3	-12.8	59.3	32.3	59.3	35.3

Internal Rate of Return 73.7%

(1) Capital Investment (1000 DT)	Life of Product	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1									
Greenhouses:												17.1				
-Frames	15 years	81.0														
-Plastic	2 years	24.0														
-Accessories	3 years	3.0		24.0				24.0			24.0			24.0		24.0
Machinery & Implements	5 years	30.0			3.0			3.0			3.0			3.0		3.0
Packing/Cooling Rooms	7.5 years	30.0					30.0									
Vehicles	5 years	15.0							30.0							
							15.0					15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

CASH FLOW ANALYSIS FOR CARNATION PRODUCTION, HIGH YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
Price	DT/stem	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
Value of Total Production	1000 DT/farm	0.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0	486.0
Production Sold (80% of Total)	1000 DT/farm	0.0	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8	388.8
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8	290.8
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	98.0	74.0	95.0	74.0	35.9	71.0	68.0	74.0	95.0	41.9	98.0	71.0	98.0	74.0
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	82.0	58.0	79.0	58.0	19.9	55.0	52.0	58.0	79.0	25.9	98.0	71.0	98.0	74.0

Internal Rate of Return	68.8%
--------------------------------	--------------

(1) Capital Investment (1000 DT)	Life of Product	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1									
Greenhouses:												17.1				
-Frames	15 years	81.0														
-Plastic	2 years	24.0		24.0		24.0		24.0		24.0						
-Accessories	3 years	3.0			3.0			3.0			24.0		24.0		24.0	24.0
Machinery & Implements	5 years	30.0					30.0				3.0			3.0		
Packing/Cooling Rooms	7.5 years	30.0														
Vehicles	5 years	15.0					15.0			30.0						
												15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

Units	YEARS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
CASH INFLOW																
Yield	stems/m ²	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
Price	DT/stem	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	
Value of Total Production	1000 DT/farm	0.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	
Production Sold (80% of Total)	1000 DT/farm	0.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7	117.7
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	62.3	34.3	59.3	38.3	0.2	35.3	32.3	38.3	59.3	6.2	62.3	35.3	62.3	34.3
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	46.4	22.4	43.4	22.4	-15.7	19.4	16.4	22.4	43.4	-9.7	62.3	35.3	62.3	34.3

Internal Rate of Return	27.4%
-------------------------	-------

(1) Capital Investment (1000 DT)	Life of Product	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1														
Greenhouses							17.1					17.1				
-Frames	15 years	81.0														
-Plastic	2 years	24.0														
-Accessories	3 years	3.0		24.0		24.0		24.0		24.0		24.0		24.0		24.0
Machinery & Implements	5 years	30.0			3.0			3.0			3.0			3.0		
Packing/Cooling Rooms	7.5 years	30.0					30.0									
Vehicles	5 years	15.0							30.0							
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

CASH FLOW ANALYSIS FOR ROSE PRODUCTION, MEDIUM YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Price	DT/stem	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
Value of Total Production	1000 DT/farm	0.0	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5
Production Sold (80% of Total)	1000 DT/farm	0.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9	128.9
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	141.1	117.1	138.1	117.1	79.0	114.1	111.1	117.1	138.1	85.0	141.1	114.1	141.1	117.1
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	125.2	101.2	122.2	101.2	63.1	98.2	95.2	101.2	122.2	69.1	141.1	114.1	141.1	117.1

38

Internal Rate of Return **115.3%**

(1) Capital Investment (1000 DT)	Life of Product	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1									
Greenhouses												17.1				
-Frames	15 years	81.0														
-Plastic	2 years	24.0		24.0		24.0		24.0		24.0						24.0
-Accessories	3 years	3.0			3.0			3.0			3.0				3.0	
Machinery & Implements	5 years	30.0					30.0									
Packing/Cooling Rooms	7.5 years	30.0								30.0						
Vehicles	5 years	15.0					15.0					15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Price	DT/stem	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
Value of Total Production	1000 DT/farm	0.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
Production Sold (80% of Total)	1000 DT/farm	0.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2	140.2
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	219.8	195.8	216.8	195.8	157.7	192.8	189.8	195.8	216.8	163.7	219.8	192.8	219.8	195.8
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	203.9	179.9	200.9	179.9	141.8	176.9	173.9	179.9	200.9	147.8	219.8	192.8	219.8	195.8

Internal Rate of Return	196.9%
-------------------------	--------

(1) Capital Investment (1000 DT)	Life of Product	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1					17.1				
Greenhouses:																
-Frames	15 years	81.0														
-Plastic	2 years	24.0														
-Accesories	3 years	3.0	24.0													
Machinery & Implements	5 years	30.0			3.0	24.0		24.0		24.0		24.0		24.0		24.0
Packing/Cooling Rooms	7.5 years	30.0					30.0							3.0		
Vehicles	5 years	15.0					15.0		30.0							
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

CASH FLOW ANALYSIS FOR GLADIOLA PRODUCTION, LOW YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Price	DT/stem	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Value of Total Production	1000 DT/farm	0.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0
Production Sold (80% of Total)	1000 DT/farm	0.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5	151.5
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	64.5	40.5	61.5	40.5	24	37.5	34.5	40.5	61.5	8.4	64.5	37.5	64.5	40.5
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	48.6	24.6	45.6	24.6	-13.5	21.6	18.6	24.6	45.6	-7.5	64.5	37.5	64.5	40.5

Internal Rate of Return	30.0%
-------------------------	-------

(1) Capital Investment (1000 DT)	Life of Product															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1														
Greenhouses							17.1					17.1				
-Frames	15 years	81.0														
-Plastic	2 years	24.0		24.0		24.0			24.0		24.0					
-Accessories	3 years	3.0			3.0			3.0			3.0		24.0		24.0	24.0
Machinery & Implements	5 years	30.0					30.0				3.0			3.0		
Packing/Cooling Rooms	7.5 years	30.0														
Vehicles	5 years	15.0					15.0			30.0						
												15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

SCENARIO 1: HIGH YIELD FOR GLADIOLA PRODUCTION, MEDIUM YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Price	DT/stem	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Value of Total Production	1000 DT/farm	0.0	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5	337.5
Production Sold (80% of Total)	1000 DT/farm	0.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	93.8	69.8	90.8	69.8	31.7	66.8	63.8	69.8	90.8	37.7	93.8	66.8	93.8	69.8
FINANCING																
Interest Rate	9.5%															
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	77.8	53.8	74.8	53.8	15.7	50.8	47.8	53.8	74.8	21.7	93.8	66.8	93.8	69.8

Internal Rate of Return 64.1%

(1) Capital Investment (1000 DT)	Life of Product	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1					17.1				
Greenhouses:																
--Frames	15 years	81.0														
--Plastic	2 years	24.0		24.0		24.0		24.0		24.0		24.0		24.0		24.0
--Accessories	3 years	3.0			3.0			3.0			3.0			3.0		
Machinery & Implements	5 years	30.0					30.0							3.0		
Packing/Cooling Rooms	7.5 years	39.0							30.0							
Vehicles	5 years	15.0					15.0					15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

CASH FLOW ANALYSIS FOR GLADIOLA PRODUCTION, HIGH YIELD SCENARIO, 3 HECTARE FARM

	Units	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH INFLOW																
Yield	stems/m ²	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Price	DT/stem	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Value of Total Production	1000 DT/farm	0.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0	405.0
Production Sold (80% of Total)	1000 DT/farm	0.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0	324.0
CASH OUTFLOW																
Capital Investment (1)	1000 DT/farm	200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0
Operating Expenditures (2)	1000 DT/farm	0.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0	201.0
INCREMENTAL NET BENEFIT																
Before Financing	1000 DT/farm	-200.1	123.0	99.0	120.0	99.0	60.9	96.0	93.0	99.0	120.0	66.9	123.0	96.0	123.0	99.0
FINANCING																
Interest Rate		9.5%														
Loan Receipts	1000 DT/farm	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt Outstanding	1000 DT/farm	100.0	93.6	86.5	78.8	70.4	61.2	51.0	40.0	27.8	14.5	0.0	0.0	0.0	0.0	0.0
Debt Service	1000 DT/farm		15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	0.0	0.0	0.0	0.0
Net Financing	1000 DT/farm	100.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	0.0	0.0	0.0	0.0
Annual Interest Payment			9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.8	2.6	1.4				
INCREMENTAL NET BENEFIT																
After Financing	1000 DT/farm	-100.1	107.1	83.1	104.1	83.1	45.0	80.1	77.1	83.1	104.1	51.0	123.0	96.0	123.0	99.0

Internal Rate of Return	96.1%
-------------------------	-------

(1) Capital Investment (1000 DT)	Life of Product	YEARS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Irrigation System	5 years	17.1					17.1					17.1				
Greenhouses:																
--Frames	15 years	81.0														
--Plastic	2 years	24.0		24.0		24.0		24.0		24.0		24.0		24.0		24.0
--Accessories	3 years	3.0			3.0			3.0			3.0			3.0		
Machinery & Implements	5 years	30.0					30.0							30.0		
Packing/Cooling Rooms	7.5 years	30.0								30.0						
Vehicles	5 years	15.0					15.0					15.0				
TOTAL		200.1	0.0	24.0	3.0	24.0	62.1	27.0	30.0	24.0	3.0	56.1	0.0	27.0	0.0	24.0

(2) Operating expenditures include labor, variable costs for material inputs, and fixed costs (minus interest charges and depreciation) as shown on crop budgets.

5. TUNISIAN GOVERNMENT AGENCIES AND POLICIES

This section describes the principal GOT agencies with responsibilities related to cut flower exports. Specific policies and regulations which affect the cut flower sector are also addressed.

5.1 CEPEX - Centre de Promotion des Exportations

The Centre de Promotion des Exportations (CEPEX), a public institution attached to the Ministry of Economy and Finance with a commercial and industrial character, was created by law #73-20 on April 14, 1973. Its principal role is to promote Tunisia's foreign trade, especially its exports, and to assist Tunisia's exporters and foreign importers in initiating business contacts. Within this task CEPEX:

- undertakes market and marketing research;
- advises and guides Tunisian exporters;
- assists foreign importers;
- disseminates commercial information;
- undertakes promotional actions;
- contributes to the development of the national foreign trade policy.

FOPRODEX (Fond de Promotion des Exportations), an export promotion fund managed by CEPEX, is a public fund created by law #84-84 on December 31, 1984 to help exporters access market research and promote Tunisian products abroad. Specific actions that FOPRODEX can fund are in two categories:

1. Support actions directly related to exports:
 - subsidizing transport of new products and of products being exported to countries not on the current list of countries already slated for transport subsidies;
 - subsidizing interest rates on credits financing exports;
 - bonus to improve competitiveness of strategic products on foreign markets.
2. Support export promotion actions, such as:
 - market studies;
 - prospecting;

- participation in international fairs and exhibitions;
- advertising - brochures, catalogues, etc.

All exporters, individuals or groups, are eligible for support by filing an application with FOPRODEX, which supports these activities on a case by case basis through subsidies and credit at a subsidized interest rate.

An agreement between CEPEX and Tunis Air provides for reduced rates for export shipments on Tunis Air and Compagnie Tunisienne de Navigation (CTN). For air shipments exporters receive a 50 percent reduction in transport rates. Shippers must pay the full rate at time of shipment but they receive a 50 percent rebate from CEPEX. The principal problem with this program is late reimbursement by CEPEX. Some exporters noted that they had waited as long as one year to receive their rebates. In addition to the delay exporters pointed out that they incurred additional costs during the lengthy process of pursuing their claims. This appears to be a case where the administrative procedures are negating some of the incentives which the policy sought to create for flower exporters.

CEPEX's export promotion activities such as marketing research, dissemination of commercial information, and participation in international trade fairs are limited by scarce resources. Given the very small scale of the cut flower sector, CEPEX's export promotion activities have been limited to attendance at international fairs. It is not currently able to undertake research on cut flower markets in Europe or provide detailed commercial information to Tunisian flower exporters.

5.2. Agence de Promotion des Investissements Agricoles (APIA)

APIA is a public agency whose main role is to promote investment in the agricultural and fisheries sectors. APIA provides four principal services:

1. Disseminating Information. APIA serves as a source of information on the agricultural investment code for Tunisian and foreign investors.
2. Identifying Investment Opportunities. APIA helps interested parties identify promising agricultural initiatives, especially those oriented toward exports. It also acts as liaison between potential foreign investors and Tunisian partners.
3. Resolving administrative problems. APIA provides advice to business on how to take advantage of different provisions of the investment code and assists them in completing their paperwork.
4. Advising on financing. APIA helps potential investors apply for financing from the National Agriculture Bank (BNA). Since this bank handles about 90 percent

of credit funds for agriculture, it is essential that investors learn to access this source of financing.

Cut flower producers report that APIA's performance in carrying out the functions listed above has been inconsistent. For firms to be eligible for the benefits of the agricultural investment code, they must receive prior APIA approval. Several of the cut flower producers mentioned that the APIA approval process was long and troublesome. In two specific cases producers decided to forego the benefits available to APIA-approved enterprises because the process required so much time. In an effort to respond to such problems APIA has recently instituted a "one stop office" (guichet unique) to speed up the administrative procedures.

It appears that APIA could play an important role in encouraging investment in the cut flower sector if it easier for enterprises to apply for and receive the incentives incorporated in the Agriculture Investment Code. A number of the code's provisions should be attractive to cut flower investors. These include:

- 10-year tax exemption
- Up to 5,000 dinars for feasibility studies
- Preferential credit rates
- Tax exemption on locally purchased inputs
- Shared training costs for personnel on projects using new technologies

APIA's knowledge of the cut flower sector is limited. It lacks the resources to follow-up on the businesses which it has promoted in the past. In one particular case, an APIA-approved cut flower exporter pointed out that no one from APIA had visited his operation in the three years he had been in business. This was significant because the foreign partnership which APIA had helped to arrange was now defunct. It appears that APIA does not have the means to screen and qualify foreign investors which it refers to Tunisian growers. It also seems that APIA currently is unable to evaluate the success or failure of investments which it helped to promote in the cut flower sector.

5.3. Customs

Tunisian cut flower exporters depend on the Customs Service to expedite entry of inputs into Tunisia and to clear the export of their outputs to foreign markets. They expressed dissatisfaction with the Customs Service whereas they were generally pleased with export oriented services.

5.3.1 Import Issues

Three major problems with imports were cited by firms in the cut flower sector. The first concerns the speed with which customs clears bulbs and other perishable inputs. It appears that cumbersome import procedures have delayed the delivery of bulbs and cuttings, resulting in damage and losses which are borne by the Tunisian growers. The second problem is related

to pesticides and herbicides that are banned for use on food crops. Cut flower growers would like to use these inputs but find that customs will not make exceptions. The Customs Service says that it is not a policymaking body, so the question of clearing these inputs for flower production is not their mandate. The third problem with imports that flower growers have concerns exoneration from import taxes. Currently, if an input is used for production of an export crop, it is exempt from the import tax. However, growers state that customs finds it difficult to determine whether a specific import will be used exclusively to produce export flowers.

5.3.2 Export Issues

Several flower exporters as well as transport companies pointed out that export procedures and policies have been streamlined in the past few years. This improvement has been attributed to the use of one basic export declaration document, a guide that explains the required steps that an exporter must follow. It appears that in this particular area the GOT's desire to promote exports has resulted in simplified procedures that are making the system more efficient and responsive to exporters' needs. One area where improvement could be made is in reimbursement of the customs and TVA taxes. Exporters can apply for reimbursement through CEPEX. However, as mentioned above, actual repayment can take from 8 to 10 months.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section enumerates the principal conclusions and recommendations of the study. It begins by listing major assets and constraints facing participants in the Tunisian cut flower export sector. This list is followed by a detailed set of recommendations centered on the formation of an association of flower exporters.

6.1. Conclusions: Assets and Constraints

The cut flower sector in Tunisia is small and experimental. There are only half a dozen producer/exporters of cut flowers in the country. It appears that these growers benefit from a number of "natural" advantages, such as good climate, adequate soils, sufficient irrigation water and proximity to the export market. In addition to these assets, it is clear the Government of Tunisia has begun to make important policy and regulatory changes which are increasing the appeal of agricultural exports, including flowers, for investors. These changes include:

- Simplification of export procedures
- Reimbursement of export and TVA taxes on flowers
- Reduction of cargo rates of Tunis Air
- Assistance to potential investors and exporters through APIA and CEPEX

On a less tangible level the Tunisian public sector appears to be interested in working with private enterprises. This interest in cooperation was evident at the Roundtable on Floriculture held in Tunis in October 1990 where representatives of the Ministry of Agriculture, CEPEX, APIA, Customs, and Tunis Air met with current and potential flower exporters to discuss ways to facilitate and increase flower exports.

These advantages are balanced by problems in areas such as infrastructure, market information, government procedures, and technical knowledge. The principal constraints are:

- Lack of organized air cargo shipments for flowers;
- Lack of cold storage at the Tunis airport;
- Little technical information available from extension services;
- Insufficient knowledge of the European flower market;
- Inadequate postharvest handling procedures;
- An inexperienced labor force;
- Delayed reimbursement of export tax payments;
- Very limited access to credit, short and long-term; and
- Restrictions on import of special pesticides for flowers.

Two major conclusions drawn from this review of the Tunisian cut flower export sector:

1. Tunisia has the natural, physical, and human resources to develop a competitive cut flower export sector if a concerted effort is made to remove the constraints identified in this study.
2. Most constraints that affect the Tunisian cut flower sector can be attributed to its very small scale. Economies of scale must be developed by collaboration among current producer/exporters and by cooperation between them and the relevant agencies of the Tunisian Government.

6.2. Recommended Actions

This section presents three interrelated recommendations. The first addresses actions which the private sector can take to resolve problems in the sector. The second covers how the Tunisian Government can participate in this effort. The third identifies the most promising foreign market for Tunisian flowers and discusses flower varieties with high export market potential.

6.2.1 Flower Exporters Association

A major recommendation of this report is that a private trade association of Tunisian flower exporters be formed. The association should have the following goals and responsibilities:

1. Represent growers in contacts with the Government, international banks, donors and the local press. Educate them on the goals of the flower growers and inform them of the impact of the flower sector on employment and foreign exchange generation.
2. Organize promotion of the flower sector. Encourage professors, consultants, and top staff of commercial flower companies in France, Switzerland, and Germany to share their experience and expertise with Tunisian growers.
3. Develop basic marketing materials on the Tunisian flower industry (to be used or adapted by all flower exporters) including brochures, press kits, and video tapes. Organize participation by association members in major European flower fairs and competitions as a means of contacting new clients or potential investors.
4. Host prospective foreign clients, joint venture partners, bankers, and donor representatives who are interested in business opportunities in Tunisia.
5. Hold periodic meetings with representatives of the Government (including CEPEX and APIA) as well as the farming, transportation and banking sectors to solve problems that limit exports. Promote inter-sectorial cooperation.

6. Help growers make bulk purchases of fertilizers, irrigation equipment, greenhouses, and bulbs and cuttings.
7. Work with government and foreign firms to resolve postharvest handling problems, especially those related to packing, labelling, and transportation.
8. Serve as a central data source on the Tunisian flower export sector, giving foreign buyers and investors easy access to information. Keep data on flower farms, hectareage, production and export volume by flower type and the name, address, phone number and fax number of all current Tunisian flower exporters.

The Tunisian flower exporters association will need assistance in its formative stage. USAID should consider including aid to this type of trade association in its upcoming agribusiness project. In the meantime, the GOT should encourage close collaboration between CEPEX and APIA and any informal or newly formed association of flower exporters.

1.2.2 Government Actions

The Tunisian Government could take action to improve the conditions in which cut flower exporters operate in Tunisia in three areas: government regulations and policies, research and extension, and investment and export promotion.

In the area of policy, GOT should review the procedures for reimbursing export and VA taxes. Considerable time and resources could be saved by simply exonerating qualified lower exporters from these taxes. The GOT should also review the value of the 10 percent tax on imported agricultural inputs. Consideration should also be given to reviewing current restrictions on the import of certain banned pesticides for use on non-food (i.e. flower) crops.

In the area of research and extension, the Government should examine the feasibility (economic and technical) of establishing a research facility devoted to cut flowers. It could include both a research farm and a laboratory facility:

1. A research farm devoted to testing and selecting varieties of roses, carnations, miniature carnations, gladioli, gypsophila, statice, lilies, liatrus, and other flowers including those grown from cuttings, seeds, and bulbs imported from abroad. A five-year program of experimentation in variety selection, soils, greenhouse types, fertilization, irrigation, pest control, post-harvest treatment, grading, packaging, chilling and shipping should be designed along with a training program for agronomists and farm labor. No attempt should be made to propagate bulbs or cuttings locally in Tunisia during this period. Each private farm should do this work according to the needs of the individual markets.
2. A laboratory facility with microscopes, soil testing apparatus, and a complete floriculture library with books, films, slides, and video tapes of flower export

arms from all over the developing world, open to all members of the export flower organization.

This research facility should not be considered for funding until the stability and viability of the export flower sector is more certain. In the meantime, the GOT should consider training a few agronomists from Chott Meriem in practical aspects of flower propagation and production focusing on roses, gladioli, and carnations.

In the area of promotion, the Government should continue to support the efforts of APIA to identify potential investors in the sector. APIA should be encouraged to follow up more closely on the results of partnerships or joint ventures which APIA has helped to arrange. CEPEX should be encouraged to collaborate closely with any association established by growers. In particular, CEPEX needs to develop a better understanding of the capabilities of current flower exporters so that it can accurately represent Tunisia's potential at international fairs. CEPEX should begin to develop video tapes and brochures on Tunisian flowers for distribution in the European market. Once the flower exporters association is fully functional, many of these responsibilities and costs can be transferred from CEPEX to the association.

6.3 Tunisian Marketing Strategy

A marketing strategy for Tunisian cut flower exports must necessarily consider the actual development of the sector. In this case it is at a prefeasibility stage. That is, producers have not yet perfected or refined technical aspects related to production, harvesting, packaging and shipping of cut flowers. Growers are still experimenting with different kinds of flowers, determining what grows best and trying to match their production with market demand. Unfortunately, with limited technical assistance and little knowledge of outside markets, growers are encountering difficulties producing a marketable quality product. A number of steps need to be taken for Tunisia to adopt a successful market entry strategy.

First, growers need to identify the flowers best suited agronomically to the Tunisian context and profitably grown at quality standards acceptable to the export market. Second, market demand should be analyzed so that growers can determine the best product mix among flowers that are in demand and also offer the most remunerative prices. Market information from secondary sources like ITC, combined with information from potential or existing partners or buyers in Europe, would provide growers with a solid idea of market potential and trends. Third, competing suppliers need to be analyzed to ensure that there are real market opportunities for Tunisian flowers. Demand for roses may be growing but if other suppliers like Morocco have well-established marketing structures and are flooding the market with low-cost flowers (as appears to be the case with Moroccan roses to France), there may not be room for a new producer like Tunisia. However, Tunisia should try to identify a "niche" in the winter market.

One product that a number of French wholesalers felt might have potential for Tunisia is gladioli, a flower that grows well in Tunisia. While gladioli do not represent a significant percentage of total world flower trade, or French imports for that matter, they have good export potential for Tunisia because of the country's close proximity to France and other major markets. Gladioli production in France has increased to meet growing demand, but off-season production is expensive because it is a long-cycle (three-month) flower and greenhouse heating costs have soared with rising fuel costs.

Tunisia already grows many of the same mediterranean flowers that are in high demand in France. Besides roses, Tunisia grows other flowers with good export potential including chrysanthemum (marguerite) and gladioli. While these and other varieties such as carnations, gypsophila, roses, statice, and strelitzia, are viable flowers to produce in Tunisia, the ability to achieve export quality in volume has not yet been demonstrated. According to one wholesaler at Rungis, one shipment of strelitzia from Tunisia was tested on the market but did not meet quality standards. The wholesaler felt that it would be very difficult to compete with French production.

Of course, successfully competing with existing developing country suppliers is a bigger problem. Tunisia would have difficulty competing with Colombia and Peru, which are prominent producers of carnations and gypsophila respectively. Tunisia should exploit its strong competitiveness with respect to its location and seasonal market windows. The French market holds the greatest potential due to the strong growth in cut flower imports against declining domestic production, and the well-established trade, transportation, and communication links.

BIBLIOGRAPHY

- Annuaire de la Federation Nationale des Grossistes en Fleurs Coupees, 1990-91.
- Bloemen Bureau Holland. 1990. Cut Flowers.
- Comite National Interprofessionnel de l'Horticulture. 1989. Vegetaux d'Interieur - Les Achats des Francais en 1988.
- Commission des Communautes Europeenes. 1986. Le Marche des Fleurs et Feuillages Frais Coupes et des Fleurs Sechees en RFA, France, Pays-Bas et Suisse.
- Cornell Cooperative Extension. 1991. 1991 Recommendations for Integrated Management of Greenhouse Florist Crops. Part II Management of Pests and Crop Growth.
- Cornell University. 1981. Cornell Recommendations for Commerical Floriculture Crops. Part I: Cultural Practices and Production Programs.
- Gittenger, J. Price. 1982. Economic Analysis of Agricultural Projects. The Johns Hopkins University Press.
- Holtzman, John S., Jerry Martin, and Richard Abbott. 1988. Operational Guidelines: Rapid Appraisal of Agricultural Marketing Systems.
- International Trade Centre UNCTAD/GATT. Floricultural Products. A Study of Major Markets. 1987. Geneva.
- Johnson, Doyle C. 1990. Floriculture and Environmental Horticulture Products: A Production and Marketing Statistical Review, 1960-88. Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. Statistical Bulletin No. 817.
- L'Or Vert. Le Journal du CNIH et de l'ANIHORT. 1990. No.157.
- McGregor, Brian M. 1987. Tropical Products Transport Handbook. U.S. Department of Agriculture, Agriculture Handbook No. 668.
- Ministry of Agriculture, Direction Generale de la Production Vegetale. 1990. Programme de Developpement de la Floriculture en Tunisie.
- Office National Interprofessionnel des Fruits, des Legumes et de l'Horticulture et Comite National Interprofessionnel de l'Horticulture et des Pepinieres. 1990. L'Horticulture Francaise - Synthese Economique.

ANNEXES

ANNEX 1

ROUNDTABLE ON FLORICULTURE

CEPEX organized a roundtable on floriculture held at the El Mechtel Hotel in Tunis in collaboration with Abt Associates and APLA. The purpose was to exchange information on the international cut flower market, the Tunisian cut flower sector, and government export promotion efforts for cut flowers. In addition, the agenda included discussion of Tunisia-specific problems, comparisons with Latin American producers, and solutions to floriculture problems that hinder exports to Europe and elsewhere.

Initially, participants agreed that Tunisian advantages include favorable climate and soil, relatively low cost of labor, and proximity to Europe. However, the need to identify market potential was highlighted. Some first steps were recommended, including defining production and export objectives, establishing a good flow of market information, and making the market more familiar to Tunisians. Nancy Laws of Abt Associates pointed out that Tunisia faces a market with excellent potential, with world demand increasing 11 percent annually. One exporter indicated that a comparison between Tunisia and Colombia is invalid because Tunisia lacks the facilities and technology that Colombia has, and its climate and soils are less favorable than Colombia. Ms. Laws responded to this point by commenting that Colombia and Ecuador started their cut flower export industries from scratch relatively recently.

Another grower said that Tunisia should not try to export due to the complexities of the cut flower sector. Exporting from Tunisia was relatively expensive, he said, compared to other nations. This statement was followed by a lively debate on the sector's problems. One grower pointed out that floriculture poses enormous risks, which makes it difficult to obtain financing, one reason it remains underdeveloped.

Administrative problems were discussed, including the slow, inefficient bureaucracy and the fact that airport offices do not respond to the needs of perishable products.

Technical problems cited included the lack of technical training for staff and producers and the inadequate technical expertise for production decisions (such as which flowers to grow), soil analysis, equipment inspections, etc. One expatriate grower cited a resistance to foreign experts who are not academics. He also complained that Tunisian customs charges high tariffs, and does not provide good service (e.g. they are closed on Sundays and holidays, which are important days for flowers).

The team emphasized that 80 percent of the problems associated with cut flower exports occurs postharvest during packaging, and air/land transportation, and storage. The lack of cold storage facilities was mentioned as a possible problem, as was the minimum number of flowers needed to justify reserving air time for exporters. It is important to be able to reserve space for flowers on passenger planes bringing tourists to Tunisia.

One exporter gave an example of failure due to the foreign partner's withdrawal from agreement. Also, he said that obtaining insurance to cover product loss is a problem.

55

The following solutions were offered to improve the sector's performance:

- Training for staff, technicians, and advisors;
- Laboratory to help producers improve products for export;
- Bulk transportation, as small volume shipments are too costly; and
- Creation of a flower growers association.

Several participants voiced an urgent need to form an association of flower producers/exporters. Whether the association should be publically-sponsored or remain private was an issue, but consensus seemed to favor a private sector group not associated with government organizations. All agreed that an association should serve to resolve problems in the flower sector and call together producers/exporters as necessary. The idea of an association pleased representatives from customs and the plant inspection service, because dealing with a group saves time. One grower voiced reservations about an association, predicting problems between producers and sellers. The Abt team pointed out that Colombia has a strong association, which has 200 members including three brand name growers, without such problems. At the conclusion of the roundtable, cut flower producers agree to form a federation of producers and exporters, and one grower suggested that a lawyer draw up the charter for the new federation.

ANNEX 2

NOTES TO ENTERPRISE BUDGET COST ESTIMATE FOR SELECTED FLOWERS PRODUCTION/REVENUE ASSUMPTIONS

Planting Density and Yields

These are based on visits to farms and production recommendations from Chott Merien. It is assumed that each hectare, which is 10,000 m², will have 20 plastic greenhouse sections of 500m² each. The actual surface area in production is three-quarters of the covered area, or 7,500 m², which allows for space between rows. For roses, the planting density refers to the number of rose bushes per square meter. For carnations and gladiola, it refers to the number of cuttings per square meter.

Producer Prices

These are based on visits to Rungis Market. The wholesale price for Moroccan roses are used as the reference price for Tunisian roses. Prices reported were 24FF per bunch of 20 stems, or 1.2FF per stem (200 millimes per stem using an exchange rate of 6FF = 1DT). Airfreight costs are approximately 6FF/kg. airfreight). This includes handling, packing, shipping, unloading, and insurance. Estimates of carnations and gladioli are similarly rough, but conservative estimates. Assumptions on prices received by grower are based on the existing market prices in France minus air transportation costs to establish an FOB price. Transport and handling charges were subtracted from the FOB price to calculate prices paid to growers.

Labor

Labor costs are based on time estimates shown in Exhibit 4.1-4.3 which were developed by a floriculture specialist at Chott Meriem and wage rates based on interviews with growers.

Cuttings/Bulbs/Seeds

The estimated cost for rose plants is 2-4 DT per plant, and the productive life of the plants varies from 7 to 10 years. For purposes of analysis, it was assumed that costs were 3 DT per plant, with a productive life of 7 years. Roses plants, once in production will produce 12-30 flowers per year for 7-10 years before they must be replaced.

Fertilizer Costs

Fertilizer costs are based on (1) application rates and schedules developed by a specialist at Chott Meriem and (2) suppliers' prices in Tunis.

Pesticide and Fungicide Costs

See Annex 2-A for explanation of assumptions used for calculation of pesticide application rates and costs.

Irrigation Costs

Miscellaneous maintenance (buying valves and repairing pipes, tubes or hoses) for a 3 ha irrigation system is estimated to cost 300 DT per year per hectare.

Machinery Expenses

350 DT per month, or 6,000 DT per year for the operation is estimated to be reasonable. This makes for a per hectare cost of 2,000 DT per year.

Packing materials

Based on the authors' experiences in other countries, a benchmark estimate of costs for shipping and packing materials is 20 millimes per flower for roses and 10 millimes per flower for other flowers.

Fixed Costs

Cut flowers in Tunisia are typically produced either in open fields or under plastic greenhouses³³ that are simple oval-framed structures consisting of metal ribs covered by plastic sheeting. Because the climate in Tunisia is Mediterranean and temperate there is no need for more sophisticated enclosed greenhouse structures, although the plastic structures used in Tunisia protect flowers from severe rains and cool winter nights. The initial investment, still much lower than for European countries, includes the following equipment:

<u>Equipment Category</u>	<u>New Cost</u>	<u>Life of Product</u>	<u>Total Cost Per 3 Hectare</u>
Irrigation Pumps/Pipe:	5,700/ha	5 years	17,100
Greenhouse:			
-Frames	27,000/ha	15 years	81,000
-Plastic	8,000/ha	2 years	24,000
-Accessories	1,000/ha	3 years	3,000
Machinery/Implements:	30,000/farm	5 years	30,000
Packing/Cooling Rooms:	30,000/farm	15 years	30,000
Vehicles:	15,000/farm	5 years	15,000
	TOTAL		201,000 DT

³³ A typical plastic greenhouse is 6 meters by 80-85 meters, or approximately 500 square meters.

The depreciation schedule derived from this is as follows:

Depreciation: Equipment/Vehicles:

<u>Equipment Category</u>	<u>New Cost</u>	<u>Life of Product</u>	<u>Annual Cost</u>
Irrigation:	5,700/ha.	5 years	1,140DT
Greenhouses:			
-- Plastic	8,000/ha.	2 years	4,000
-- Frames	27,000/ha.	15 years	2,467
-- Accessories	1,000/ha.	3 years	333
Machinery & Implements	10,000/ha.	5 years	2,000
Packing/Cooling Rooms	10,000/ha.	7.5 years	1,333
Vehicles	5,000/ha.	5 years	<u>1,000</u>
		TOTAL	12,273 DT

Management and Staff Salaries

It is assumed that the management costs (salaries for a manager and assistant) average 1,500 DT/month, including taxes and social security. Staff salaries, including secretaries and one or two other staff persons, are assumed to average 700/month. Therefore, the annual costs are 26,400 DT per operation, or 8,800 DT per hectare for a three-hectare operation. Promotional expenses, which would include contributions to the flower growers association, are estimated to be 3,000DT, or 1,000DT per hectare. Administrative fees (mail, minor taxes, accounting fees, etc.) have been budgeted at 500DT per month, 6,000DT per year, or 2,000DT per hectare.

Land and Building Costs

Land and building costs are estimated to be 4,000 DT for a three hectare operation, or 1,350DT per hectare.

ANNEX 2-A

ASSUMPTIONS FOR CALCULATIONS OF PESTICIDE/FUNGICIDES APPLICATION RATES AND COSTS

Basically, there is no conventional way to calculate pesticide/fungicide costs for a particular area of production of a particular period of time. It depends on how many pesticide/fungicide applications you need for a particular product (flowers) and what kind of pesticide/fungicide might be needed. This information can be found in any technical reference for flowers. However, for roses, carnations, and gladioli you may use the following norms under normal production conditions (no heavy infestation). This information was collected from growers in the Chott Meriem area.

Roses

Disease	Pesticides or Fungicides Used	Number of Applications
Oidium	Triforine	3-4/year
Mildion	Manèbe	2-3/year
Botrytis	Vinchlozoline	2-3/year
Pucerons Verts	Perimor Dimethoate	3-4/year

One application needs 80 to 100 hectoliters of solution (pesticides/fungicide quantity + water) per hectare. One hectare usually consists of 18 or 20 greenhouses. Therefore, the quantity of any pesticide/fungicide needed for hectare is:

100 times the number of grams/hectoliter needed

e.g.:

Given a solution of Perimor of 10 grams/hectoliter

and,

an application rate of 100 hectoliters per hectare for one application, then 1 application/hectare needs $100 \times 10 \text{ grams} = 1000 \text{ grams} = 1 \text{ kg}$ of perimor

The costs/application/hectare is 22 DT for Perimor which cost 22DT/kg.

If roses need 3 to 4 applications of Perimor/hectare/year, then total costs per year per hectare would come to 88 DT/ha/year.

60

Roses		
Disease	Pesticide/Fungicide Used	Number of Applications
Acariens	Lambose Tores	2-3/year
Carnation		
Pucerons	Diméthoate Lannate Périmor	3-4/year
Acariens	Lambose Tores	2-3/year
Tordeuses Mineuses	Lannete	1-2/year
Rouille	Mancozète Triforine	1-2/year
Verticilliose Fusariose Rhizoctone	no chemical treatment	
Gladiolas		
Thrips (insect)	Diméthoate Lannat Perimor	3-4/year
Botrytis	Vinchlorzoline	2-3/year
Rouille transversale	Triforine	1-2/year
Viroses Stromtinoise Fusariose Nécroses	no chemical treatment	

61

Pesticide Costs:	Lannate		21.0 DT/kg.
	Karate		20.0 DT/kg.
	Décis		17.0 DT/kg.
	Dimethoate		4.5 DT/kg.
	Karatane		4.0 DT/kg.
	Perimor		22.0 DT/kg.
	Lambox		11.0 DT/kg. (Kelthane equivalent)
	Torcs S.		30.0 DT/kg. (Kelthane equivalent)

Fungicide Costs:	Manèbe		6.8 DT/kg.
	Folpel	n/a	
	Benlate		40.0 DT/kg.
	Vinchlozoline		35.0 DT/kg. (Ronilan)
	Mancozele		6.5 DT/kg. (Dithane M45)
	Triforine		18.0 DT/kg. (Saprol)

ANNEX 2-B

DETAILED ENTERPRISE BUDGETS

CARNATION: ENTERPRISE BUDGET, LOW/MEDIUM/HIGH YIELD
SCENARIOS, PER HECTARE, 1990-1991 SEASON

PRODUCTION/REVENUE	Low	Medium	High
Yield (Stems/m ²)	32.0	32.0	32.0
Plant Density (Plants/m ²)	120.0	160.0	180.0
Production Period (months)	Nov-May	Nov-May	Nov-May
Area in Production (m ² /yr./ha.)	7500.0	7500.0	7500.0
Total Production (Stems/yr.)	900000.0	1200000.0	1350000.0
Production Sold (80% of Total)	720000.0	960000.0	1080000.0
Producer Price per Stem	0.120	0.120	0.120
Value of Production (DT/ha.)	86400.0	115200.0	129600.0
COSTS (VARIABLE AND FIXED)			
Hired Labor Wage (DT/Day)	3.5	3.5	3.5
Specialized Labor Wage (DT/Day)	5.0	5.0	5.0
Hired Labor: Person-days	970	970	970
Specialized labor: Person-days	495	495	495
Subtotal - Labor Costs	5870.0	5870.0	5870.0
Variable Costs - Inputs:			
Cuttings/Bulbs/Secds	62400.0	62400.0	62400.0
Fertilizer	1314.1	1314.1	1314.1
Insecticides & Fungicides	210.0	210.0	210.0
Irrigation	300.0	300.0	300.0
Machinery Expenses	500.0	500.0	500.0
Packing Materials	9000.0	12000.0	13500.0
Subtotal - Material Input Costs	73724.1	76724.1	78224.1
TOTAL VARIABLE COSTS	79594.1	82594.1	84094.1
Fixed Costs:			
Depreciation: Equipment/Vehicles	12273.0	12273.0	12273.0
Interest	9500.0	9500.0	9500.0
Managements & Staff Salaries	11500.0	11500.0	11500.0
Land & Buildings	1350.0	1350.0	1350.0
TOTAL FIXED COSTS	33273.0	33273.0	33273.0
TOTAL COSTS PER HA (DT)	112867.1	115867.1	117367.1
NET REVENUE PER HECTARE	-26467.1	-667.1	12232.9
Conversion Factor (ha/qty. sold)	0.00000139	0.00000104	0.00000093
Total Costs per Stem Sold (DT)	0.157	0.121	0.109
GROSS MARGIN (DT/Plant)	-0.037	-0.001	0.011
Exchange Rate (DT/\$U.S.)	0.85	0.85	0.85
Costs per Hectare (\$U.S.)	132784.8	136314.2	138078.9
Costs per Stem (\$U.S.)	0.148	0.114	0.102
GROSS MARGIN (\$US/Stem)	-0.043	-0.001	0.013

63

GLADIOLA: ENTERPRISE BUDGET, LOW/MEDIUM/HIGH YIELD
SCENARIOS, PER HECTARE, 1990-1991 SEASON

PRODUCTION/REVENUE	Low	Medium	High
Yield (Stems/m ²)	40.0	50.0	60.0
Plant Density (Plants/m ²)	45.0	55.0	65.0
Production Period (months)	Nov-May	Nov-May	Nov-May
Area in Production (m ² /yr./ha.)	7500.0	7500.0	7500.0
Total Production (Stems/yr.)	300000.0	375000.0	450000.0
Production Sold (80% of Total)	240000.0	300000.0	360000.0
Producer Price (DT/Stem)	0.300	0.300	0.300
Value of Production Sold (DT/ha.)	72000.0	90000.0	108000.0
COSTS (VARIABLE AND FIXED)			
Hired Labor Wage (DT/Day)	3.5	3.5	3.5
Specialized Labor Wage (DT/Day)	5.0	5.0	5.0
Hired Labor: Person-days	265.0	265.0	265.0
Specialized Labor: Person-days	150.0	150.0	150.0
Subtotal - Labor Costs	1677.5	1677.5	1677.5
Variable Costs - Inputs:			
Cuttings/Bulbs/Seeds	30000.0	37500.0	45000.0
Fertilizer	869.3	869.3	869.3
Insecticides & Fungicides	225.0	225.0	225.0
Irrigation	300.0	300.0	300.0
Machinery Expenses	500.0	500.0	500.0
Packing Materials	3000.0	3750.0	4500.0
Subtotal - Material Input Costs	34894.3	43144.3	51394.3
TOTAL VARIABLE COSTS	36571.8	44821.8	53071.8
Fixed Costs:			
Depreciation: Equipment/Vehicles	12273.0	12273.0	12273.0
Interest	9500.0	9500.0	9500.0
Management & Staff Salaries	10500.0	10500.0	10500.0
Land and Building Costs	1350.0	1350.0	1350.0
TOTAL FIXED COSTS	33623.0	33623.0	33623.0
TOTAL COSTS PER HA (DT)	70194.8	78444.8	86694.8
NET REVENUE PER HECTARE	1805.3	11555.3	21305.3
Conversion Factor (ha/qty. sold)	0.00000417	0.00000333	0.00000278
Total Costs per Stem Sold (DT)	0.292	0.261	0.241
GROSS MARGIN (DT/Stem)	0.008	0.039	0.059
Exchange Rate (DT/\$U.S.)	0.85	0.85	0.85
Costs per Hectare (\$U.S.)	82,582.1	92,287.9	101,993.8
Costs per Stem (\$U.S.)	0.28	0.25	0.23
GROSS MARGIN (\$US/Stem)	0.009	0.045	0.070

Sources: See ANNEX 2 of this report for notes on calculations.

W

ROSE: ENTERPRISE BUDGET, LOW/MEDIUM/HIGH YIELD
SCENARIOS, PER HECTARE, 1990-1991 SEASON

PRODUCTION/RETURNS	Low	Medium	High
Yield (Stems/m ²)	50.0	75.0	100.0
Plant Density (Plants/m ²)	5.0	5.0	5.0
Production Period (months)	Nov-May	Nov-May	Nov-May
Area in Production (m ² /yr./ha.)	7500.0	7500.0	7500.0
Total Production (Stems/yr.)	375000.0	562500.0	750000.0
Production Sold (80% of Total)	300000.0	450000.0	600000.0
Producer Price per Stem	0.200	0.200	0.200
Value of Production (DT/ha.)	60000.0	90000.0	120000.0
COSTS (VARIABLE AND FIXED)			
Hired Labor Wage (DT/day)	3.5	3.5	3.5
Specialized Labor Wage (DT/Day)	5.0	5.0	5.0
Hired Labor: Person-Days	1150.0	1150.0	1150.0
Specialized Labor: Person-Days	450.0	450.0	450.0
Subtotal - Labor Costs	6275.0	6275.0	6275.0
Variable Costs - Inputs:			
Cuttings/Bulbs/Seeds	16071.4	16071.4	16071.4
Fertilizer	2092.3	2092.3	2092.3
Insecticides & Fungicides	285.4	285.4	285.4
Irrigation	300.0	300.0	300.0
Machinery Expenses	500.0	500.0	500.0
Packing Materials	7500.0	11250.0	15000.0
Subtotal - Material Input Costs	26749.1	30499.1	34249.1
TOTAL VARIABLE COSTS	33024.1	36774.1	40524.1
Fixed Costs:			
Depreciation: Equipment/Vehicles	12273.0	12273.0	12273.0
Interest	9500.0	9500.0	9500.0
Management & Staff Salaries	4850.0	4850.0	4850.0
Land and Buildings	1350.0	1350.0	1350.0
TOTAL FIXED COSTS	26623.0	26623.0	26623.0
TOTAL COSTS PER HA (DT)	59647.1	63397.1	67147.1
NET REVENUE PER HECTARE	352.9	26602.9	52852.9
Conversion factor (ha/qty. sold)	0.00000333	0.00000222	0.00000167
Total Costs per Stem Sold (DT)	0.199	0.141	0.112
GROSS MARGIN (DT/Stem)	0.001	0.059	0.088
Exchange Rate (DT/\$U.S.)	0.85	0.85	0.85
Costs per Hectare (\$U.S.)	70,173.1	74,584.8	78,996.6
Costs per Stem (\$U.S.)	0.187	0.133	0.105
GROSS MARGIN (\$US/Stem)	0.001	0.070	0.104

65

ANNEX 3

ISSUES RELATED TO POST-HARVEST HANDLING AND SHIPPING

Stages in the marketing of cut flowers from the time of harvest to arrival on the market include the following: (1) the harvest itself, (2) grading, (3) preservation and packing, (4) pre-cooling and storage, (5) loading and shipping and (6) unloading and reception. As a perishable product, flowers cannot tolerate lengthy delays or mishandling.

For example, roses are packaged after post-harvest treatment in specific solutions cooled to 1°C and classified for quality in bunches of tens or twenties, wrapped in white paper cardboard or plastic with four-color product care instruction sheet, and placed in sturdy corrugated cardboard flower boxes. Grading is by centimeters and the most popular lengths are 40-50, 50-60, 60-70, 70-80, and 80-90 centimeters. Lengths are measured from the bottom of the calyx to the end of the stem. Roses are delicate and sensitive to any delays or heating in transport and require ice in shipping to more distant markets.

If they are to be shipped to distant markets, carnations also must be cut in bud stage and treated with preservatives on the farm, graded and packed to client specifications, and chilled to 1°C before shipping. This implies ample well-lighted grading rooms, refrigerated cooling rooms, and in cases where the farm is more than an hour from the airport, refrigerated trucks for transport.

Carnations cut in bud stage are very handy, easy to pack and transport, and if properly refrigerated, will last two weeks before they are forced open with immersion of stems in warm water, and arranged by florist or consumer into bouquets. Because they last a long time, carnations are important in the flower markets abroad, where the time between cutting of the flower and arrival at the home of a consumer may be 5-10 days.

To illustrate the importance of timing, we can cite the example of the transport of carnations from Colombia to Trondheim, Norway. Flowers are picked at 6 a.m., graded and packed and chilled all day and night. They are flown to Frankfurt on the second day and trucked to Oslo on the third day. On the fourth day the shipment is trucked from Oslo to Trondheim and arrives at the wholesalers for storage in the cold store on the fifth and sixth days, for sale to retailers on the seventh, eighth and ninth days. Retailers spend the tenth and eleventh days making bouquets for consumers who purchase flower arrangements, hoping to enjoy them for one week (up to 18 days from the time the flowers were first picked). This two and one-half week time frame underlines the importance of sending healthy flowers, with good postharvest care and cold storage. One industry expert asserts that 80 percent of the problems associated with cut flower exports occur after harvest during packaging, air/land transportation, and storage.

1/10

Information on Selected Flower
Varieties

L'OEILLET AMERICAIN

DIANTHUS CARYOPHYLLIS

FAMILLE DES
CARYOPHYLLACEESProduction

- Densité de plantation: de 32 à 45 plants/m² cultivé
la plantation se fait en planches
- Rendement: 6 à 10 fleurs/pied la 1ère année
Les rendements sont inférieures la 2ème année
Sur les 2 ans de culture, rendement moyen de 12 à 16
fleurs/pied
- Plantation: d'avril à juin-juillet
- Récolte: elle est possible toute l'année mais surtout de
septembre à juin
- Prise de vente moyenne: 250 millimes/fleur (ESH Chott Mariem)

Intrants

- Fertilisants: Fumure de fond:
fumier: 15 à 25 kg/m²
100-200 g/m² de Super phosphate 45
20-25 g/m² de Sulfate de potasse
100-150 g/m² de Sulfate de magnésie
- Fumure d'entretien:
apport d'une solution fertilisante
contenant dans 1000 l d'eau: (2,2):
1 kg d'Ammonitrate 33%
200 g de Phosphate d'ammoniaque
800 g de Nitrate de potasse
- Cette solution est distribuée, à raison
de 10 l/m², tous les 15 jours d'octobre à
juin.

- | | | | | |
|---------------|----------------|------------|-----|------|
| Fongicides: | Verticillisse: | Thirame | 200 | g/hl |
| | | Benlate | 70 | g/hl |
| | Rouille: | Mancozèbe | 200 | g/hl |
| | Botrytis: | Benlate | 70 | g/hl |
| | | Captane | 100 | g/hl |
| Insecticides: | Pucerons: | Lannate | 50 | g/hl |
| | | Dimethoate | 30 | g/hl |
| | Tordeuse: | Carbaryl | 75 | g/hl |

67

Acaricides: Kelthane 0,2 l/hl

Systeme d'irrigation

Basse aspersion. Nombre de plants pour une surface de 500m²: 16500.

Main d'oeuvre

Pour une surface de 500 m², exprimée en journées de travail:

	main d'oeuvre spécialisée	main d'oeuvre ordinaire
Préparation du sol	3 j	-
Plantation	5 j	-
Désherbage	-	8 j
Fertilisation	-	15 j
Contrôle phytosanitaire	-	10 j
Taille (pincements)	10 j	-
Irrigation (manuelle)	-	10 j
Récolte	15 j	-
Conditionnement	-	15 j

Autres informations techniques

- Les températures optimales de croissance sont:
 - en hiver: 15 à 18°c le jour
8 à 12°c la nuit
 - en été: 21°c le jour
12°c la nuit
- 2 pincements sont généralement pratiqués:
 - 1er pincement: au dessus du 4ème, 5ème ou 6ème noeud (selon les cultivars), soit 15 à 20 jours après la plantation
 - 2ème pincement: effectué 30 à 50 jours après le premier sur les ramifications secondaires obtenues et au-dessus du 3ème noeud
- Un rabattage des plantes est effectué en juin à 35-40 cm
- Tuteurage: on utilise généralement en grillage métallique dont les mailles font 12,5 x 12,5 cm ou 15 x 20 cm

68

LE ROSIER

ROSA

FAMILLE DES ROSACEES

Production

Densité de plantation: 5 à 6 plants/m² sous abri-serre
6 à 8 plants/m² sous serre

Rendement: les rendements varient avec la région, les techniques de production et les variétés:

7 à 8 fleurs/pied/an pour le cultivar "Baccara"
12 à 13 fleurs/pied/an pour le cultivar "Visa"
15 à 20 fleurs/pied/an pour le cultivar "Sonia"

Plantation: elle est possible de fin décembre à fin février

Récolte: elle est possible toute l'année

la culture discontinue: en moyenne 4 récoltes/an
la culture continue: en moyenne 7 récoltes/an

Prise de vente moyenne: 250 millimes/fleur (ESH Chott Mariem)

Intrants

Fertilisants: Fumure de fond:
organique: fumier: 20 à 25 kg/m²
minérale: 100 g/m² de Super phosphate 45
150 g/m² de Sulfate de potasse

Fumure d'entretien:
fumier: 10 kg/m²
apport d'une solution fertilisante
contenant dans 1000 l d'eau: (2,2%),
800 g l'Ammonitrate 33%
300 g de Phosphate d'ammoniaque
900 g de Nitrate de potasse
200 g de Sulfate de magnésie

Cette solution est apportée, à raison de
15 l/m², une fois/mois en hiver et 2
fois/mois de mars à septembre.

Fongicides: Oidium: Milcurb 100 cc/hl
Saprol 100 cc/hl
Rubigan 12 cc/hl

Rouille: Mancozèbe 200 g/hl

69

	Mildrion: Manèbe	160 g/hl
	Zinèbe	200 g/hl
	Botrytis: Benlate	70 g/hl
Insecticides:	Pucerons: Decis	100 ml/hl
	Dimethoate	30 g/hl
Acaricides:	Kelthane 0,2 l/hl	

Système d'irrigation

Basse aspersion. Nombre de plants pour une surface de 500m²: 3000.

Main d'oeuvre

Pour une surface de 500 m², exprimée en journées de travail:

	main d'oeuvre spécialisée	main d'oeuvre ordinaire
Préparation du sol	3 j	-
Plantation	5 j	-
Désherbage	-	15 j
Fertilisation	-	15 j
Contrôle phytosanitaire	-	15 j
Taille	7 j	-
Irrigation (manuelle)	-	10 j
Récolte	15 j	-
Conditionnement	-	15 j

Autres informations techniques

- Les températures optimales de croissance sont:
 - par temps couvert: 16°C la nuit
 - 20-21°C le jour
 - par temps dégagé: 24-28°C
- Humidité relative: 65 à 70%
- La culture du rosier peut être conduite de 2 façons:
 - culture continue: On récolte les fleurs tout au long de l'année.
 - culture discontinue: La récolte des fleurs est arrêtée en Juillet et Août et on intervient par une taille en sec en Septembre. La floraison aura lieu ainsi à partir de Décembre.

LE GERBERA

GERBERA JAMESONII

FAMILLE DES COMPOSEES

Production

Densité de plantation: 9 plants/m² cultivé
la plantation se fait en planches

Rendement: en moyenne 25 à 30 fleurs/peid/an

Plantation: elle est possible de mars à juin

Récolte: elle se fait d'octobre à juin

Prise de vente moyenne: 150 millimes/fleur (ESH Chott Mariem)

Intrants

Fertilisants: Fumure de fond: fumier: 15 kg/m²
50 g/m² de Super phosphate 45
150-200 g/m² de Sulfate de potasse

Fumure d'entretien:

apport d'une solution fertilisante
contenant dans 1000 l d'eau (2%),
500 g l'Ammonitrate 33%
1200 g de Nitrate de potasse
300 g de Phosphate d'ammoniaque

Cette solution est distribuée, à
raison de 11-12 l/m², tous les 15
jours de septembre à juin.

Fongicides: Mildion: Fospel 150 g/hl
Fusariose: Benlate 70 g/hl

Insecticides: Pucerons: Lannate 50 g/hl
Mineuse: Bioresmethrine 6 g/hl

Système d'irrigation

Goutte à goutte. Nombre de plats pour une surface de 500 m²: 4500.

Main d'oeuvre

Pour une surface de 500 m², exprimée en journées de travail:

	main d'oeuvre spécialisée	main d'oeuvre ordinaire
Préparation du sol	3 j	-
Plantation	4 j	-
Désherbage	-	7 j
Fertilisation	-	15 j
Contrôle phytosanitaire	-	8 j
Irrigation (manuelle)	-	12 j
Effeuilage	-	7 j
Récolte	12 j	-
Conditionnement	-	15 j

Autres informations techniques

- Les températures optimales de croissance sont:
13-15°C en hiver
18-20°C en été
- Température minimale de croissance: 8°C
- Humidité relative: 60 à 70%
- Plante héliophile (aime la lumière) apport dans la préparation du sol de tourbe (4-5 kg/m²) ou de marc de raisin (8-10 kg/m²)

LE GLAIEUL

GLADIOLUS

FAMILLE DES IRIDACEES

Production

Densité de plantation: 50-60 bulbes/m² cultivé sous serre
la plantation se fait en planches

Rendement: généralement 1 à 2 fleurs par bulbe

Plantation: culture avancée: de janvier au 15 février
culture de saison: mars-avril
culture retardée: de septembre à novembre

Récolte: elle commence 3,5 à 4 mois après la plantation

Prise de vente moyenne: 700 millimes/fleur (ESH Chott Mariem)

Intrants

Fertilisants: Fumure de fond: 100 g/m² de Sulfate de potasse
70 g/m² de Super phosphate 45

Fumure d'entretien:
3 apports de:
30-40 g/m² d'Ammonitrate 33%
40 g/m² de Nitrate de potasse
aux stades 2 feuilles, 4 feuilles et
formation de l'inflorescence

Désinfectants: Furadan avec la fumure de fond: 40-50 g/m²

Fongicides: Fusarisse: Benlate 70 g/hl

Botrytis: Benlate 70 g/hl
Vinchlozoline 75 g/hl

Rouille: Mancozèbe 200 g/hl
Triforine 28 g/hl

Insecticides: Thrips: Lindane 30 g/hl
Diméthoate 30 g/hl

Système d'irrigation

Basse aspersion. Nombre de bulbes pour une surface de 500m²:
25000.

14

Main d'oeuvre

Pour une surface de 500 m², exprimée en journées de travail:

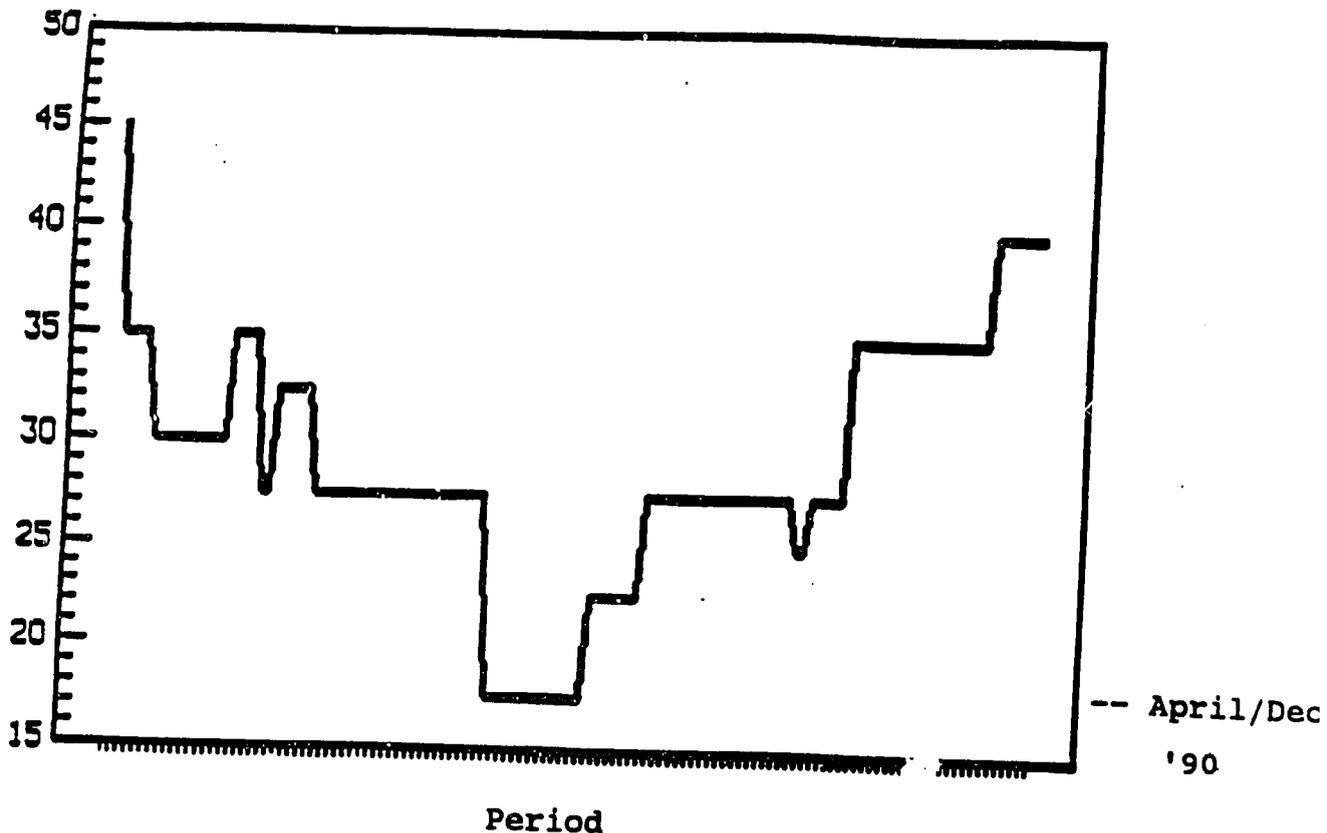
	main d'oeuvre spécialisée	main d'oeuvre ordinaire
Préparation du sol	3 j	-
Plantation	4 j	-
Désherbage	-	1 j
Fertilisation et brinage	-	3 j
Contrôle phytosanitaire	-	1 j
Irrigation (manuelle)	-	1 j
Récolte	3 j	-
Conditionnement	-	5 j

Autres informations techniques

- Pour des cultures sous serre (hors saison), on doit utiliser des bulbes (cormus) de gros calibre: 14 cm et plus.
- Un choix variétal s'impose pour chacun des 3 types de culture. Pour la plantation, on utilise les mailles su'un grillage métallique. Les cultures avancée et retardée sont faites sous serre alors que la culture de saison est faite généralement en plein air. Pour la culture avancée, la température optimale de croissance est de 15°C.

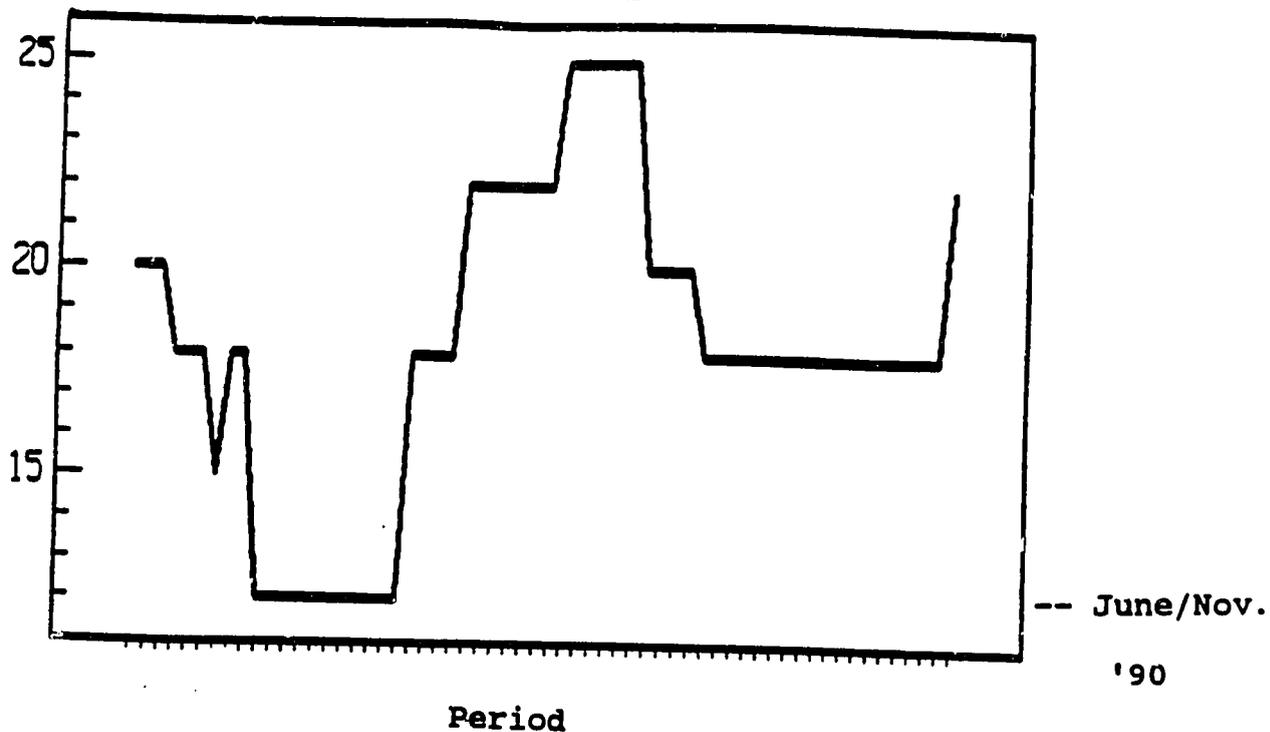
60 CM SONIA ROSE
ILE DE FRANCE

FF/10. stems



120 CM GLADIOLI
ILE DE FRANCE

FF/10 stems





NORMALISATION DES FLEURS COUPEES FRAICHES ET FEUILLAGES FRAIS

Règlement CEE n° 316/68 du
12 mars 1968 fixant des

NORMES DE QUALITE POUR LES FLEURS
COUPEES FRAICHES ET LES FEUILLAGES FRAIS

I — CHAMP D'APPLICATION

Les présentes normes sont applicables aux fleurs et boutons de fleurs, coupés, pour bouquets ou pour ornements, frais, de la position 06.03 A du tarif douanier commun.

II — CARACTÉRISTIQUES DE QUALITÉ

A. Caractéristiques minimales

Les produits doivent avoir été soigneusement coupés ou cueillis, selon l'espèce, et avoir atteint un développement approprié.

B. Classification

i) Catégorie I

Les produits classés dans cette catégorie doivent être de bonne qualité. Ils doivent présenter les caractéristiques de l'espèce et, éventuellement, de la variété (cultivar).

Toutes les parties des fleurs coupées doivent être :

- entières,
- fraîches,
- libres de parasites d'origine animale ou végétale ainsi que des dégâts provoqués par ceux-ci,
- exemptes de résidus de produits pesticides ou d'autres substances étrangères affectant l'aspect du produit,
- exemptes de meurtrissures,
- exemptes de défauts de végétation; pour les œillets, l'éclatement du calice, n'est pas considéré comme un défaut de végétation. Cependant, pour les œillets américains, les fleurs à calice éclaté doivent être baguées, présentées séparément en lots homogènes, et un marquage approprié doit être apposé sur les emballages.

Les tiges doivent être, selon l'espèce (species) et la variété (cultivar), rigides et suffisamment fortes pour porter la ou les fleurs.

ii) Catégorie II

Cette catégorie comporte des produits ne répondant pas à toutes les exigences de la catégorie I.

Toutes les parties des fleurs, coupées doivent être :

- entières,
- fraîches,
- libres de parasites d'origine animale.

AA

Les fleurs peuvent, toutefois, présenter les défauts suivants :

- de légères malformations,
- de légères meurtrissures,
- de légers dégâts dus notamment à des maladies ou à des attaques de parasites d'origine animale,
- des tiges moins rigides et moins fortes,
- de petites taches provenant de traitements pesticides.

Les défauts admis ne doivent pas compromettre la tenue, l'aspect et la bonne utilisation des produits.

C. Dénomination EXTRA

Les produits qui présentent les caractéristiques de la catégorie I peuvent être dénommés EXTRA dans la mesure où ils ne bénéficient d'aucune tolérance de qualité. Toutefois, cette dernière dénomination ne peut être utilisée pour désigner les œillets américains à calice éclaté.

III — DISPOSITIONS PARTICULIÈRES

Les dispositions particulières à certains genres de fleurs, figurant dans l'annexe I A, prévalent sur les dispositions prévues à la présente annexe.

IV — CALIBRAGE

Pour les fleurs coupées, le calibrage doit répondre au moins à l'échelle suivante :

Code de longueur	Longueur	Code de longueur	Longueur
0	moins de 5 cm ou fleurs commercialisées sans tige	40	40— 50 cm
5	5— 10 cm	50	50— 60 cm
10	10— 15 cm	60	60— 80 cm
15	15— 20 cm	80	80—100 cm
20	20— 30 cm	100	100—120 cm
30	30— 40 cm	120	au-delà de 120 cm

Ces longueurs s'entendent fleur comprise. La différence par unité de présentation (bottes, bouquets, boîtes et similaires) entre les longueurs maximales et minimales des fleurs contenues dans cette unité ne peut dépasser :

- 2,5 cm pour les fleurs classées dans les codes 15 et inférieurs,
- 5,0 cm pour les fleurs classées dans les codes 20 (inclus) à 50 (inclus),
- 10,0 cm pour les fleurs classées dans les codes 60 et supérieurs.

Cette différence peut être doublée pour les fleurs présentées en palme. Pour les chrysanthèmes à grandes fleurs, présentées en palme, cette différence peut atteindre 20 cm pour les fleurs classées dans les codes 20 (inclus) à 50 (inclus).

L'échelle de calibre et l'homogénéité de longueur prévues ci-dessus ne sont pas applicables au mimosa.

La longueur minimale des branches de mimosa est fixée à 20 cm. Cependant, des colis et des bouquets composés exclusivement de petits brins de longueur inférieure à 20 cm peuvent être admis sous réserve que l'expression « boutonnière » ou une mention équivalente soit apposée sur les emballages.

V — TOLÉRANCES DE QUALITÉ

Des tolérances de qualité sont admises dans chaque unité de présentation pour les produits non conformes.

i) Catégorie I

5 % des fleurs coupées peuvent présenter de très légers défauts, à condition que l'homogénéité des fleurs dans une unité de présentation ne s'en trouve pas affectée.

ii) Catégorie II

10 % des fleurs coupées peuvent ne pas correspondre aux caractéristiques de la catégorie. La moitié de cette proportion peut être attaquée par des parasites d'origine animale ou végétale. Les défauts en cause ne doivent pas compromettre l'utilisation des produits.

VI — EMBALLAGE ET PRÉSENTATION

A. Présentation

Une unité de présentation (bottes, bouquets, boîtes et similaires) doit comporter 5, 10 ou un multiple de 10 pièces. Toutefois, les fleurs normalement commercialisées à l'unité, ainsi que celles normalement commercialisées au poids, échappent à cette règle.

B. Homogénéité

Chaque unité de présentation (bottes, bouquets, boîtes et similaires) doit contenir des fleurs de même genre (genus), espèce (species) ou variété (cultivar) et de la même catégorie de qualité, présentant un développement homogène.

Le mélange de fleurs et, éventuellement, de fleurs et feuillages de genre (genus), d'espèces (species) ou de variété (cultivar) différents est, toutefois, admis, sous réserve qu'il soit composé de produits de la même catégorie de qualité et qu'un marquage approprié soit apposé.

C. Conditionnement

Le conditionnement doit être tel qu'il assure une protection convenable du produit. Les papiers ou autres matériaux en contact direct avec les fleurs coupées doivent être neufs.

VII — MARQUAGE

Les indications suivantes doivent accompagner les marchandises :

A. Identification

Expéditeur
ou
Emballleur } Nom et adresse ou
identification symbolique

B. Nature du produit

- genre (genus),
- espèce (species) ou variété (cultivar) ou couleur des fleurs,
- le cas échéant, la mention « mélange » (ou l'utilisation d'un mot équivalent).

C. Origine du produit (facultatif)

Zone de production ou appellation nationale, régionale ou locale.

D. Caractéristiques commerciales

- Catégorie,
- Calibrage (code de longueur) ou longueurs minimale et maximale,
- Nombre ou poids net.

E. Marque officielle de contrôle (facultative)

11

ANNEXE I A

NORMES COMMUNES DE QUALITE POUR LES FLEURS COUPEES FRAICHES

DISPOSITIONS PARTICULIÈRES POUR LE MIMOSA

Le mimosa doit répondre au moins aux critères qualitatifs de la catégorie I.
Cependant, pour ce genre, la notion de rigidité n'est pas à prendre en considération pour les extrémités supérieures des tiges florales. La base des rameaux ne doit pas être trop ligneuse.

Le mimosa doit, en outre, présenter les critères qualitatifs suivants :

- rameau bien fourni de fleurs;
- tige non épointée. Toutefois, sont admises des tiges épointées dont la coupe supérieure présente un diamètre inférieur à 2 mm.

Le mimosa peut être présenté soit épanoui, soit non épanoui.

Pour le mimosa épanoui, la floraison doit être normale compte tenu de la variété, le nombre de glomérules verts, non encore épanouis, ne devant pas excéder :

- 60 % pour le Floribunda,
- 20 % pour les autres espèces et variétés.

En outre, les glomérules épanouis doivent être de couleur franche, non tachés, bien fixés à l'inflorescence.

Pour le mimosa non épanoui, 80 % des glomérules doivent être jaunes (légèrement ouverts).

Présentation

Les branches de mimosa doivent être litées en couche ou présentées en bottes de :

- 150, 250 et multiples de 250 grammes.

Le mimosa non épanoui doit être conditionné sous sachet de polyéthylène ou constitué d'une matière similaire.

Chaque unité de présentation, même offerte en vrac, doit être de composition homogène et ne contenir que des branches de même espèce et de même variété.

Marquage

Outre l'identification de l'embauteur ou de l'expéditeur apposée sur chaque colis, le marquage doit comporter les mentions suivantes :

- Le genre : mimosa,
- l'espèce ou la variété (cultivar),
- l'expression « épanoui » ou « non épanoui »,
- le cas échéant, la dénomination « boutonnière » ou une mention équivalente,
- le poids net total ou le nombre de bouquets et leur poids unitaire.

90

Annex 6
Cost of Analysis

REPUBLIQUE TUNISIENNE
-:-
MINISTERE DE L'AGRICULTURE
-:-
INSTITUT NATIONAL DE
LA RECHERCHE AGRONOMIQUE DE TUNISIE
-:-
LABORATOIRE D'ANALYSE
DES SOLS, PLANTES, EAUX

/// ARIF DES ANALYSES

1990

	<u>PRIX (T)</u>
<u>V/ ANALYSE DES SOLS</u>	
1.- Granulometrie (chaque échantillon).....	5.000
2.- pH, conductivité (chaque détermination).....	1.500
3.- Calcaire total, calcaire actif (chaque détermination).....	2.000
4.- Azote total, carbone, phosphore assimilable, potassium échangeable (chaque détermination).....	3.000
5.- Sels solubles, sodium, potassium, ammonium, calcium, magnésium, chlorures, nitrates (chaque détermination)	2.000
6.- Bore, cuivre, fer, Manganèse, Zinc (chaque détermination).	5.000
<u>B/ ANALYSE DES PLANTES</u>	
1.-Azote, phosphore, potassium, sodium	3.000
2.-Calcium, magnésium, manganèse, cuivre, fer, bore, zinc.....	3.000
<u>C/ ANALYSE DES EAUX</u>	
1.-pH et résidu sec (ensemble).....	2.000
2.-Chlorures, sulfates, bicarbonates, carbonates, nitrates, sodium, potassium, calcium, magnésium (chaque détermination).....	3.000
<u>D/ ENGRAIS. FUMIER ET AUTRES</u>	
1.-Humidité, matière minérale totale, matière minérale inerte, matière organique (ensemble des déterminations).....	15.000
2.-Azote, phosphore, potassium, sodium, Calcium, magnésium, zinc, manganèse, cuivre, fer, cadmium, bore (chaque détermination)..	10.000

81'

Annex 7

List of Participants at Round Table
on Cut Flowers

LISTE DES PARTICIPANTS

ETUDE SUR L'EXPORTATION DES FLEURS
TABLE RONDE
Samedi 20 Octobre 1990
El Mechtel

IPARTICIPANTS	ADRESSE	TELEPHONE	VARIETES
IPRODUCTEUR			
11. Mohamed BAHR AGROFLORA	Mornag CP 2090	292 303	plusieurs + plantes
12. Fredj GANDOUZ ETS. GANDOUZ	Av Mohamed V Chott Meriem Sousse CP 4000	03 48 349	Roses
13. BEN MOUSSA FLORASOL	Oued Ellil	535 167	Roses Oeillet Gladiolus
14. Mohamed BEN HAMOUDA PDG STE TAFPELOUNE FLOWERS	63 Av Habib Bourguiba Le Parnasse CP 1000	351 868	Gladiolus Oeillets
15. Shabi MAHJOUR STE AGRICOLE SADIRA	Sidi Saad Mornag CP 2090	360 245	Fleurs seche
16. Amor CHAALALI NABILA FLEUR	Chott Meriem Sousse CP 4042	03 48 476	Roses Oeillets Gysophila
17. Richa/Mounir BOSTANJI AZZA FLOWERS	Huilerie Bayrem Cebalet Mornag	292 041	Gladiolus Stacice
18. Leila DAHBI/BOUJEMAA HORTI-UTICA	Domaine Utique Utique CP 7060	02 45 489	Strelitezia Eucalyptus
19. Youssef BENZARTI CORNICHE PLANTE	Route Panoramique Bizerte CP 7000	02 337 82	
110. Mabrouk MANAI UPEA	Port El Kantaoui Sousse Nord CP 4089 BP 26	03 27 665 B 03 48 335 D 03 27 479 fax	Plantes Ornementales

IPARTICIPANTS	ADRESSE	TELEPHONE	VARIETES
11.Imed MEJBRI	12 rue Dakar Nouvelle Ariana CP 2080	716 510	Jasmin
12.Sadok BOUKHRIS	16 rue de foie Bab Souika CP 1006	262 199 domicile 561 280 bureau	Jasmin
13.Abdessatar Larbi BEN OTHMAN	Sidi Dhafer Bouargoub Nabeul CP 8040	02 59 617	Jasmin
14.Hassine JEBARA PDG Societe FLORA AFRICA Societe L'HUMUS	Route Beni Khallad Grombalia CP 8030	02 55 410 02 55 685	
15.Simon LORENZ Administrateur Suisse FLORASOL	4 Place des Fatimites El Menzah V 1004 Tunis	535 167	
IPRODUCTEUR POTENTIEL			
16.Lotfi MEJBRI	12 rue Dakar Nouvelle Ariana CP 2080	716 510	
17.Tahar ABDELWAHEB	23 rue Hannibal Salambô CP 2025	730 086	
18.Chedly BEN AMMAR PDG CURAT	11 rue Mohamed Ali Annabi Tunis CP 1002	897 975	
19.Youssef MOULHI	Ben Arous	225 777	
20.Redhia ABDELLATIF	3 rue El Mansousra El Menzah IV	767 170	
21. Ismail Chedly GHLALA			

83

PARTICIPANTS	ADRESSE	TELEPHONE
ICEPEX		

22. Mustapha BELHADJ YAHIA	Angle rues Ghandi et Kamel Ataturk	350 344
Directeur Conseiller	1001 Tunis	
23. Dalila SEGHIR		
Sous Directeur		354 362
Cellule Assistance et Conseil		
24. Mohamed BERBECHÉ		
Sous Directeur de la Direction		350 344
des Etudes et Recherches		
IAPIA		

25. Mohamed DRIDI		
Directeur de la Promotion	"	288 400
des Investissements		
ICCSPC		

26. Allala GHORBANE	45 Av Farhat Hached	340 350
Directeur General	CP 1000	
Cooperative Centrale des		
Semences et Plants Selectionnés		
Ecole d'Horticulture		

27. Abdallah OMEZZINE	Chott Meriem	03 48 459
Economiste Agricole		
28. Ridha KRICHEIE		
Enseignant	"	

PARTICIPANTS	ADRESSE	TELEPHONE
TRANSPORT		

129. Lotfi AYADI Douane	Av. Mulhouse Tunis	651 195
130. Lotfi BEN MAAOUJA Direction Commerciale SOCUTU	59 rue 18 janvier 1000 Tunis	256 781 253 050
131. Rachid BOUABANE Chef d'Agence Direction Commerciale Sous-Direction Fret TUNISAIR	Aéroport Tunis-Carthage CP 2035	235 000/236 000 poste 3078
132. Rachid BELHAJ Gerant Directeur Commercial Ste de Transport International Routier Aerien et Maritime	56 rue Al Jazira Tunis CP 1000	342 524
INRAT		

133. Mme SASSI Etude des Sols	rue 7050 Ariana CP 2049	230 107
134. Mme CHATTI Botanique	"	"
PRODUCTION VEGETALE		

135. Amina BOUATTOUR Contrôle Phytosanitaire	30 rue Alain Savary	680 263
136. Mohamed MZALI Directeur de la Direction Arboriculture		680 262
IUTAP		

137. Mohamed BOUGHEPA Directeur de la Federation au sein de l'UTAP	6 Av Habib Thameur CP 1069 Tunis	245 095

85

PARTICIPANTS	ADRESSE	TELEPHONE
CHAMBRE DES AGRICULTEURS DU NORD		
138. Mohamed TERRAS President	20 rue Mouaouia Ibn Abi Soufiane 1002 Tunis Belvédère	788 986/789 996
IA3T ASSOCIATES/PROJET APIP	Ministere de L'Agriculture	
139. Cheri RASSAS Representante Residente APIP	30 Rue Alain Savary 1003 Tunis/BP 24	785 764 681 572
140. Nancy LAWS Consultante Nations-Unies		
141. Jerry MARTIN Chef de mission		
142. Charlie STATHACOS Agro-economiste		
143. Jouda DAOUJ Assistante APIP	30 Rue Alain Savary 1003 Tunis/BP 24	785 764 681 572
IDGPDIA		
144. Mohamed GHARBI Directeur General-DGPDIA	Ministere de L'Agriculture	240 767/249 062
145. Abdelhakim KHALDI Sous-Directeur-DGPDIA	"	681 574
IDAVUM		
146. Anouar HAMMAMI - DAVUM Chef de département, produits chimiques	33 Rue K. Barberousse 1001 Tunis	240 767/249 062
IUSAID	rue Suffex Notre Dame	784 300
147. Shirley PRYOR Economiste Agricole Responsable du Projet APIP		

ANNEX 8

PERSONS CONTACTED IN PARIS

Wholesalers/Importers

Airfleurs

Jacques H. Lemaire, Président Directeur G 
Centre Commercial Les 3 Fontaines,
Hall B, Boite 1026
95000 CERGY-PONTOISE
T l.(1) 34.25.03.65
T l copie (1) 30.73.19.50
T lex 699 148

Fleurassistauce

Fabrice Fourgeux
94648 M.I.N. RUNGIS CEDEX
T l phone: (1) 46 86 43 97
T lex: 205 374 F
T l fax: (1) 45 60 90 07

Florimex

61, Avenue de la Villette
FLEURS 384
94637-RUNGIS CEDEX
T l phone: 46-87-12-30/46-86-91-37
Fax: 46-87-01-48
T l x: 200958

Francerose Andr  OMAR

301, All e des Eillets
M.I.N. - Fleurs 347
94645-RUNGIS CEDEX
T l x: 270 771 F
Fax H9780077

Lauraflor

L. P. Biwinski, G rant
Batiment: C1
19, All e des Arums
Fleurs 229
94644-RUNGIS CEDEX
FRANCE
Tel.: (1) 46-86-45-66
T l x RUNGIS PUBLIC 250 304 pour Lauraflor

Laville et Cie

Mr. Moriniere
259, All e de An mones
Fleurs 465
94638-RUNGIS CEDEX
Tel.: (1) 46-86-05-92
Fax: (1) 46-86-15-23

Michel Paul
7, Allée Orchidées 94639
94639-RUNGIS CEDEX
Tél: (1) 46.86.85.78

Government Agencies on Trade Associations

Claudine Emery
Sous-Direction PAEM
Chargée d'Etudes et de Missions
Comite National Interprofessionnel de L'Horticulture et des Perinieres
13, Rue Du Pont Des Halles - B.P. 94152 Rungis Cedex
Tel: 16 (1) 87 26 29
Fax: 16 (1) 46 75 01 41
Telex: 263 458 F

Centre Fraugais du Commerce Exterieur (CFCE)
10, Avenue d'Iéna
75783 Paris Cedex 16
Tel.: (1) 40-73-30-00
Fax: (1) 40-73-39-79
Telex: C.F.C.E. 611934F