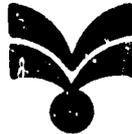


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**ARAB REPUBLIC  
OF EGYPT**



**INVESTMENT  
AND  
FREE ZONES  
AUTHORITY**

**Sectoral Survey 8**

**THE CHEMICAL INDUSTRY  
IN EGYPT**

**1982**

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A GUIDE TO DOING BUSINESS IN EGYPT follows page 133 of this report.

## PREFACE

This report is one of a series published by the General Authority for Investment and Free Zones and is designed specifically to promote the participation of U.S. companies in investment projects in Egypt.

Funded by the U.S. Agency for International Development (U.S. AID) and prepared by the Chase World Advisory Group of Chase Trade Information Corporation, these reports focus on sectors of the Egyptian economy which offer the foreign investor specific investment opportunities in significant areas of the Egyptian economy, ranging from pharmaceuticals, the processing and distribution of food crops, the production and processing of livestock, poultry and fish products, to construction materials, components and systems, and to electronic machinery.

There are ten reports in all. This eighth report, on the chemical industry in Egypt, was prepared by the engineering construction firm of Singmaster & Broyer, Inc., a member of the SNC Group, under the direction of Dr. Ray S. Kelley, Jr., of the Chase Trade Information Corporation.

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## INTRODUCTION

The chemical industry in Egypt represents a major component of the industrial sector. It produces a wide variety of products, including bulk chemicals, fertilizers, pulp and paper, petrochemicals, rubber products, plastics, pharmaceuticals, soaps and detergents, and paints, varnishes, and lacquers. In 1980, the chemical sector produced approximately 13.5 percent of the total industrial output, a percentage which has been gradually increasing.

Table A shows the relative productive output of the various elements of the Egyptian industrial sector. An analysis of the data indicates that the chemical sector has been expanding at a rapid pace. Since 1975 the overall compound growth rate has been 18.5 percent.

While chemical production within Egypt has been growing, imports have been growing as well, indicating that internal growth has not been sufficient to meet the rising demand. Table B shows the imported value of chemical industry goods from the years 1976 to 1980. During this time, imports have more than doubled.

This report provides an in-depth review of the chemical industry in Egypt and identifies potential joint-venture opportunities stemming from the continued growth of this vital sector of the Egyptian economy.

Table A  
**THE VALUE OF EGYPTIAN INDUSTRIAL OUTPUT:  
 SELECTED YEARS, 1952-1980\*\***

(L.E. Millions, at Current Prices)

Sector	1952	1975	1976	1977	1978	1979	1980 *
Chemicals and Pharmaceuticals	20.5	269.0	282.0	345.0	372.0	476.0	629.0
Mining	3.6	22.4	23.0	27.0	30.0	32.0	39.0
Food Industries	122.3	694.0	778.0	871.0	989.0	1158.0	1443.0
Engineering and Electric Industries	30.1	393.0	447.0	554.0	666.0	821.0	1030.0
Building Material Industries	8.4	94.0	76.3	82.0	81.0	84.0	85.0
Spinning and Weaving Industries	84.6	689.0	757.0	873.0	1099.0	1166.0	1423.0
<b>TOTAL</b>	<b>269.5</b>	<b>2161.4</b>	<b>2363.3</b>	<b>2752.0</b>	<b>3237.0</b>	<b>3737.0</b>	<b>4649.0</b>
Chemicals and Pharmaceuticals As Percent of Total	7.6	12.4	11.9	12.5	11.5	12.7	13.5

\* Tentative Figures.

\*\* Excluding petroleum industries, governmental workshops, military factories for military purposes, ginning and grinding industries, bakery, tea, packing, press, and publishing.

Source: Statistical Yearbook, July 1981, Central Agency for Public Mobilization and Statistics.

Table B

EGYPTIAN IMPORTS OF PRODUCTS OF THE  
CHEMICAL INDUSTRIES, 1976-1980

Year	Imports L.E. (000)
1976	126,921
1977	164,038
1978	210,966
1979	195,780
1980	260,946*

\* Tentative.

Source: Statistical Yearbook,  
July 1981, Central Agency  
for Public Mobilization  
and Statistics.

In addition to the potential investment opportunities identified in this report, there are undoubtedly significant numbers of other Egyptian businessmen or companies interested in participation in chemical industry joint ventures.

Interested U.S. investors are encouraged to contact any of the following organizations involved in the continuing review of investment opportunities:

- o The Egyptian General Authority for Investment and Free Zones

- o Chase Trade Information Corporation
- o U.S. AID
- o Egypt-U.S. Business Council
- o U.S. Trade Representative, U.S. Department of Commerce

#### Scope of Products Covered

While the report deals with a broad spectrum of the chemical industry, the range of products covered by the report was limited, based upon discussions with knowledgeable Egyptian government employees, Chase Trade Information Corporation (CTIC) personnel, and U.S. AID Cairo Mission sources. The purpose of the screening was to select those products which are fundamental to the economy and would appear to offer the greatest potential for joint ventures and investment opportunities. In addition, the following factors entered into the selection process:

- o Petroleum and petrochemical products were excluded because these areas are reserved to the public sector and special concessions. Similarly, fertilizer and pulp and paper products were also excluded.
- o The products selected have the potential for export.

- o The products selected have the potential to reduce or eliminate foreign raw materials.
- o The products selected are used directly to satisfy human needs or are used in the manufacture of such products.

As a result of the screening process, the following products were selected for detailed study:

- o Soap, detergents, and specialty cleansers
- o Paints, varnishes, and lacquers
- o Pesticides and insecticides
- o Plastics, rubber, and synthetic fibers
- o Alkalis, chlorine, and sodium chemicals
- o Sulfuric and hydrochloric acids
- o Textile chemicals, dyes, and pigments
- o Industrial gases
- o Wood chemicals

#### Need for Technology and Financing

During interviews with the managers of both public and private sector chemical companies, a majority stated that the most desired item is acquisition of state-of-the-art technology. Although the availability of skilled technicians is a general problem in Egypt, many companies have a corps of experienced chemists, engineers, and technicians who would be major assets in

bringing new chemical facilities into production.

Financial assistance is also an important requirement, mainly in the medium- and small-sized private sector companies which are considering horizontal integration with the introduction of new process technology to their operations. Several of the public-sector companies have completed planning for new projects for which an Egyptian market has been identified and proven. These projects might possibly go forward earlier with the assistance of a U.S. investor, bringing financial assistance to a newly-formed Public Law 43 joint-venture company.

#### Types of Joint Ventures Covered

Two types of joint-venture opportunities are discussed in this report--specific and conceptual. The criteria for the specific joint-venture opportunity are:

- o The defining of a specific project that the Egyptian government considers important to national welfare eligible for approval under Public Law 43.
- o The participation of a potential Egyptian partner who desires outside management, technical, or financial assistance on a specified project.

U.S. businessmen interested in specific projects will be encouraged to undertake reconnaissance visits to Egypt to meet potential partners and discuss proposed projects in detail. If sufficient interest is generated, both parties will be further encouraged to undertake the necessary feasibility studies.

The criteria for defining a conceptual joint-venture opportunity are less precise. In this case, although there appears to be a need for the project, joint-venture partners have not been specifically identified. U.S. businessmen interested in these more general opportunities are encouraged to make their interest known. After additional details are developed with the assistance of Egypt's General Authority for Investment and Free Zones, a search for potential Egyptian joint-venture partners can be initiated.

#### Methodology

After initial scoping discussions in the United States, Singmaster & Breyer, Inc., assigned a Resident Technical Coordinator to carry out the necessary field work in Egypt. During his assignment on the chemical sectoral study, he operated as a member of a project team which consisted of Chase Trade Information Corporation and General Authority for Investment and

Free Zones personnel.

The major work activity in Egypt consisted of conducting interviews with top executives of key chemical companies. The report is based upon more than seventy such interviews. Each interview was carried out by the S&B Technical Coordinator and a counterpart Investment Authority Representative (whenever possible), who provided translation services and technical assistance. A "Call Report" was prepared for each meeting.

The reports served as the basis for the joint-venture opportunity descriptions which are discussed in the report. Some of the joint ventures were classified as "specific" based upon discussions with an Investment Authority representative, even though no formal review in writing was carried out by the Authority.

The other work activity consisted of obtaining statistical data in regard to production, imports and exports, and other relevant areas. Most of this data was obtained from the Central Agency for Public Mobilization and Statistics (CAPMAS). Much of the data obtained from the Federation of Egyptian Industries is unpublished as of this date.

## Outline of Report

The first section of the report following the Executive Summary provides a general overview of the chemical industry, including the role of public and private sector companies, the role of the government and its key agencies, general pricing conditions, methods of distribution, the labor picture, and other general information.

Subsequent sections deal with the product categories studied. Each product section includes a brief description of the product and its uses, its method of manufacture and raw materials used; a brief discussion of the industry structure; a discussion of the present and projected market demand, including where available, statistics on production, imports, exports, and growth rates; and a review of the potential investment opportunities.

Table 12-1 includes a profile of each of the potential investment opportunities developed from this sector survey. Table 12-2 lists potential investment opportunities which are relevant but were developed by others.

The last part of the report, A Guide to Doing Business in Egypt, provides background data in regard to

the Egyptian business environment, including information on the economy, taxes, repatriation of funds, key government agencies and addresses, and other helpful information.

## 1. EXECUTIVE SUMMARY

The growth of the chemical industry in Egypt is being driven by a number of powerful forces. These include the increasing emphasis on industrialization, a rapidly growing population, the need to modernize much of its existing facilities, the desire to reduce imports and increase exports, and the rapid technological obsolescence which characterizes the chemical industry.

Egypt has many advantages in carrying out its expansion program. An industrial base already exists, a basic infrastructure is in place, major financial institutions are functioning, a large labor pool exists, and there are many excellent technical and educational institutions in operation. Its strategic location also makes Egypt an ideal base for exporting its industrial products.

Along with its assets, Egypt has a number of significant problems to overcome. These include a shortage of skilled technicians and managers, high unemployment, and restrictive labor laws which frequently result in overstaffing and inefficiency, high cost, and poor quality resulting from a lack of incentives and skills, and the excessive bureaucratic involvement in the operation and planning of the industrial sector.

Cognizant of these problems and of the need to involve foreign investors to assist in building its economy, the Egyptian government has undertaken a series of steps to overcome these difficulties. The most important for the foreign investor was the enactment of its so-called "Open Door" policy. The major thrust of this policy was the enactment in 1974 of Public Law 43, which provides major incentives for the foreign investor. The legislation features tax holidays for five years, regulations which facilitate the repatriation of invested capital and profits, freedom from local taxes for Free Zone products, exemption from government regulation on labor participation in management, profit sharing, and board composition. The combination of the Public Law 43 legislation and the anticipated growth of the chemical sector provide excellent opportunities for the U.S. businessman.

#### Industry Structure

Egypt's economy operates on a dual track, including both public and private sector companies. Each sector operates under different guidelines with respect to production goals, investment, expansion, and pricing. The public sector, which stems from the nationalization

policies of the early 1960s, is the larger of the two sectors and is subject to strict governmental control.

The Public Law 43 legislation is intended to place greater emphasis on increasing the role of the private sector, to reduce the tightly centralized control over the public sector, and to allow the effect of free market forces to play a greater role in establishing prices and wages.

#### Survey Results

Thirty-one potential joint-venture opportunities are discussed in the report, twenty-six of which are a result of the survey work carried out for this sector study. The results of the survey for each product category are summarized below.

#### Soaps, Detergents, and Specialty Cleansers

The production of soaps and detergents is one of the major activities of the chemical sector. Almost all of the soaps and detergents used are produced locally by Egyptian firms using imported raw materials. The public sector companies dominate. Laundry soap is the item produced most, followed by toilet soap and detergents. The industry is growing rapidly. With Egypt's continuing population growth and increasing purchasing power, the industry's growth rate should be maintained.

Seven joint-venture opportunities are discussed in the report. All of them involve proposed facilities to produce or package detergents. The increasing use of detergents instead of laundry soaps is a pattern which has been repeated in other parts of the world.

#### Paints, Varnishes, and Lacquers

The bulk of the paints, varnishes, and lacquers used in Egypt are produced locally. The essential raw materials, pigments, binders, etc., are imported. Most of the output is provided by private sector companies. Production is increasing at a rate of 24.8 percent annually. With the projected major increases in housing and reconstruction of new communities, it is anticipated that this sector of the industry will continue to grow rapidly.

Three project opportunities are discussed in this report. Two involve the production of paints and lacquers, and the third covers polyester coatings for metal and wood.

#### Plastics, Rubber, and Synthetic Fibers

These industries may be segregated into two broad areas. The first is the production of the basic polymers, resins, and fibers; the second, the manufacture of finished products from these materials by

extension blow molding, injection molding, weaving, etc. At present, local industry is concerned primarily with the latter phase.

The production of plastics, rubber, and synthetic fiber products is growing rapidly. The public sector companies dominate production. The high growth rates are expected to be maintained. All of the raw materials are imported. Plans have been announced for the start of production of some of the basic raw materials. As Egypt's petrochemical industry begins to grow, it is expected that the importation of the basic polymer, resins, and fibers will decline.

Fourteen project opportunities are discussed in this report. Nine represent projects to produce polymers, resins, plasticizers, and other basic raw materials. The balance cover projects to fabricate final products using raw materials produced elsewhere. While not strictly chemical processing activities, they have been included to provide a complete picture of the investment opportunities available in this area.

#### Pesticides and Insecticides

The bulk of the pesticides and insecticides used in Egypt are imported. In 1980, imports represented more than 70 percent of the total used. However, local

production, which is largely in the hands of the public sector, is continuing to grow. Three project opportunities are discussed in the report, all of which involve production facilities for pesticides and insecticides.

#### Alkalis, Chlorine, and Sodium Chemicals

The chemicals covered in this area include salt, caustic soda, chlorine, sodium carbonate, sodium bicarbonate, sodium sulphate, and sodium sulfide. The bulk of the production of these basic chemicals is in the hands of two public sector companies: The El Nasr Salines Company and the Misr Chemical Company. While demand for these chemicals is expected to grow, consistent with the rest of the industrial sector, the survey did not establish any joint-venture opportunities. However, the report describes two potential projects which have been developed by others. One is a large project at Lake Qarun, which covers an extraction plant to produce salt, sodium, sulfate, sodium sulfide, magnesium oxide, and other chemicals. The second project is in the initial conceptual stage and involves a possible salt-production facility at Lake Bardaweil.

### Sulfuric and Hydrochloric Acids

The production of these basic chemicals is primarily in the public sector. The Abu Zaabal Fertilizer and Chemical Company is the primary producer of sulfuric acids and oleums, and the Misr Chemical Industry Company is the major producer of hydrochloric acid. The survey did not uncover any joint-venture opportunity for the production of these or any other acids.

### Textile Chemicals

Textile chemicals, dyes, and pigments are vital elements in the continuing growth of Egypt's spinning and weaving industry. The production of textile chemicals primarily is in the public sector. It is expected that the growth in this area will follow that of the spinning and weaving industry, which has been expanding rapidly. Three potential joint ventures were developed in this area, all covering new facilities for the production of textile chemicals.

### Industrial Gases

The major producer of industrial gases in Egypt is the Industrial Gases Company, a public sector enterprise. The company produces acetylene, carbon dioxide, hydrogen, oxygen, and nitrous oxide. Other

industrial gases such as neon, argon, refrigerants, and nitrogen are imported. One joint-venture opportunity was developed. The proposed project covers a new plant to expand Industrial Gases Company's production of acetylene by 20,000 metric tons (MT)\* per year.

#### Wood Chemicals

The production of wood chemicals in Egypt is insignificant. While large quantities of wood and wood products are imported, the wood is used in the production of pulp and paper and manufactured wood products. The survey did not develop any joint ventures in this area.

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\* A metric ton is 1,000 kilograms, or about 2,205 pounds. Unless otherwise specified, the term "ton" refers to a metric ton (MT) throughout this report.

## 2. GENERAL OVERVIEW OF THE CHEMICAL INDUSTRY

The chemical sub-sector's operations in Egypt are subject to the same conditions and restraints that affect most of the industrial sector. The discussion which follows provides a broad overview of the organization and operation of the chemical industry in Egypt.

### Governmental Policy in the Public and Private Sectors

Industry in Egypt consists of two basic groupings, the public sector and the private sector. Both operate in the same marketplace under different regulations. A brief historical review will be helpful in understanding the role of the two sectors and of the shifts in emphasis that have taken place in recent years.

In the early 1960s the Egyptian government nationalized all major enterprises. Most industries employing one hundred or more people were placed under government control. This resulted in a large number of companies with overlapping operations. In due course, the government consolidated and restructured the number of public sector companies to provide more efficient operation.

Today, the public sector in the chemical field is comprised of 27 companies reporting to the Ministry of Industry and Mineral Wealth. They produce mainly basic chemicals, fertilizers, and pulp and pulp products. A listing of these companies, their addresses, and major fields of activity is given in Appendix 1. In 1980, the public sector accounted for approximately 73 percent of chemical production.

In addition to the 27 companies described above, there are two other public sector companies which play key roles in the chemical sector but which report to other ministries. The Heliopolis Company for Chemicals, which is under the control of the military, produces a line of paint products. The General Trading and Chemicals Company is a major importer and wholesale distributor of chemical products. General Trading reports to the Ministry of Economy.

The private sector is generally composed of establishments employing ten to fifty people, although there are firms with much larger workforces. It has been estimated that there were approximately 4,000 privately owned establishments in the industrial

sector in 1978.\* Data on the number of such companies in the chemical sub-sector is not available. The private sector chemical companies' production consists primarily of specialty chemicals and plastic items for consumer use.

In the period between 1960 and the early 1970s, the major emphasis for industrial growth was on the public sector, with a high degree of centralized planning and control. In 1974, the government instituted its so-called "Open Door" policy. The program was aimed at stimulating the private sector, encouraging foreign investment, de-emphasizing the tight control over all aspects of the public sector, and on a limited scale introducing of market forces in establishing wages and prices. However, at this time the Egyptian economy still remains extensively controlled by the government. It is estimated that approximately 75 percent of the gross domestic product (GDP) is generated by the public sector.

#### Public Law 43

The most important legislation affecting foreign investment in Egypt today is "Public Law 43 of 1974,

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\* A.D. Little, "Report to the Special Inter-agency Task Force Reviewing the U.S. Security Supporting Assistance Program for Egypt. An Assessment of Egypt's Industrial Sector," January 1978.

Concerning the Investment of Arab and Foreign Funds and the Free Zones,\* as amended by Law 32 of 1977. The legislation deals with three main areas: 1) It provides the principles for establishing and regulating foreign investments; 2) It establishes regulations for investments in free zones; and 3) It establishes regulations for incorporating joint-venture companies.

Under Public Law 43, the investor is offered tax incentives, simplified methods for repatriation of earnings and capital, freedom from price controls and other concessions. A more complete discussion of Public Law 43 may be found in the section of this report entitled A Guide to Doing Business in Egypt. As of December 1981, some 1,287 projects had been approved under the legislation, although only about 555 were actually reported to be in operation by December 30, 1980.

Excerpts from 1980-1984 Egyptian Development Plan for Investment are shown in Table 2-1. The data indicates a major role for private investment in the industrial sector, calling for expenditures of 500 million Egyptian pounds (L.E.). Data as to what part of this investment is in the chemical sector is not readily available.

Table 2-1

**PLANNED FIXED INVESTMENT IN THE FIVE-YEAR PLAN  
1980-1984**

Sector	Investment (L.E. Million)		
	Public	Private	Total
Agriculture and food security	3,600	775	4,375
Housing, utilities and building materials	2,880	1,750	4,630
Transportation and communication	3,000	250	3,250
Industry sector (includes chemicals)	2,000	500	2,500
Export sector	1,800	300	2,100
Electricity	1,500	--	1,500
Social services	1,600	--	1,600
Reconstruction and new communities	900	300	1,200
Local governments	1,000	--	1,000
<b>TOTAL</b>	<b>18,280</b>	<b>3,875</b>	<b>22,155</b>

Source: Ministry of Planning.

## Governmental Regulation - Key Agencies

### General Authority for Investment and Free Zones

The governmental agency which administers Public Law 43 is the General Authority for Investment and Free Zones, also referred to as the Investment Authority. The agency promotes investment in Egypt by providing advisory services, offering projects for investment, operating promotional campaigns, and assisting investors in implementing projects. A more detailed discussion of the Investment Authority's services is also given in A Guide to Doing Business in Egypt. The Investment Authority relies on an allied agency, the General Organization for Industrialization (GOFI), for technical and feasibility evaluations of proposed projects.

### Ministry of Industry and Mineral Wealth

The governmental agency regulating the operation of the chemical sub-sector is the Ministry of Industry and Mineral Wealth. The chemical sector is administered by a "Higher Council" made up of ministry and company officials, representatives of the Ministries of Finance, Planning, and Economics, and experts in the technical, economic, or legal fields. The Higher Councils provide overall planning and coordination for the industry. Pricing, employment, and other key factors are controlled through this organization.

### General Organization for Industrialization

The General Organization for Industrialization (GOFI) is a branch of the Ministry of Industry and Mineral Wealth. GOFI employs about 1,300 people, of whom 800 are engineers, technicians, and commercial staff. GOFI's functions include formulation of industrial development policies, collection of data, studies to improve efficiency and technology, identification of investment opportunities, performance of pre-investment feasibility studies of proposed projects, examination and review of applications for establishing new joint ventures submitted to the Investment Authority, implementation of industrial projects, and other related activities. GOFI's approval is required before a Public Law 43 joint venture may proceed.

### Pricing and Price Controls

Prices for products may be fixed or allowed to float free, depending upon the nature of the product. Prices of essential consumer items and basic chemical and industrial components are generally fixed by the government.

Pricing of output produced by the public sector, including raw materials, intermediate products, and finished products, is generally subject to rigorous

control by the government. The price levels are generally set up on a cost-plus basis, but the pricing of essential consumer products is frequently established on the basis of sociopolitical considerations rather than economics. Occasionally a company's cost to produce a product is more than its controlled selling price. In this case the company submits a request for reimbursement to the government, which then makes a compensatory payment. The government intends to allow free market forces to play a greater role in the future.

Pricing of products in the private sector is subject to less control, and enforcement is frequently not as strict as in the public sector.

#### Distribution Patterns - Procurement and Sales

##### Procurement

Raw materials for a chemical producer may be obtained on an allocated basis from an Egyptian company or may be obtained from foreign sources.

Transactions which involve finished products or intermediates moving from one public sector company to another are carried out on the basis of a quota at a government-controlled price. The quotas are based upon the previous year's purchase. Thus, the supplying company must produce a quantity of material to allow the

purchasing company to at least meet its previous year's demand. The allocation may also require the supplying company to meet, where possible, the increased requirements of an expanding market.

The purchasing company can, if it wishes, purchase additional raw materials on the open market. But it will not enjoy the advantage of government-controlled prices for these additional requirements. To purchase raw materials on the world market, chemical sector companies must first submit a request to the Sector Foreign Trade Committee. This information includes commodity specifications, price, delivery, and method of payment. With approval by the Committee, the import transaction may take place. For large-quantity bulk products, international tenders are issued with the prior approval of the Ministry of Industry. Generally a fee is paid by the potential seller to obtain the tender specifications.

#### Commercial Agents

In order to submit a bid to a public sector company, a foreign company must engage the services of an Egyptian commercial agent. An agent is not required for bids to private sector companies or for sales financed by AID. Egyptian law also requires that foreign companies engage the services of agents, regardless of whether sales or

services are involved, where activities such as technical consulting, market research, or operation of a representative office are involved. In any case, private sector companies may also engage the services of an agent because of his well established access to certain markets. Further information in regard to agents may be found in the section entitled A Guide to Doing Business in Egypt.

#### Sales - Wholesale and Retail

Wholesale and retail distribution operations are generally carried out by vertically integrated merchants or public sector trading companies. The General Trading and Chemicals Company is the largest of the public sector trading companies. Government-run consumer cooperatives with many hundreds of retail outlets also provide wholesale and retail distribution activities. The co-ops purchase directly from producers, other cooperatives, or from importers, and distribute the products through their own shops. These co-ops operate mainly in the food industry, but many chemical products are distributed in this manner.

The retail trade in Egypt is conducted by numerous small private shops and factories having in-house sales personnel. In the smaller shops, such as local paint

stores, the proprietor and, possibly, members of his family are the retail sales personnel, an arrangement not unlike the smaller stores in the U.S. According to size, these companies may sell both wholesale and retail. They may sell locally produced chemical products and also imports. There are no price ceilings involved in these sales activities. Also, the government operates large, modern department stores in Cairo, where privately owned general and specialized stores can be found. The famous Khan el Khahli and Muski bazaars in Cairo are another source of retail distribution.

## Labor

### General

The labor picture for the chemical sector resembles that of most of Egyptian industry. Egypt has a large labor force which is characterized by a number of problems:

- 1) Large-scale unemployment, which is estimated to be in the range of 10-15 percent. Egypt's population growth requires the addition of 359,000 new jobs each year to maintain stable employment. This goal has not been met. In order to ease the problem, government-owned industry is forced to use a larger staff than it requires for efficient operation.

2) A shortage of skilled technicians and managers. While industry and labor unions do carry out vocational training programs, these have not been adequate. To correct the problem, the government is planning to establish an independent vocational training program which will produce 50,000 graduates and 600 instructors annually. Public Law 43 joint-venture companies must also establish training programs but are entitled to bring in a cadre of expatriates for key positions.

3) A "brain drain" which results from the large number of Egyptian skilled workers who leave to work in the oil producing Arab states. Wages in these countries are very much higher than those paid by the Egyptian public sector companies.

4) Underemployment and inefficiency in the public sector, resulting from the government's guarantee of a job to all college graduates.

#### Unions

Egypt has a large trade union movement. There are 21 general trade unions organized on industry lines. Professional groups such as engineers, doctors, lawyers, and teachers also have their own organizations.

### Need for Research - Technological Obsolescence

The international chemical industry is characterized by its heavy dependence on research and the rapid technological obsolescence of processes and equipment. In free market economies, competitive forces ensure that high cost, inefficient, technologically obsolescent plants are replaced. Construction of a dynamic chemical industry in Egypt will require attention to these problems.

### 3. SOAPS, DETERGENTS, AND SPECIALTY CLEANSERS

#### Soaps and Detergents

##### Description and Uses

One of the major activities of the chemical industry in Egypt is the production of soaps and detergents.\* Soap is produced by reacting oils and fats with an alkali and then salting out the soap. The fats may be derived from tallow, various oils such as cottonseed, coconut, and palm, or greases. Frequently, the oils used are the by-products of oil processing. The alkalis are sodium hydroxide (caustic) in bar soaps and potassium hydroxide in liquid soaps. Most of the oils used in Egypt are imported. Salt and caustic are produced locally, but more than half of the caustic in use in Egypt is imported.

Soaps may be made by batch processing or by continuous processes. In the batch method, the fats and alkali are mixed in large vats or kettles and heated by the addition of steam. Salt is added later to aid in the separation of the soap, which is

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\* The term "detergent" is used to mean synthetic detergents, although the term detergent technically includes both soaps and synthetic detergents.

partially in solution in the water. There is also a number of continuous processes for the manufacture of soap. The continuous methods are used where high levels of production are required.

Synthetic detergents generally consist of a surfactant, which aids in lifting dirt from the soiled surface, a water-softening agent such as sodium carbonate, and other compounds such as bleaches, suds stabilizers, and anti-redeposition agents. The primary component is the surfactant which can be made from a variety of organic compounds such as tallow and by-products of petroleum. Detergents have superior cleaning characteristics, particularly in hard or acid water, and in much of the world their use is growing rapidly.

#### Industry Structure

Substantially, all of the soap and detergents used in Egypt are produced domestically by the public sector. Table 3-1 shows the amount of soap and detergents produced by Egyptian companies during the years 1977-1981, and import data for 1979 and 1980.

The data shows that the public sector contributed 89.2 percent of the total domestic soap production versus 10.8 percent for the private sector. Imports

Table 3-1

PRODUCTION AND IMPORTATION OF SOAPS AND DETERGENTS IN EGYPT, 1977-1981  
(1,000 MT)

Product	1977		1978		1979		1980		1981	
	Prodn.	Imports								
<u>Soaps-Public Sector</u>										
Laundry Soap	161.3	N/A	169.0	N/A	181.7	N/A	251.0	N/A	261.0	N/A
Toilet Soap	21.8	N/A	26.4	N/A	29.7	N/A	37.7	N/A	42.6	N/A
Carbolic Acid Soap	N/A	N/A	N/A	N/A	0.5	N/A	0.4	N/A	0.4	N/A
<u>Soaps-Private Sector</u>	35.0	N/A	35.0	N/A	35.0	N/A	35.0	N/A	*35.0	N/A
Total Soap Demand	218.1	N/A	230.4	N/A	246.9	N/A	324.1	9.7	339.0	N/A
Synthetic Detergents and Surfactants	21.9	N/A	22.9	N/A	27.9	3.9	32.8	7.1	40.3	N/A

\* Data not given. 35.0 assumed as per previous years.

N/A: Data not available. Probably insignificant.

Source: Federation of Egyptian Industries, unpublished data.

were a relatively minor factor, amounting to only 3.0 percent of the total domestic soap production.

The bulk of the soap production industry in Egypt uses by-products of the edible oils industry as raw materials. This accounts for the fact that seven of the eight major public sector companies producing edible oils also produce soap and detergents. The bulk of the detergents used in Egypt are also produced locally-- 82.2 percent versus 17.8 percent obtained from imports. There are three private sector companies which produce detergents which, while small, are profitable.

#### Market Demand

An analysis of the data given in Table 3-1 indicates that the public sector production of laundry and toilet soaps is increasing rapidly, while private sector production has remained stable. The annual compound increases in demand actually experienced for these products is shown below:

Public Sector Laundry Soap Growth 1977-1981	12.8 percent
Public Sector Toilet Soap Growth 1977-1981	18.2 percent
Private Sector (all soaps)	0 percent
Detergents	16.9 percent

The General Organization for Industrialization (GOFI) has made projections of soap and detergent demand through the year 2000. This data is shown in Table 3-2. Analysis of this data indicates the following projected annual compound increases in demand:

Laundry Soap - 8.3 percent

Toilet Soap - 9.0 percent

Detergents - 10.1 percent

It would appear that GOFI's projections for growth, while still substantial, are below the level that the industry is currently experiencing. In either event this sector appears to have excellent prospects for growth.

#### Project Opportunities

Seven project opportunities are discussed briefly below. Further details are given in individual project profiles in Chapter 12. Six of the seven were developed as a result of work on this sector study. All of these cover expansion in the detergent field. The other project was discovered as a result of the earlier sector survey in this series on Egyptian food crops and involves both soaps and detergents. In all cases, the Egyptian company (or companies) is seeking both technical and financial assistance and intends to set up

a Public Law 43 company.

Table 3-2

PROJECTED DEMAND FOR SOAPS AND DETERGENTS:  
SELECTED YEARS 1980-2000

(1,000 MT)

Year	Laundry Soap	Toilet Soap	Detergents
1980	228	40	33
1984/1985	450	90	90
1989/1990	675	135	135
1994/1995	900	180	180
1999/2000	1,125	225	225

Source: General Organization for Industrialization.

The first project involves a group of four Egyptian companies seeking to enter into a joint venture with a foreign company. The newly formed company would produce 35,000-50,000 MT per year of sodium tripolyphosphate and 20,000 MT per year of dicalcium phosphate (feed grade) at a site in Suez. An investment cost for the plant has not yet been established. The lead company is a long-time fertilizer producer, the Suez Fertilizer Company. The three other companies are major detergent producers. The sodium tripolyphosphate is intended for use in synthetic

detergent production (see Profile 1).

The El Nasr Export and Import Company is proposing to build a plant which will blend synthetic detergents, using imported materials, and package them. Local manufacture of the imported materials is to be considered. The plant will produce approximately 40,000 pounds per week of detergents and will be located in the Cairo area. The cost of only equipment for the plant was estimated to be U.S. \$112,000 in November, 1981 (see Profile 2).

The Nile Oil and Soap Company is planning a plant to produce a complete line of detergent products in the Governorate of Sohag. The proposed output is 30,000 MT per year of detergents, 12,000 MT per year of laundry soap, 61,000 MT per year of toilet soap, and 2,000 MT per year of solvents for soybean oil extraction. The plant is estimated to cost L.E. 14 million for the detergent production only, including offsites (see Profile 3).

A new plant to package detergents using imported materials is being proposed by the El Tawil Trading and Engineering Company. The initial output would be approximately 1,500 MT per year. The plant will be located in a Free Zone near Alexandria (Amiria). The estimated cost of the plant is approximately U.S. \$1 million (see Profile 4).

A plant to produce 20,000 MT per year of industrial detergents is being proposed by the Organo-Technic Company at its existing factory site. The company presently produces a small quantity of detergents, textile preparations, softening materials, dyes, and paint. The plant cost is estimated at approximately U.S. \$7 million (see Profile 5).

The Abu Zaabal Specialty Chemicals Company is proposing to extend the production of an existing plant in the Cairo area from 1,000 MT per year of sodium toluene sulphonate (STS) to 3,000 MT per year. STS is used in industrial detergent production. The estimated cost of the facility is L.E. 4 million (see Profile 6).

The last project opportunity, which stems from the food sector study, covers the plans of the Egyptian Salt and Soda Company. The company is considering a joint venture to produce a line of toiletries under license to Guinness-Peat, a British firm. This line will include toilet soaps, after-shave lotions, shaving cream, and similar products for both local consumption and export. In addition, the company has an approved project to produce detergent powder. This might be developed either as a joint venture or on a licensing basis. To date the Egyptian company has had preliminary discussions with

several U.S. companies and with the British subsidiary of a U.S. company.

### Specialty Cleansing Agents

The market for specialty cleansing agents in Egypt is very small. At present almost all of the demand is satisfied by imports.

A survey of a number of supermarkets in the Cairo area found the following products on the shelves:

- o "Harpic" and "Harpic - W.C." sanitary cleansers for lavatories and toilets by Reckitt and Colman of England. "RITE" and "VIM", two scouring powders, are also in fairly wide use. These are made by Atlantis Egypt, Ltd., under license with Reckitt and Colman in Alexandria.
- o Purex Company of California U.S.A. products, including ammonia water, Old Dutch cleanser (scouring powder), and a peroxygen bleach and cleanser, "Purex All-Fabric All-Color Bleach." The Purex aluminum and stainless steel cleanser "Cameo" was also found in some markets.
- o Johnson Wax Co. (U.S.A.) products, including "Glance" window-cleaner spray, "Shout" spray (a laundry soil and stain remover), "Pledge" spray polish for furniture, as well as other household items. These are

currently being produced in England, but a new Public Law 43 joint-venture company commenced operation earlier this year. It was formed with Abu Zaabal Specialty Chemicals Company. It is expected that most of the popular Johnson Wax products will be made in Egypt in the near future.

- o Two well known specialty products of Boyle-Midway Company (U.S.A.), "Woolite Cold-Water Wash" and "Diaper Pure" presoak for infant laundry. The "Woolite Upholstery Cleaner" was also found in one market surveyed. Two "Easy-Off" specialty cleansers, one for kitchen ovens and the other for windows, were also found, as well as the spray cleanser "Kitchen Power."
- o A chlorinated scouring powder, "Calinda-Clorat," produced by an Italian company, Muratanja.
- o "Solitaire," a special tile cleanser which is a product of France.
- o Products of an Italian company, Brill, Spa Nova-Milanese: "Ceramica Bella," which appears to be a heavy-duty liquid detergent, another floor cleanser labeled "FOR," and a glass cleanser, "Vetril."
- o An all-purpose cleanser for floors and carpets from Germany under the label "Leifheit."
- o "Vileda," an all purpose spray cleanser, appears to

be a product similar to "Fantastic," which is marketed in the U.S.A. by the Texize Company.

- o A special toilet cleanser, "Water Flax," marketed by Fumakilla Italia, Spa, Milano. From the directions for use, it appears to be a caustic soda-based product.

- o "Liq-Tile" from Italy, a bathroom and tile cleanser which is basically a liquid-detergent product.

- o A multi-purpose hand cleanser, "Goop," from the U.S.A. This is a paste, used mainly as a pre-wash cleanser and stain remover.

The availability of specialty cleansing agents for the industrial sector was found to be limited. The ICI Scientific Company (U.K.) markets a line of hospital anti-bacterial cleansers under the name "Savion Concentrate."

#### Project Opportunities

The survey did not uncover any potential joint-venture opportunities in this area.

#### 4. PAINTS, VARNISHES, AND LACQUERS

##### Description and Uses

A wide variety of paints, varnishes, and lacquers are produced in Egypt, including wall surface preparations, protective finishes for wood, metal, automobiles, and marine use, and industrial coatings. Table 4-1 is a listing of products produced by the Paints and Chemicals Industries Company, the largest supplier of paints, varnishes, lacquers, and surface coatings in Egypt.

Paints are composed of three basic elements, a "pigment" which provides the color or some other useful property such as rust inhibition, a liquid or binder which is which is non-volatile, such as a drying oil or resin, and a liquid or "thinner" which is volatile, such as solvent or water. The combination of the binder and the thinner is known as the vehicle. Paints may be classified according to the binder used, e.g., alkyd, vinyl, or according to their properties or end use.

The basic steps in the manufacture of paint include: 1) the mixing of the vehicle and the pigment to produce a paste; 2) grinding of the paste to reduce

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Table 4-1

PRODUCT LIST OF  
PAINTS AND CHEMICAL INDUSTRIES COMPANY

Paints and Varnishes for General Purposes

1. Flooring varnishes
2. Wood finishes
3. Building finishes
4. Metal finishes
5. Air-drying car finishes

Industrial Finishes

1. Heat-resistant paint
2. Fire-resistant paint
3. Leather finishes
4. Furniture finishes
5. Antichemical flooring paints and varnishes (epoxy)
6. Baking paints
7. Refrigerator and washing-machine finishes
8. Paints for metal furniture
9. Electric transformer finishes
10. Paints and varnishes for petroleum company usage
11. Metal coatings and varnishes
12. Electric equipment and metal-casting finishes
13. Powder coatings
14. Paste inks
15. Liquid inks
16. Rotary news inks
17. Silk screen inks
18. Marine paints

particle size and enhance mixing; 3) thinning, where more vehicle, solvents and driers are added; 4) tinting; and finally 5) straining and packaging.

The term "varnish" is applied to transparent, clear coating materials that dry by evaporation of the solvent, followed by polymerization and oxidation of the dry oils and resins. A lacquer is a protective coating which dries by the evaporation of volatile components. The basic raw materials used in the manufacture of paints, varnishes, and lacquers in Egypt are imported.

#### Industry Structure

Production of paints, varnishes, and lacquers is dominated by two large public sector companies, the Paints and Chemicals Industries Company and Heliopolis Company for Chemicals, Military Factory No. 81. The chairman of Paints and Chemicals Industries estimated that his company produced 60 percent of the total public and private sector output. Some production is also carried out by the private sector using Egyptian and imported materials under foreign license. Imports of finished products is relatively small, accounting for only 6.9 percent of the total demand.

### Market Demand

Table 4-2 shows the value of the annual production and imports of paints, varnishes, and lacquers for the period 1979 through 1981. A comparison of the 1979 versus 1981 figures indicates that the total value of production is increasing at a compound annual rate of 24.8 percent. The public sector produced more than 80 percent of the total output in 1980 and is expanding. The same data indicates that while the public sector output substantially increased, the private sector output remained relatively stable. The statistics also show that imports are not a

Table 4-2

VALUE OF PRODUCTION AND IMPORTS  
OF PAINTS, VARNISHES, AND LACQUERS

(L.E. 1000)

Year	PRODUCTION			Imports
	Private	Public	Total	
1979	9,958	3,200	13,158	1,092
1980	14,651	3,500	18,151	1,353
1981	N/A	N/A	20,495	N/A

Source: Federation of Egyptian Industries, unpublished data.

major element in the supply of these products, accounting for only 7.5 percent of the total consumption in 1980.

While market projections for the future were not available, it is reasonable to expect a major increase in the growth rate for this sector. Fixed investment in Egypt's Plan covering the years 1980-1984, as shown in Table 2-1, gives major emphasis to the "Housing, Utilities, and Building Materials" and "Reconstruction and New Communities" sectors. Together they represent a planned investment of L.E. 5.83 billion, the largest of any of the sectors. Both these areas will require large quantities of paints and protective coatings. Therefore, a continued high growth rate for this sector is anticipated.

#### Project Opportunities

The Egyptian Light Industries Company is proposing a joint-venture company to produce paints, lacquers, and some primary materials for sale to other manufacturers. The company is a private sector producer of calcium carbonate and small quantities of paints, oxides, and lacquers. The new plant would be located in the industrial zone at Basatine, Cairo. Further work is

required to establish the output and investment costs (see Profile 7).

The Heliopolis Company for Chemical Industry, a public sector company, would like to establish a joint venture to produce 1,500 MT per year of polyester coatings for metal and wood. Raw materials would be imported. The plant would be located in Heliopolis and is estimated to cost L.E. 7-8 million (see Profile 8).

A new plant to produce a variety of paints, varnishes, rust inhibitors, and thinners was proposed by the Salem Company, a private sector company, in 1979. The project was identified by the A.D. Little Company. Details in regard to plant output, location, and investment costs have not been established. The project may be pursued through the Investment Authority or the Salem Company (see Profile A).

## 5. PESTICIDES AND INSECTICIDES

### Description and Uses

Pesticides and insecticides are chemicals used to kill rodents, insects, fungi, weeds, and other agents harmful to agriculture. The pesticide industry is characterized by the large number of chemicals employed; the high degree of governmental regulation over all aspects of the production, shipment, and use of the products; and the rapid technological obsolescence of the chemicals used.

The bulk of the pesticides in use consists of synthetic organic compounds. Some of the more common chemicals used are chlorinated organic compounds such as DDT, the cyclodiene group such as Chlordane, and organic phosphate pesticides such as Malathion. Insecticides may be classified by their method of action. Stomach poisons are lethal on ingestion, contact insecticides kill following external bodily contact, and fumigants act on the insect through the respiratory system.

The Ministry of Agriculture has jurisdiction over the selection and application of pesticides for agricultural use.

### Industry Structure

The bulk of pesticides used in Egypt is imported. Table 5-1 shows the value of local production and imports for the years 1979 and 1980. In 1980, imports accounted for 70.1 percent of the total value of pesticides used. The percentage dropped from 1979, when it was 81.9 percent. Data obtained from corporate interviews suggests that more than thirty different products were imported from twenty or more countries. Total Egyptian production in 1981 was valued at L.E. 14.6 million. Import data was not available for 1981.

The pesticide industry in Egypt is dominated by two public sector companies, the General Trading and Chemicals Company, which accounts for 90 percent of the imports, and the Kafr Al Zayat Company, which accounts for the bulk of the local production. The General Trading and Chemicals Company also imports the bulk of the raw materials used by the Kafr Al Zayat Company. The two companies report to two separate ministries, the former to the Ministry of Economy and Kafr Al Zayat to the Ministry of Industry. The production of Kafr Al Zayat is distributed 80 percent to the Ministry of Agriculture, 15 percent to the Ministry of Health, and

5 percent to the private market.

Table 5-1

VALUE OF PRODUCTION AND IMPORTS  
OF PESTICIDES AND INSECTICIDES,  
1979 AND 1980

(L.E. 1,000)

	1979	1980
<u>Production</u>		
Private	350	600
Public	8,650	12,400
Subtotal	9,000	13,000
Imports	40,801	30,431
TOTAL	49,801	43,431

Source: Federations of Egyptian  
Industries, unpublished  
data.

Market Demand

Table 5-2 shows the tonnage of bulk agricultural pesticides used in the years 1976-1980. The data indicate declining demand, for reasons which are not clear. The decline also is evident from Table 5-1,

which shows that the total value of pesticides and insecticides dropped from L.E. 49.8 million in 1979 to nearly L.E. 43.4 million in 1980.

Table 5-2  
UTILIZATION OF BULK AGRICULTURAL PESTICIDES IN EGYPT,  
1976-1980

Year	1,000 MTs Applied
1976	25.6
1977	29.3
1978	26.1
1979	22.7
1980	20.2

Source: Federation of Egyptian Industries, unpublished data.

The data in Table 5-1 indicates that although imports were decreasing from 1979 to 1980, the local production of pesticides increased. Over the three-year period from 1979-1981, local production increased at an annual rate of 27.4 percent. It is also apparent from this table that the production of the private sector is very small, amounting to only 4.6 percent of the local production in 1980.

Based upon Egypt's long-range plan to increase the land area under cultivation, the demand for pesticides and insecticides can be expected to increase at a significant rate.

#### Project Opportunities

Kafr Al Zayat, a public sector company, is proposing to build a new plant to produce insecticides for the Egyptian and export markets. The initial production targets are small and include 500 MT per year of Malathion, 300 MT per year of Difocol, 400 MT per year of Dimethoate, 200 MT per year of Dursban, and 50 MT per year of methyl and ethyl parathion. The estimated cost of the plant is U.S. \$5 million. Kafr Al Zayat is interested in discussing a joint-venture opportunity with a U.S. firm which can provide technology and detailed engineering support (see Profile 9).

The Dexan Company is a well established private sector organization producing a line of insecticides including dusting compounds, liquids, and sprays. The company has an immediate interest in a joint venture to produce one million cans of insecticides and aerosol sprays annually. The plant would be located in a free zone, but a specific location has not yet been

established. The plant investment cost has not been calculated. The major requirement from the joint-venture partner is the latest technology to produce aerosol sprays (see Profile 10).

The Investment Authority is prepared to assist a foreign company interested in a joint venture to develop pyrethrum production and pyrethrum insecticides for Egypt and Middle East markets, including assistance in obtaining an Egyptian joint-venture partner. The use of pyrethrum (extracted from blossoms of flowers grown in Africa) has increased considerably in the world market in recent years. In the United States alone, the use of pyrethrum is growing at an estimated rate of 20 percent or more a year.

Insecticides using this ingredient or synthetic pyrethroids are particularly effective contact agents with a low degree of toxicity to man and animals. They do not inhibit plant growth and have high-specificity kill. Pyrethrum could be cultivated in Egypt in areas with growing conditions similar to Kenya, the major exporter of pyrethrum at this time. As the major application of pyrethroids is to cotton crops (up to 90 percent in the U.S.A.), it appears that insecticide blends using pyrethrum would find a ready market in

**Egypt. Further details can be obtained from the  
Investment Authority.**

## 6. PLASTICS, RUBBER, AND SYNTHETIC FIBERS

### Description and Uses

#### Plastics

The plastics industry, like the synthetic-rubber and synthetic-fiber industries, is based upon polymer technology. The materials produced are long chains of complex organic molecules which are formed by polymerization.

The plastics industry may be segregated into two broad classifications:

- 1) The production of monomers and polymers that make up the basic materials or resin, and
- 2) The fabrication of plastics parts and films by means of extrusion, blow molding, injection molding, casting, vacuum forming, etc.

In Egypt, the major part of the industry effort is concentrated in the second category or fabrication end, using resins imported from overseas. However, efforts are underway to produce more of the required resins locally.

The most common raw materials used in manufacturing plastics are petrochemicals, coal, cotton, wood, gas, air, salt, and water. Plastics may be classified according to their broad general application, as listed

below. A few common trade names for each category include:

Thermosetting Resins	- Formica, Micarta, Melmac
Thermoplastic Resins	- Celluloid, Styrenes, Polystyrenes
Oil-Soluble or Modified Resins	- Albersol, Ambersol
Protein Substances	- None

Plastics may also be classified on the basis of their derivation; for example, natural resins, cellulose derivatives, protein products, and synthetic resins.

Plastics consist of a "binder" which is usually a resin or cellulose derivate and a "filler" such as cellulose, fiber, asbestos, etc. Plasticizers are organic chemicals that are added to synthetic plastics and resins to impart flexibility, formability, and improved product characteristics.

Egyptian industry produces a wide variety of plastic products. The following is a general list of consumer and commercial articles currently produced by both the public and private sectors:

Cellophane film	Plastic crates for vegetables, chickens, and soft drinks
Clothes hangers	
Clothes pins	Polyethylene film

Silicate (adhesive)	PVC pipe and electrical conduit
Trash and rubbish cans	Plastic bags, both woven and film
Kitchen items, dish drainers, bowls, etc.	Plastic footwear
Jerry cans - gasoline	Stationery items, pens, pencils, briefcases
Milk and detergent bottles	Electrical components - insulators, insulated wire
Pharmaceutical bottles	Plastic wall and prayer mats
Water and feed-trough systems for poultry	Plastic panels and parts for major appliances, kitchen cabinets, radios and television, refrigerators
Battery cases	Plastic hose
Paints and varnishes	Plastic tables, chairs, cabinets
Formica sheets	Plastic toilet seats
Floor coverings	
Tableware (melamine) such as dishes, bowls	

### Rubber

The rubber industry may also be segregated into the same two categories as plastics, e.g., production of the basic rubber material and its fabrication into consumer and industrial products. As with the plastics grouping, Egyptian industry is at present concentrated in the fabrication area using imported raw materials.

Rubber may be natural or synthetic. Natural rubber is obtained by tapping the latex from the rubber tree

and treating it with various chemicals to preserve it and enhance its properties. Synthetic rubbers are produced from monomers such as butadiene and styrene. The monomers are then polymerized to produce synthetic rubbers. Rubber is a key material in the transportation and electrical industries and has many other industrial and consumer uses. In the United States synthetic rubber has taken a dominant position vis-a-vis natural rubber. In Egypt, available data indicates that as much as 50 percent of the rubber imported was natural rubber.

Rubber products manufactured in Egypt include rubber soles for shoes, hoses for various home and industrial applications, pipe and tank coatings, and belts for materials handling and power transmission applications.

#### Synthetic Fibers

Like the plastics and rubber industries, the synthetic fiber industry may also be classified into two categories, the production of the fiber itself and the weaving of the fiber into finished consumer and industrial products. Here again, Egyptian industry is mainly involved in the second phase, the production of finished goods.

The production of synthetic fibers begins with the preparation of the polymer, which is then spun into fiber using one of four procedures which are designated "melt," "dry," "wet," or "core." The fibers must be stretched to orient the molecules and improve strength. The main classification of the fibers includes:

Polyamides	- Nylon
Polyesters	- Dacron, Mylar
Acrylics	- Orlon, Acrilan
Vinyls & Vinylidenes	- Saran
Spandex	- Lycra
Olefins	- Polyethylene, Polypropylene
Fluorcarbons	- Teflon
Glass Fibers	- Fiberglas
Cellulosic	- Rayon, Viscose, Cellophane

The fibers are widely used in the floor covering, clothing, and packaging industries.

#### Industry Structure

Substantially all of the resins, polymers, and plasticizers used in the manufacture of the plastic, fiber, and rubber products are imported. Table 6-1 shows selected statistics in regard to the import and production of plastic materials. No local production is shown.

Table 6-1  
 SELECTED DATA ON EGYPTIAN PRODUCTION AND IMPORTS OF  
 VARIOUS PLASTICS, RUBBER, AND SYNTHETIC FIBER PRODUCTS, 1977-1981  
 (L.E. 1,000)

	1977		1978		1979		1980		1981	
	Prodn.	Imports								
Raw Materials including Synthetic Resins, Plastic, Cellulose, and Rubber Materials	0*	58,400	0*	87,500	0*	81,300	0*	113,900	N/A	N/A
Miscellaneous Plastic Products	N/A	N/A	12,800	N/A	14,500	N/A	17,500	N/A	19,100	N/A
PVC Coated Fabric	N/A	N/A	5,990	N/A	7,230	N/A	9,140	N/A	11,390	N/A

\* Assumed insignificant, since no data given in this category.  
 N.A.: Data not available.

Source: Federation of Egyptian Industries, unpublished data.

A large number of companies are involved in the manufacture of plastic and rubber products, both large and small, and from both the public and private sectors. Background data on some of the key producers is given below.

The largest public sector company producing a line of plastic products is the National Plastics Company in Cairo; it was formed in 1948 and nationalized in 1960. This company employs over 2,500 people and has an annual turnover of L.E. 20 million.

A large private sector producer of plastic products is the Al Sharif Plastics Company in Heliopolis. The company has over 1,200 employees and produces a line of products that approaches those of the National Plastics Company.

The Middle East Company for Plastics produces approximately 10,000 MT per year of various plastics goods, including blow-molded, injection-molded, and film products. This is a private sector company located in Alexandria. The company was formed in 1947 and is the oldest of the consumer products companies in the plastics field.

The largest public sector producer of fibers and film is the Misr Rayon Company at Kafr Al Dawar. This company produces polyester fiber, nylon fiber for carpeting, a line of viscose products, and cellophane film. It is by far the largest company in terms of employment, having 10,000 employees.

There are several companies producing particle board and plywood. The major plywood producer is the Nile Match Company in Alexandria.

Modern Arab Timber Industries, a private sector company located in Alexandria, produces laminated chipboard, doors, printing paper, and impregnated papers. This company is now planning to start a new laminated production facility during 1982. An estimated output of 36,000 MT per year of chipboard is planned.

#### Market Demand

Imports of the raw materials for plastic and rubber product manufacture have been increasing at a rapid rate. Analysis of the data in Table 6-1 indicates a compound annual growth rate of 24.9 percent. While the statistics are impressive, there is reason to question whether this growth rate can be sustained. The basic chemicals used in the

manufacture of the resins and polymers stem from refinery operations. With Egypt's planned expansion of petrochemical production, imports are expected to level off or begin to decline. Consistent with this thesis is the recent announcement of a major government project for the construction of a new polyvinyl chloride (PVC) reactor project. B.F. Goodrich has been awarded a contract to design an 80,000-MT-per-year facility using their own technology.

Statistical data on the production of goods by Egyptian fabricators is limited. The data that is available indicates that production is growing consistent with the increase in imports of raw materials. Table 6-1 indicates that the production of miscellaneous plastic products is increasing at an annual rate of 14.3 percent, while the production of PVC-coated fabric is increasing at an annual rate of 23.9 percent. We expect that these areas will continue to experience high growth rates.

Table 6-2 provides limited data on the relative production of miscellaneous plastic products by the public and private sectors. The data indicates that the public sector produces the bulk of the output and that its share is increasing. In 1979, it produced

65.5 percent of the total and 70.3 percent in 1980. This ratio is probably typical for the rest of the plastics, rubber, and synthetic fiber production.

Table 6-2

MISCELLANEOUS PLASTICS PRODUCTION:  
1979, 1980  
(L.E. 1,000)

	1979	1980
Private Sector Production	5,000	5,200
Public Sector Production	<u>9,500</u>	<u>12,300</u>
TOTAL	14,500	17,500

Source: Federation of Egyptian Industries, Industrial Egypt, Vol. 57, No. 1, January/June 1981.

Project Opportunities

The interviews carried out in Egypt resulted in the identification of fourteen project opportunities, five of which are being proposed by the Abu Zaabal Specialty Chemicals Company, a large public sector company, and three by the Misr Rayon Company, another large public sector company. These opportunities are briefly outlined below. Further details are given in Chapter 12.

1) The Pharos Plastic Corporation, a private sector plastic compounding company, is proposing a 40,000-MT-per-year plant to produce PVC resins for both local and export markets. The plant would be located at the same site as their existing facilities. At this time, investment costs have not been established (see Profile 11).

2) The Abu Zaabal Specialty Chemicals Company is proposing a new production facility to produce 15,000 MT per year of dioctyl phthalate. The material is a plasticizer used in the production of PVC adhesives and fibers. The plant site would be at an existing plant in the Cairo area close to the airport. The initial production is intended to satisfy domestic demand, with exports projected for the future. It has been reported that Exxon has established a tank storage facility in Alexandria for dioctyl phthalate. The estimated cost of the Cairo facility is approximately L.E. 13 million (see Profile 12).

3) Abu Zaabal Specialty Chemicals Company is also proposing the construction of a new plant to produce 5,000 MT per year of synthetic resins for the lacquer, foundry, varnishes, moldings, and glue industries. The plant would be located at its existing site in the

Cairo area close to the airport. Investment costs for this facility have not yet been established (see Profile 13).

4) The Egyptian Plastic and Electrical Industry is a large public sector company which produces a wide range of plastic products. It is proposing to build a plant which will produce both solid and perforated wall pipes for irrigation and drainage use. The plant would be built in El Ras El Soda, Alexandria. The intent is to design a self-contained injection unit that can be mounted on a tractor trailer and moved from farm site to farm site to produce the pipe required for immediate installation on the farm. The concept has been studied by the Plastic Development Center of UNIDO. The program has also been supported by U.S. AID (see Profile 14).

5) The Eastern Trading Company is a medium-sized private sector company producing mainly health care products. It is proposing to build a plant to produce 5-6 million PVC bottles per year by the blow-molding process. The plant would be built on a site outside of Cairo. The estimated investment cost is L.E. 300,000 (see Profile 15).

6) The El Nasr Glass Company, the largest public

sector glass company in Egypt, is proposing a plant for the production of fiberglass reinforced plastic products. The company is now discussing possible potential production applications for the El Nasr Automotive and Segwat Company. The plant would be located in either Shubra or Mostard. An investment cost for the plant has not yet been established (see Profile 16).

7) The Misr Rayon Company is the largest public sector fiber and film operation in Egypt. It produces polyester, nylon, and viscose products. The company is planning to construct a plant to produce non-woven materials such as linings for men's suits and coats from plastic wastes. It is currently meeting with a U.S. consultant who has access to the required technology. The plant would have a capacity of 2,500 to 3,000 MT per year and would use waste generated in the plant as a raw material. An order-of-magnitude cost estimate for the project is U.S. \$10 million. The facility would be located at an existing plant site in Kafr El Dawar (see Profile 17).

8) The Misr Rayon Company is also a major producer of cellophane. It is presently attempting to meet an increasing demand with a plant which is technologically

out-of-date and inefficient. The intent is to provide new technology and upgrade the existing equipment, where possible, to produce 12-15 MT per day of cellophane. The site of the existing plant is at Kafr El Dawar. An estimated investment cost for the facility has not yet been established (see Profile 18).

9) In the event that its plant discussed above cannot be upgraded economically, Misr Rayon has alternate plans to build a new plant to produce polypropylene film (see Profile 19).

10) The Nile Match Company, a public sector company, is the largest match producer in Egypt. The company is also building prefabricated homes. It is proposing construction of a facility to produce 15,000 MT per year of particle board from wood wastes resulting from the production of matches. The plant would be located at its Moharam Bey factory. The estimated cost of the facility is L.E. 6 million (see Profile 20).

11) The Abu Zaabal Specialty Chemicals Company is considering construction of a facility to produce cellulose-based products for domestic and sanitary use. Typical products include baby diapers, sanitary napkins, facial tissues, etc. The plant has an output

of 10,000 MT per year and an investment cost of L.E. 15 million. The plant would be located at an existing site in the Cairo area near the airport (see Profile 21).

12) Another Abu Zaabal Specialty Chemicals Company project contemplates construction of a plant to produce bleached cotton linters (the short fibers that cling to cottonseeds after the first ginning) from raw linters. Linters are used in the production of a wide range of products, including absorbent cotton, cellulose, and plastics. The facility would be located at Abu Zaabal's existing plant in the Cairo area. The plant has a proposed output of 4,500 MT per year of bleached cotton linters. An estimated investment cost is L.E. 7.9 million (see Profile 22).

13) The fifth Abu Zaabal project involves a new joint venture to produce 5,000 MT per year of carboxymethyl cellulose from bleached cotton linters. The plant would be located at Abu Zaabal's existing site in the Cairo area. Investment cost is estimated at L.E. 13.5 million (see Profile 23).

14) The Port Said government is sponsoring a project to produce PVC water pipe and electrical conduits in Ismailia. The plant's output would be

3,600 MT per year. The estimated cost of the facility is L.E. 3.8 million (see Profile B).

## 7. ALKALIS, CHLORINE, AND SODIUM CHEMICALS

### Description and Uses

#### Salt

Sodium chloride (salt) is one of the five primary raw materials (the others are sulfur, limestone, coal, and petroleum). Its total per capita consumption for all purposes is a measure of a country's industrial activity. The primary methods of sodium chloride recovery are solar evaporation of brines from various sources (sea, salt lakes, or natural brines) and from the mining of solid rock salt deposits. Sodium chloride is the most common and least expensive source of sodium or chlorine for all chemicals containing these elements. Many important sodium chemicals are made directly from sodium chloride, including sodium hydroxide and sodium carbonate, sodium metal, sodium sulfate, sodium nitrate, sodium cyanide, sodium chlorate, and sodium bisulfate.

#### Caustic Soda

Sodium hydroxide (caustic soda) and chlorine are produced electrolytically from sodium chloride. Most production is by diaphragm cells, but membrane-cell technology is gaining in popularity due to the higher purity of the caustic soda product and the elimination

of a caustic purification step. However, membrane cells use mercury, and extensive controls must be utilized to minimize discharge of mercury to the environment. Caustic soda is a major industrial chemical and is used in the production of soap, rayon, dyes, paper, rubber, textiles, and drugs, as well as in petroleum refining and metallurgical applications.

#### Chlorine

Chlorine is used in the production of calcium hypochlorite and in the manufacture of pulp and paper, plastics, pesticides, sanitation products, refrigerants, and various solvents. Calcium hypochlorite is used as a disinfectant for use in water and sewage treatment, dairies, and for household and laundry purposes. It also is used as a bleach for cellulose products, cotton, linen, rayon, pulp, and paper. Sodium hypochlorite, also made from chlorine and caustic soda, is important in water treatment and for bleaching cellulose products.

#### Sodium Carbonate and Sodium Bicarbonate

Sodium carbonate (soda ash) is produced in Egypt mainly by the Solvay (ammonia-soda) process. The primary raw materials required are salt, limestone, and natural gas or coke (to make ammonia), all of which are

available in Egypt. Sodium carbonate is used in the processing of foodstuffs, the manufacture of dyes, caustic soda, glass, and ceramics, and for water-softening and photographic applications.

Sodium bicarbonate (baking soda) is produced by reacting carbon dioxide with a saturated solution of sodium carbonate in a carbonation tower. Although sodium bicarbonate is not a high-tonnage chemical, it finds major usage in the manufacture of baking powder, carbonated waters, leather goods, and in fire extinguishers.

#### Sodium Sulfate and Sodium Sulfide

Other sodium compounds of interest are sodium sulfate and sodium sulfide. Production and import figures for these chemicals are not available; however, both are important chemicals which can be derived from salt.

Sodium sulfate (salt cake) production from natural sources has been growing, whereas the by-product salt cake from rayon and hydrochloric-acid manufacture by Mannheim furnaces has been declining. Solar evaporation of salt-lake brines is another method used for the recovery of salt cake. Sodium sulfate is used in the manufacture of Kraft pulp, glass and ceramics,

household detergents, textile dyes, bleach, and in photography.

Sodium sulfide is made on a commercial scale by several processes; however, the newest process is the saturation of sodium hydroxide with hydrogen sulfide. The oldest and probably most used process is the reduction of sodium sulfate with powdered coal in a reverberatory furnace. Sodium sulfide is important to the organic chemical industry in the manufacture of amino compounds and dyes. Other industries where its use is important are the rayon, metallurgical, and photographic fields.

#### Industry Structure

The El Nasr Salines Company, a public sector concern, is the country's major salt producer. Its current operations include five salt production facilities.

The Misr Chemical Company at El Max, Alexandria, a public sector company, is the major producer of caustic soda, chlorine, and soda ash. Private sector companies account for little, if any, of the production when compared to the above two public sector companies. Based on the statistical data available, there is little, if any, production of sodium sulfate, sodium

sulfide, or magnesium oxide.

#### Market Demand

The General Organization for Industrialization (GOFI) has projected total Egyptian demand for salt at 1.25 million MT for 1982. Salt production in 1982 is expected to be approximately 717,000 MT, all from saline evaporation plants located adjacent to the sea. A new plant planned for the Lake Qarun site will supply an additional 200,000 MT of salt; it will utilize a combination of solar evaporation and more modern and efficient technology for water removal, such as multiple effect evaporation. This will result in a more consistent rate of production throughout the year. The sodium sulfate and sodium sulfide production from the planned new plant may find export markets as well as satisfy domestic demand; magnesium oxide will be totally absorbed in the domestic market.

Table 7-1 indicates Egyptian production of sodium chloride, sodium hydroxide, sodium carbonate, and sodium bicarbonate. In addition, there were imports of sodium hydroxide of 29,000 MT and 64,552 MT in 1979 and 1980, respectively. Detailed import data were not available for the other products.

Table 7-1  
 EGYPTIAN PRODUCTION OF  
 SELECTED SODIUM PRODUCTS AND CHLORINE,  
 1978-1981  
 (MT per year)

	1978	1979	1980	1981
Sodium Chloride (salt)	712,000	613,236	636,043	717,299
Sodium Hydroxide (caustic soda)	30,800	37,300	43,800	43,000
Sodium Carbonate (soda ash)	21,700	32,500	37,400	46,358
Sodium Bicarbonate	340	566	3,177	3,322
Chlorine	4,110	5,664	5,959	5,737

Source: Federation of Egyptian Industries.

Caustic soda production has been scheduled for an increase of 60,000 MT per year for 1984. Soda ash production is also to be increased through expansion of the Misr Chemical Company's facilities at El Max. Much of this output will be utilized to meet the needs of the expanding glass industry.

Project Opportunities

The interviews conducted did not establish any

joint-venture opportunities for the expansion of the existing salt, alkalis, or chlorine production facilities. However, two other projects, both developed by others, may be important.

The General Organization for Industrialization has developed a joint venture with El Nasr Salines Company for the Lake Qarun Evaporation Project, for a multi-purpose chemical extraction plant to produce sodium sulfate, sodium sulfide, magnesium oxide, and other chemicals. A feasibility study has been completed and is available for reference. The study details the domestic and export market potentials for the salt-derived sodium chemicals. Since the Lake Qarun project is a large capital intensive project, a foreign partner (or partners) is being sought by the Investment Authority and GOFI (see Profile C).

The Egyptian government is also interested in obtaining a partner to manage Lake Bardaweil, in Northwest Sinai. This 80-kilometer-long lake covers 165,000 feddans\* and, as a natural fish farm, has produced up to 3,500 MT annually of high quality fish. As part of its U.S. AID financed Sinai Development Study for the Egyptian Ministry of Development, Dames

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\* One feddan is equal to 1.033 acres.

and Moore of Washington, D.C., has suggested the initiation of a feasibility study to explore development opportunities at and in the vicinity of the lake. Studies to determine salinity and nutrient levels and the best use of the lake are yet to be undertaken. One company, for example, would like to establish a salt production plant by the lake. This, however, might conflict with fishing operations (see Profile D).

## 8. SULFURIC AND HYDROCHLORIC ACIDS

### Description and Uses

Sulfuric acid is made primarily by the contact process from sulfur or pyrites. Phosphate fertilizer manufacture is the greatest single use of sulfuric acid. Chemicals, inorganic pigments, petroleum products, surfactants, rayon, iron and steel pickling, and non-ferrous metals processing also consume large quantities of sulfuric acid.

Hydrochloric acid is made from salt and sulfuric acid. It can also be made by the combustion of a mixture of hydrogen and chlorine or as the by product of organic chlorinations (a major source of production in the U.S.). Significant uses are for metal cleaning, chemical manufacture, petroleum, and the production of synthetic rubber as well as food.

### Industry Structure

Abu Zaabal Fertilizer Company, a public sector company, is the primary producer of sulfuric acid and oleums. Misr Chemical Industries Company, a public sector company, is the largest producer of hydrochloric acid. Private sector activity, if any, is of little significance in the production of these two major industrial inorganic acids. Imports have not been a significant factor in meeting the market demand.

### Market Demand

Consumption of sulfuric acid has increased approximately 16 percent annually since 1979 (see Table 8-1). It is anticipated that market demand will continue to increase, steadily paralleling the expected growth in production of phosphate fertilizers, surfactants, detergents, rayon, rubber, etc. In addition, demand may accelerate as the developing petroleum industry's requirements impact the market.

Demand for hydrochloric acid can also be expected to increase along with the expansion of Egypt's metal, chemical, food, and petroleum industries. The annual increase of approximately 19 percent in hydrochloric acid consumption will probably continue as long as the primary-user industries continue to grow. Since imports have not been a factor in meeting the domestic requirements in the past (with the exception of hydrochloric acid in 1979), it can be assumed that the public sector suppliers will continue to expand their production to meet future market demands.

### Project Opportunities

Interviews with sulfuric acid and hydrochloric acid users did not establish any private sector joint-venture opportunities for production of these acids.

Table 8-1

## THE PRODUCTION AND IMPORTS OF SULFURIC AND HYDROCHLORIC ACIDS, 1979-1981

(MT per Year)

	1979		1980		1981	
	Prodn.	Imports	Prodn.	Imports	Prodn.	Imports
Sulfuric Acid	32,500	106 (oleum)	35,300	15 (oleum)	44,000	N/A
Hydrochloric Acid	4,172	2,303	5,610	241	5,977	N/A

N.A.: Figures not available.

Source: Federation of Egyptian Industries.

## 9. TEXTILE CHEMICALS, DYES, AND PIGMENTS

### Descriptions and Uses

Textile chemicals, dyes, and pigments are essential to the spinning and weaving industry, which is growing at a rapid rate. Table A, page xiv, shows that the production of the spinning and weaving industry more than doubled between the years 1975-1980.

Many different chemicals are used in the treatment of textiles. The applications can be flameproofing, shrinkproofing, mildewproofing, mothproofing, softening, stiffening, improving resiliency, sizing, and others. In recent years, chemical finishes have been used to react with cotton fibers to actually change the fiber properties by esterification or amination.

Similarly, a wide variety of chemically derived dyes and pigments are required by the textile industry to impart colors to the fibers (which can be of animal or vegetable origin, or man-made) of their textile products.

### Industry Structure

The production of textile chemicals, dyes, and pigments is primarily by public sector companies. Dyestuffs and Chemicals Company (Ismadye) is the

largest public sector company producing direct and vat dyes and pigments. A new plant was completed at Alexandria-Kafr Al Dawar in 1974.

Products sold to other public sector companies by Dyestuffs and Chemicals Company are currently price controlled. However, products sold to the domestic private sector or for export have an uncontrolled price structure.

Statistical data on the magnitude of the import market for textile chemicals and dyes was not available; however, it may be assumed that imported products are highly competitive in Egypt because 1) Egyptian manufacturers have relatively less advanced technology and less efficient production facilities, and 2) Egyptian manufacturers must import between 50 and 75 percent of their total requirements for chemical intermediates, not enough of which are produced domestically.

#### Market Demand

There was no current statistical data available to quantify the trend in market demand for textile chemicals and dyes. However, it is probable that it closely follows the growth in textiles production, which, as noted earlier, more than doubled between 1975

and 1980. One company executive estimated that the demand for all textile chemical products in Egypt is 26,000 to 30,000 MT per year. This includes synthetic yarn sizing compounds, printing pigments, synthetic polymers for pigment binding, fabric finishing, flocking, back-coating, etc.

The expansion of Egypt's petrochemical industry should provide more of the chemical intermediates required for textile chemicals and dye production. New plants and improved technology may result in entry to the export market and thereby increase overall demand.

#### Project Opportunities

The interviews brought to light the three private sector joint-venture opportunities described below:

- 1) Dyestuffs and Chemicals Company, a public sector company, is interested in building a new plant to produce textile chemicals for dyeing and finishing. The plant location will probably be at Kafr Al Dawar. The capacity and investment will be determined after completion of a market survey which is currently in progress. The joint-venture partner is expected to provide both technology and financial assistance (see Profile 24).

- 2) Middle East Industrial Center, at Bab El Louk,

Cairo, is interested in a plant to produce 3,000 MT per year of textile chemicals and printing pigments. The plant would be located in an industrial zone 6 kilometers south of Suez. The estimated investment required from the joint-venture partner is U.S. \$900,000 (see Profile 25).

3) The Ghaibia Governorate, at Mehala, is interested in a plant to produce 2,500 MT per year of printing and dyeing chemicals for the spinning and weaving industry. The total investment is estimated at L.E. 1.5 million. The joint-venture partner's responsibilities are not as yet defined. The Investment Authority must be contacted to determine the latest information regarding this opportunity (see Profile E).

## 10. INDUSTRIAL GASES

### Description and Uses

The industrial gases category covers a broad range of products including oxygen, hydrogen, nitrogen, carbon dioxide, carbon monoxide, sulfur dioxide, nitrous oxide, fluorocarbon refrigerants, and acetylene. Other gases widely used in industry, such as propane and butane, are considered to belong to the liquified petroleum category.

Statistical data on industrial gas production in Egypt indicates that five industrial gases are produced: oxygen, hydrogen, carbon dioxide, nitrous oxide, and acetylene. It is assumed that the production of the other industrial gases is very small and that need for these products is met by imports.

### Oxygen

Oxygen is produced commercially in "air separation" plants. The process involves the liquefaction of air, which is composed primarily of nitrogen and oxygen, and their separation by distillation. Oxygen is a basic industrial chemical. It is used in steel production; for oxygen acetylene welding; as a rocket propellant; in the production of acetylene, ethylene oxide, and sodium peroxide; and as

an oxidizing agent in waste water treatment systems. High-purity oxygen is used for medicinal purposes.

### Hydrogen

Hydrogen is manufactured largely by the steam hydrocarbon reforming process, using mostly natural gas. This process releases hydrogen by the reaction of water with the hydrocarbon molecules in natural gas. High-purity hydrogen is produced in electrolytic cells by passing direct current through an aqueous solution of alkali, decomposing the water. Regular-purity hydrogen is also commercially manufactured by partial oxidation processes (Texaco, Shell) using liquid hydrocarbon or natural gas.

Hydrogen is an important raw material for the chemical and petroleum industries. Large quantities are used in the chemical synthesis of ammonia, hydrogen chloride, and methanol. Other important uses are the hydrogenation of edible oils for the production of shortening, atomic hydrogen shielded-arc welding, heat treatment of metals, and the fabrication of electronic components.

### Carbon Dioxide

Carbon dioxide is produced commercially 1) by the combustion of fuel oil, gas, or coke and subsequent

recovery of the carbon dioxide contained in the flue gases; 2) as a by-product from the fermentation industries; and 3) as a by-product of lime kiln operation. Carbon dioxide is used commercially in liquid, solid, and gaseous forms. The largest usage is in the solid form as a transport refrigerant for meat and other foods.

Liquid carbon dioxide is primarily used by the carbonated beverage industry. Carbon dioxide is also important as a fire-extinguishing material. Gaseous carbon dioxide is used in the chemical industry in the production of salicylic acid and as a raw material for soda ash (Solvay process).

#### Nitrous Oxide

Nitrous oxide, or laughing gas, is primarily used as an anaesthetic in dentistry. It is prepared by heating very pure ammonia nitrate in retorts and recovering the nitrous oxide from the decomposition products. The nitrous oxide is shipped as a liquid in steel cylinders at a pressure of about 100 atmospheres.

#### Acetylene

The primary method for producing acetylene is by the partial oxidation of natural gas or liquid hydrocarbon feeds. An older but still widely used

means is the generation of acetylene made by the reaction of calcium carbide with water. Another method uses an electric arc to pyrolyze hydrocarbons to acetylene. Acetylene is used in welding applications (with oxygen) and in the manufacture of many industrial chemicals such as acetic acid, acrylonitrile, trichloroethylene, and vinyl chloride.

#### Industry Structure

The major supplier of industrial gases in Egypt is a public sector concern, the Industrial Gases Company. Oxygen, acetylene, carbon dioxide, nitrous oxide and hydrogen are its primary products. Small quantities of nitrogen are also produced. Statistical data is not available to indicate to what extent private sector companies share in the production of industrial gases in Egypt. However, the survey indicates that the market is dominated by the Industrial Gases Company. The available data indicates that imports are not significant for any of these gases.

#### Market Demand

Table 10-1 shows the available data on the production and imports of acetylene, carbon dioxide, hydrogen, oxygen, and nitrous oxide for the years 1977-1981. Data on imports is also shown but is fragmentary, giving an unclear picture of total demand

Table 10-1

## THE PRODUCTION AND IMPORTS OF INDUSTRIAL GASES, 1977-1981

Item	Units	1977		1978		1979		1980		1981	
		Prodn.	Imports								
Acetylene	1,000 cubic meters	1,174	N/A	1,216	N/A	1,121	N/A	1,229	N/A	N/A	N/A
Carbon Dioxide	Metric tons	5,000	N/A	6,000	Note 1	3,000	Note 1	3,000	N/A	N/A	N/A
Hydrogen	L.E. 1,000	N/A	N/A	N/A	N/A	12	N/A	11	2	16	N/A
Oxygen	L.E. 1,000	701	N/A	721	N/A	634	25	747	N/A	1,056	N/A
Nitrous Oxide	1,000 cubic meters	98	N/A	104	N/A	1,231	N/A	126	N/A	N/A	N/A

Note 1: Imported data indicates relatively small imports during the years 1979 and 1980.

N.A.: Figures not available.

Source: Federation of Egyptian Industries.

for these products.

Analysis of the domestic production data indicates the following compound annual growth rates:

Acetylene	-	1.5 percent	(1977-80)
Carbon Dioxide	-	Decline	(1977-80)
Hydrogen	-	15.5 percent	(1977-80)
Oxygen	-	10.8 percent	(1977-80)
Nitrous Oxide	-	8.7 percent	(1977-80)

For acetylene the data shows very little domestic growth in production. Yet the Industrial Gases Company is planning to expand its production of acetylene (see project opportunities). This indicates that there is either an unsatisfied, pent-up demand, that a heavy new increase in the market is projected, or that imports are a major factor in supplying the demand.

The production of carbon dioxide has declined. Since the data available indicates that imports are insignificant, it may be concluded that the market is relatively flat.

The production of hydrogen, oxygen, and nitrous oxide is increasing rapidly. With the emphasis on industrialization, the demand for hydrogen and oxygen should continue to grow. The use of nitrous oxide should also increase as affluence increases and more people have dental services available.

### Project Opportunities

The interviews carried out established one possible private sector joint-venture opportunity. The Industrial Gases Company is interested in a plant to expand its production of acetylene via the partial oxidation process using either natural gas or hydrocarbon liquids or raw materials. The new plant capacity would be 20,000 MT per year of acetylene. The plant would be located at their existing facility. The joint-venture approach using the partial oxidation process will have to be proven economically attractive when compared to their currently used process based on imported calcium carbide. The joint-venture partner will be expected to provide the latest technology and share in the capital investment. If the calcium carbide process is selected, the project will be developed as a public sector expansion under the General Organization for Industrialization (see Profile 26).

## 11. WOOD CHEMICALS

### Description and Uses

The cell wall tissue of wood is made up of a complex mixture of polymers. Wood may also contain extraneous materials in the cavities of the cells such as volatile oils and resins. Through steam distillation and solvent extraction techniques, a broad spectrum of industrial chemicals can be produced. These include hydrocarbons, acids, alcohols, resins, tannin, sugars, and starch. However, the primary use of wood is in the manufacture of pulp and paper and in the fabrication of wood products.

### Industry Structure - Project Opportunities

The production of wood chemicals in Egypt is insignificant. Large quantities of wood and wood products are imported into Egypt. There is no data available as to the ultimate use of the wood imports; however, a large percentage presumably is used for the manufacture of paper, cellulose fibers and films, and fabricated wood products. The relative scarcity of timber in Egypt precludes the establishment of any joint-venture opportunities now, or probably in the future, for the production of wood chemicals.

## 12. A REVIEW OF POTENTIAL INVESTMENT OPPORTUNITIES

In the course of the research for this report, a survey of most of the principal government and private chemical companies in Egypt was made to determine the degree of interest in joint ventures. There is undoubtedly a significant number of Egyptian businessmen not now in the chemicals business who are or might be interested in entering the industry. Although some of these individuals and organizations have been contacted, it clearly has been impossible to contact all potential Egyptian investors. However, during the course of this project and in preparing the other sectoral reports, considerable additional contact will be made with the Egyptian business community. These contacts will undoubtedly reveal other possible chemical projects.

Accordingly, interested U.S. investors are encouraged to remain in contact with the Investment and Free Zones Authority, Chase Trade Information Corporation, U.S. AID, the Egypt-U.S. Business Council, the special office of the U.S. Trade Representative, the United States Department of Commerce, and others involved in the continuing review of opportunities for U.S. investment in Egypt.

If, as is hoped, this report has stimulated interest in any aspect of the chemical sector, this should be made known to any of the organizations listed above.

This report on the chemical industry has identified some 31 potential joint-venture opportunities. The 26 projects listed in Table 12-1 were developed as a result of this study. Those included in Table 12-2 were developed by others. Following the Tables are detailed profiles for each of the projects.

Table 12-1

LIST OF JOINT-VENTURE OPPORTUNITIES DEVELOPED  
AS A RESULT OF THIS SURVEY

Profile No.	Subject
1	35,000-50,000-MT Sodium Tripolyphosphate Plant
2	Blending and Packing Synthetic Detergents
3	Complete Detergents Products Plant
4	Detergents Compounding and Packaging
5	Industrial Detergents Production
6	Sodium Toluene Sulphonate (STS) Expansion
7	Paints - Lacquers - Oxides
8	Polyester Coatings
9	Pesticides and Insecticides
10	Insecticides - Aerosol Sprays
11	PVC Resin Production
12	Diethylphthalate (DOP) Plant
13	Synthetic Resin Plant (Batch)
14	PVC Pipe and Perforated Drainage Pipe (Irrigation)
15	Blow Molding of PVC
16	Fiberglass Reinforced Plastic Products
17	Non-Woven Materials from Polyester Waste
18	Cellophane Production
19	Polypropylene Film Production
20	Particle Board Plant

Table 12-1 (cont'd)

<b>Profile No.</b>	<b>Subject</b>
21	Cellulose-Based Products
22	Bleached Cotton Linters Plant
23	Carboxymethyl Cellulose (CMC) Production
24	Textile Chemicals
25	Textile Process Chemicals and Printing Pigments
26	Acetylene Production

## Profile 1

### SODIUM TRIPOLYPHOSPHATE PLANT

- Description:** Joint venture to produce dicalcium phosphate (feed grade) and sodium tripolyphosphate, which is used for surfactant production.
- Egyptian Interest:** A joint venture of four Egyptian companies headed by the Suez Fertilizer Company (SEMADCO). The other three companies are major detergent producing concerns in the public sector. SEMADCO is a public sector company having two factories in Suez and two in Talkha.
- Location:** Possible location: Suez.
- Role of Foreign Firm:** Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.
- Project Status:** In "conceptual" stage. The Egyptian companies are joining forces to study this project.
- Output:** 35,000-50,000 MT per year of sodium tripolyphosphate; 20,000 MT per year of feed grade dicalcium phosphate (for sale in Egypt only).
- Investment:** Must be developed when process data becomes available.
- Markets:** Initially to Egyptian joint-venture companies and other Egyptian producers. Also export possibilities to Arab countries. No production in these countries at present. Tunisia reported building a small unit for 10,000 MT per year, and Algeria is to erect a new plant.
- Competition:** For the captive production to the partners, no competition. Little to none for export to nearby countries, due to lack of production in these areas.
- Raw Materials:** Phosphate rock imported from Jordan. Sulfur imported. Soda ash: local or Kenya.

Profile 2

BLENDING AND PACKAGING SYNTHETIC DETERGENTS

Description: Joint venture for blending synthetic detergents from imported components, including a packaging operation. Manufacture of components is also to be considered.

Egyptian Interest: El Nasr Export and Import Company, established in 1958 as a public company. Since Public Law 43 was passed, the company has been in four joint-venture concerns, covering investment, trading, and distribution.

Location: Cairo. 1,000 square meters available at 10th of Ramadan City.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: Project considered to be "specific" opportunity. Survey and estimate completed; figures to be reviewed with U.S. partner.

Output: Approximately 40,000 pounds per week.

Investment: Basic equipment only (no engineering or installation included), U.S. \$112,000 (November 1981). Land L.E. 130,000, plus civil works and engineering costs.

Markets: Domestic.

Competition: Not critical; market needs are high.

Raw Materials: All imported materials: Sodium tripolyphosphate, borax, sodium sulfate, brighteners, sodium carbonate, perfume, sodium perborate tetrahydrate, and sulfonic acid derivative ingredients.

### Profile 3

## COMPLETE DETERGENT PRODUCTS PLANT

**Description:** Joint venture to produce complete detergent products line.

**Egyptian Interest:** The public sector Nile Oil and Soap Company (originally a Unilever company). Company has a good production background. Currently producing its own brands of soap and detergents, but not for toiletry products. Company also engages in edible oil extraction from cottonseed and soybeans.

**Location:** In the Sohag Governorate. Sixty feddans available (no cost stated). Current detergent production is at Mostorod.

**Role of Foreign Firm:** Joint-venture partner in a Public Law 43 company. To supply technology and financial assistance.

**Project Status:** In "conceptual" stage. Company has made some preliminary plans.

**Output:** 30,000 MT per year of detergents; 12,000 MT per year of laundry soap; 61,000 MT per year of toilet soap; 2,000 MT per year of solvents for soybean oil extraction. Also hydrogenated oil line and cattle meal production from seed cake.

**Investment:** Estimated L.E. 14 million including offsites, for detergents facility only. Total for complete complex estimated at L.E. 94 million exclusive of land cost.

**Markets:** Egypt: Domestic market 75 percent; export market 25%.

**Competition:** Several companies: three public and some small private companies, but demand is large for products throughout Egypt.

**Raw Materials:** Jordanian phosphate rock. Some sulfur from refineries, but must also import. Some STS produced locally; must import difference. Toluene from local supplier. Some hexane available but not enough; must import difference.

Profile 4

DETERGENTS - COMPOUNDING AND PACKAGING

Description: Joint venture for plant to compound and package detergents using imported materials.

Egyptian Interest: El Tawil Trading and Engineering Company. Is involved in several different activities including milk and ice cream factories.

Location: In Free Zone, near Alexandria (Amiria). (Rent cost approximately U.S. \$1 per square meter.)

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology, engineering expertise, packaging equipment selection, and financial assistance to the project. Brand name company is preferred.

Project Status: In "conceptual" stage; prefers to work with joint-venture partner from the outset.

Output: To be finalized with joint-venture partner, but probably in the range of 1,500 MT per year to start.

Investment: To be estimated with joint-venture partner when plant size and equipment are agreed upon. (Owner's estimate: U.S. \$1 million.)

Markets: Both domestic and export markets, each about one-half.

Competition: Not critical. Market demands are high.

Raw Materials: Mostly imported.

Profile 5

INDUSTRIAL DETERGENTS

Description: Joint venture to produce industrial detergents.

Egyptian Interest: Organo-Technic. Private sector producer of chemicals.

Location: At existing factory site.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To bring technology and financial assistance to project.

Project Status: In "conceptual" stage; discussion with owner only.

Output: 20,000 MT per year.

Investment: Estimated by owner at U.S. \$7 million (order of magnitude).

Markets: Egypt - Local. Small quantity to export.

Competition: Not critical. Market demand is high.

Raw Materials: Mostly imported.

Profile 6

SODIUM TOLUENE SULPHONATE (STS) EXPANSION

Description: Joint venture to produce sodium toluene sulphonate (STS), required for industrial detergent manufacturing.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company, a public sector concern producing specialized chemicals for 1) the Egyptian government and 2) industry. Manufactured products include intermediates such as sodium toluene sulfonate, hydrogenated fatty oils, paints, lacquers, anaesthetic ether, explosives, ammonium nitrate, and aniline. Company has engaged in two joint ventures, one with WASAG (Germany) for engineering and industrial development supplies, the other with Johnson Wax (U.S.A.) for products, "Raid" (insecticides), "Pledge" (furniture polish), and "Glade" (air purifier).

Location: Cairo area; near airport. Existing property.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: Project considered to be "specific" opportunity. In planning stage, part of five-year plan, to start up in 1985.

Output: 3,000 MT per year of STS (Present production: 1,000 MT per year), using in-house process.

Investment: Approximately L.E. 4 million: L.E. 1.7 million foreign, L.E. 2.4 million local.

Markets: Domestic: to three major Egyptian detergent companies.

Competition: Little; one of two small Egyptian producers at present.

Raw Materials: Raw materials mostly local, except for toluene (both local and imported). All toluene from Egypt projected by end of 1984.

Profile 7

PAINTS - LACQUERS - OXIDES

Description: Joint venture for plant to produce paints and lacquers plus some primary materials for sale to other companies.

Egyptian Interest: Egyptian Light Industries Company (Farag & Company), a private sector company now producing mainly calcium carbonate and small quantities of paints, oxides, and lacquers.

Location: Industrial zone, Basatine, Cairo.

Role of Foreign Firm: Joint-venture partner in Public Law 43 company. To bring modern technology and financial assistance.

Project Status: In "conceptual" stage. Basing plans on expansion of existing facility and knowledge of market demands.

Output: To be estimated after process and product-line selection is firmed up with joint-venture partner.

Investment: To be estimated after process and product-line selection is firmed up with joint-venture partner.

Markets: Local. Currently has 1,500 direct private sector customers. Through wholesalers, many other customers.

Competition: The market demand is such that there is room for additional production, if only to supplant some of the low-grade imports.

Raw Materials: Both local and imported.

Profile 8

POLYESTER COATINGS

Description: Joint venture to produce polyester coatings, for metal and wood.

Egyptian Interest: Heliopolis Company for Chemicals.

Location: At an existing plant in Heliopolis.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage.

Output: 1,500 MT per year (also ultimately to produce the resin, i.e., add to plant later).

Investment: L.E. 7-8 million.

Markets: Initially local; later export.

Competition: Imports only.

Raw Materials: Imported at first. Egyptian production 2-3 years.

Profile 9

PESTICIDES AND INSECTICIDES

Description: Joint venture to produce chlorinated and organic phosphorous pesticides.

Egyptian Interest: Kafr Al Zayat Pesticides and Chemicals Company, a public sector concern. Current production: 20,000 MT per year of various pesticide formulations; 800 MT per year of DDT tech.; 400 MT per year of chlorine; 1,500 MT per year of hydrochloric acid; and 50 MT per year of chloroform. DDT will be closed down in 1982. Company also produces "Mospen," based on product technology for "612" of Union Carbide Company.

Location: Kafr El Zayat City. Land cost: L.E. 300,000.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company to provide technical know-how and detailed engineering support. Equity requirements open for discussion.

Project Status: In "conceptual" stage. Some preliminary planning completed. Company is open to discussions and would like to start a feasibility study.

Output: Target production, to start, is small; size is open for discussion:

- 300 MT per year Malathion tech.
- 300 MT per year Difocol tech.
- 400 MT per year Dimethoate tech.
- 200 MT per year Dursban tech.
- 50 MT per yer Methyl and ethyl parathion tech.

Investment: Order of magnitude: U.S. \$5 million.

Markets: Supply local market and export to Middle East and Africa.

Competition: Mainly imports.

Raw Materials: Some local. Others imported from U.S.A. or Europe.

Profile 10

INSECTICIDES

Description: Joint venture to assist an existing Egyptian company in expanding its product lines. The company also wishes to convert from use of fluorocarbon propellants to hydrocarbons.

Egyptian Interest: Dexan Company, one of four private companies in specialized field of aerosol sprays. Also markets dusts and liquids. Currently has two facilities, one in Alexandria and one in Cairo.

Location: Possible in free zone. Also has two properties available for joint venture, one in 10th of Ramadan City and another near the pyramids (farm property).

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage. Dexan looks for early start of discussion with potential partner.

Output: One million cans per year (L.E. 1 million, approximately).

Investment: U.S. partner equity requirements can be low.

Markets: Initially Egyptian market; export later to Saudi Arabia and Gulf states.

Competition: Three other companies, but owner sees no problems, due to increasing market demand.

Raw Materials: Some available locally, some imported. Cans and valves imported for the most part.

Profile 11

PVC RESIN PRODUCTION

Description: Joint venture to produce resins for both local and export markets.

Egyptian Interest: Pharos Plastic Corporation, a private company established in 1979.

Location: At present plant location.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: Project considered to be a "specific" opportunity. Awaiting results of Ministry of Industry plans for 80,000-MT-per-year reactor and disposition of product.

Output: 40,000 MT per yer (base).

Investment: Not established.

Markets: Domestic. Sell to four compounding companies in Egypt.

Competition: Imports only.

Raw Materials: Imported. Some materials available in Egypt. More will be available as petrochemical industry expands.

Profile 12

DIOCTYLPHTHALATE (DOP) PLANT

Description: Joint venture to produce DOP as plasticizer for the production of PVC adhesive and fibers.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company (see Profile 6).

Location: Cairo area; existing property near airport.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financing.

Project Status: In "conceptual" stage, part of company's five-year plan. First priority: Start plans in 1982. Plant start-up in 1985.

Output: 15,000 MT per year of DOP.

Investment: Approximately L.E. 13 million: 8.4 million foreign, 4.7 million local.

Markets: Domestic. May expand to export later.

Competition: Imports. No production in Egypt as yet. (Rumored that Exxon may establish small DOP tank storage in Alexandria.)

Raw Materials: Imported, initially.

Profile 13

SYNTHETIC RESIN PLANT

Description: Joint venture to produce synthetic resins for lacquer, foundry, varnishes, moldings, and glue industries.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company (see Profile 6).

Location: Cairo area; existing property near airport.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financing.

Project Status: In "conceptual" stage. Project is part of company's five-year plan.

Output: Total production: 5,000 MT per year (to include phenolic, urea and melamine, and epoxy resins).

Investment: To be determined.

Markets: Domestic.

Competition: Imports. Very little European production.

Raw Materials: Imported: Phenols, melamine, diphenol propane, epichlorhydrin, and buffer reagents.  
Local: Formaldehyde, sulfuric acid, HCl, urea, and caustic (some phenols available from El Nasr Coke and Chemical Company).

Profile 14

PVC IRRIGATION PIPE

**Description:** Joint venture to produce PVC pipe for agricultural uses, mainly irrigation. Both solid and perforated wall pipe would be produced.

**Egyptian Interest:** Egyptian Plastic and Electrical Industries, a large public sector company engaged in making a wide line of plastic products.

**Location:** El Ras El Soda, Alexandria.

**Role of Foreign Firm:** Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance. Technology required for design of a self-contained injection unit to be mounted on a tractor trailer that can be moved from farm to farm to produce pipe required for immediate installation at farm sites.

**Project Status:** In "conceptual" stage. This idea has been studied by the "plastic development center" of the United Nations Industrial Development Organization (UNIDO). Two trucks are presently operating on a pilot basis, producing drainage pipe. This is a U.S. AID-supported program. Company will consider going into a complete joint venture to produce both PVC and truck mounted piping fabrication units if it can be arranged with a U.S. partner. The project will require an increase in PVC production.

**Output:** 30-40,000 MT per year.

**Investment:** Must be developed.

**Markets:** Domestic.

**Competition:** Little; specialized area.

**Raw Materials:** Imported to date: New 80,000-MT-per-year reactor projected to come on stream in 1984 (GOFI).

Profile 15

BLOW MOLDING OF PVC

Description: Joint venture to produce blow molded PVC bottles and bottle covers for health products.

Egyptian Interest: Eastern Trading Company is a private Egyptian company established in 1974. Working under license agreement for some products and importing PVC bottles. New facility is intended to replace imports.

Location: Between 60-70 kilometers outside of Cairo. Site is available, as are power, water, and other facilities.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology and financial assistance.

Project Status: Project considered to be a "specific" opportunity. Planning underway.

Output:  
First stage:  
Bottles ranging from 60 ml. to 45 ml.: Shampoo, baby shampoo, and bubble bath.  
Second stage:  
Bottles for pharmaceuticals ranging from 5 ml. to 50 ml.  
Total: 5-6 million bottles per year, equivalent to 1,000-1,500 MT PVC.

Investment: L.E. 300,000, equivalent to U.S. \$400,000. (Joint-venture interest to range between 7-9 percent.)

Markets: Domestic.

Competition: Mainly three large companies which have 80 percent of current market. However, market needs are growing rapidly. Total market requirement estimated at 30 million bottles per year.

Raw Materials: Not available in Egypt now. Must import.

Profile 16

FIBERGLASS REINFORCED PLASTIC COMPONENTS

Description: Joint venture to produce fiberglass reinforced plastic products.

Egyptian Interest: El Nasr Glass Company, the largest public sector glass company in Egypt. Founded 1932. Company is about to enter into joint venture with C.E. Lummus Company for a float-glass plant.

Location: At either Shubra or Mostorod.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage. Company is now discussing possible product use with El Nasr Automotive and Segwat Company, to arrive at output and investment figures.

Output: See project status.

Investment: See project status.

Markets: Initially, domestic and captive. Product would replace components normally fabricated from steel, thus offsetting steel usage, which is in short supply.

Competition: None. New product for Egyptian sale.

Raw Materials: Available locally for glass materials. Some plastic materials may be imported.

Profile 17

NON-WOVEN MATERIALS FROM POLYESTER WASTE

Description: Joint venture to produce non-woven materials from polyester waste.

Egyptian Interest: Misr Rayon Company, a public sector concern, is one of the largest in Egypt. Total personnel 10,000. Produces polyesters, nylon, viscose, cellophane. Owns a spinning mill with 54,000 spindles.

Location: Kafr El Dawar, at existing plant site.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology, engineering expertise, and financial assistance to project.

Project Status: Considered to be a "specific" opportunity. Visit by U.S. expert in non-woven technology expected shortly.

Output: Estimated 8-10 MT per day, depending upon waste volume available.

Investment: Depends on technology to be used; however, an order-of-magnitude estimate is U.S. \$10 million.

Markets: Provide for lining materials for suits. A new project in Egypt should find a ready market.

Competition: Imports. No similar production in Egypt.

Raw Materials: 2,500 MT per year of polyester waste, 400 MT per year of viscose waste, and 300 MT per year of nylon waste available in plant.

Profile 18

CELLOPHANE PRODUCTION

Description: Joint venture to produce cellophane by refurbishing and updating old equipment at an existing plant.

Egyptian Interest: Misr Rayon Company. See Profile 17 for further details in regard to this company. This joint venture will also be open to other Egyptian investors.

Location: Kafr El Dawar, at an existing plant site.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. Critical requirement is technology to improve existing plant.

Project Status: In "conceptual" stage.

Output: Projected at 12-15 MT per day with upgraded production equipment and process.

Investment: Will be established by technology brought by joint-venture partner.

Markets: Market demand for use in packaging is well beyond 15-MT-per-day capacity.

Competition: Imports only.

Raw Materials: Imported: Viscose Pulp and Sulfur.  
Local: Carbon.  
Possible supply of viscose pulp in Egypt in a year or so.

Profile 19

POLYPROPYLENE FILM

Description: Joint venture to produce polypropylene film.

Egyptian Interest: Misr Rayon Company. See Profile 17 for further details on this company.

Location: Kafr El Dawar, at an existing plant site.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To bring both latest technology and some financial support to the project.

Project Status: In "conceptual" stage. Planning will go forward only if existing cellophane plant cannot be upgraded to higher production. See Profile 18.

Output: Approximately 10-12 MT per day.

Investment: U.S. \$12-16 million.

Markets: Egypt initially. Possible export to nearby countries later on.

Competition: See Profile 18.

Raw Material: Imported from Europe (Italy, Germany, France).

Profile 20

PARTICLE BOARD PLANT

- Description: Joint venture to produce particle board from wood wastes of match production facility.
- Egyptian Interest: Nile Match Company, a public sector company, is the largest match producing concern in Egypt. It is also building (in first year) prefabricated homes amounting to L.E. 1 million. Company has three match factories and is currently planning expansion of another line in Alexandria.
- Location: At Moharam Bey Factory. Land is available.
- Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.
- Project Status: Project is considered to be a "specific" opportunity. A preliminary study has been completed and is available for review. Company is aiming at plant start-up for third quarter 1984.
- Output: 15,000 MT per year particle board. Average size 250 x 185 cm.; 8-25 mm. thickness.
- Investment: Total approximately L.E. 6 million (2.5 million local, 3.5 million foreign).
- Markets: Volume is now estimated at more than 300,000 MT per year (1982). Aim is to start production to gain 5-6 percent share of market and build with market. Annual growth of market estimated to be 15-20 percent.
- Competition: Much of competition from imports. There is Egyptian production, but market growth and scarcity of raw materials make this a promising project.
- Raw Materials: 12,000 MT per year of waste wood from match operations (80 percent); remaining 20 percent to be obtained on local market from woodworking industries. Other materials available locally.

Profile 21

CELLULOSE-BASED PRODUCTS

Description: Joint venture to produce cellulose-based products for domestic and sanitary uses. Some typical products: Baby diapers, sanitary napkins, facial tissues, napkins and tablecloths, absorbent cotton, toilet paper, and sterile dressings.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company (see Profile 6).

Location: Cairo area, near airport on existing property.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology and financial support. Name-brand U.S. company preferred.

Project Status: Project considered to be a "specific" opportunity. Part of five-year plan. Start in 1982; plant start-up in 1985.

Output: Total production: 10,000 MT per year. Continuous process.

Investment: Approximately L.E. 15 million.

Markets: Initially domestic; export later.

Competition: One small private sector company has obtained license agreement with a U.S. firm. Date of production not yet available.

Raw Materials: Locally produced: Bags, rags, straw, and bagasse.  
Imported: Wood pulp and cotton linters (Sudan).

Profile 22

BLEACHED COTTON LINTERS PLANT

Description: Joint venture to produce bleached cotton linters from raw materials.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company (see Profile 6).

Location: Cairo area; near airport, on existing property.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology and financial assistance.

Project Status: In "conceptual" stage. Part of five-year plan, to be in production by 1985.

Output: 4,500 MT per year bleached cotton linters.

Investment: Approximately L.E. 9.7 million: 5.74 foreign, 3.96 local.

Markets: Domestic.

Competition: Very little. Demand is sufficient to take up product.

Raw Materials: All raw materials locally produced except raw cotton linters, which will be imported from Sudan.

Profile 23

CARBOXYMETHYL CELLULOSE PRODUCTION

Description: Joint venture to produce carboxymethyl cellulose (CMC) from bleached cotton linters.

Egyptian Interest: Abu Zaabal Specialty Chemicals Company. See Profile 6 for further details in regard to this company.

Location: Cairo area; near airport on existing property.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology and financial support.

Project Status: In "conceptual" stage. Project is in company's five-year plan. Plant start-up scheduled by 1985.

Output: 5,000 MT per year.

Investment: L.E. 13.5 million: 8.975 foreign, 4.525 local.

Markets: Domestic.

Competition: Imports. Very little local production in Egypt.

Raw Materials: Locally produced: Caustic soda, acetic acid, ethyl alcohol, sodium carbonate, and bleached cotton linters.  
Imported: Monochloroacetic acid, produced in No. F-18 Abu Zaabal plant, or imported. Bleached linters.

Profile 24

TEXTILE CHEMICALS

Description: Joint venture to produce textile chemicals for dyeing and finishing.

Egyptian Interest: Dyestuffs and Chemicals Company (Ismadye), a public sector company, produces dyestuffs. Currently has joint venture with Hoechst (51 percent) for pigments production and another agreement covering synthetic resins (PVA).

Location: Land available at two plant sites. Probably Kafr El Dawar site would be used, as some infrastructure is available. Currently working on rough layouts for plant.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. Both technology and financial assistance required. Held preliminary talks with Grant Chemical Company of New Jersey in late 1981.

Project Status: Considered to be a "specific" opportunity. Project in planning stage.

Output: Size will be determined by market investigation now taking place.

Investment: Not established.

Markets: Local market, which is currently estimated at L.E. 4-5 million per year. Also export potential.

Competition: Aim is to produce a top-quality product with U.S. technology so as to meet the competition of imports. Currently the private sector has some production, but quality is low.

Profile 25

TEXTILE CHEMICALS AND PRINTING PIGMENTS

Description: Joint venture to produce textile chemicals and printing pigments. The chemicals include synthetic yarn sizing compounds, synthetic polymers for pigment binding, fabric finishing, flocking, and back coating.

Egyptian Interest: The Middle East Industrial Center, Bab El Louk, Cairo.

Location: Industrial zone 6 kilometers south of Suez; 85,000 square miles are available 150 kilometers from Cairo.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To bring name-brand technology and financial assistance to the joint venture.

Project Status: Considered to be a "specific" opportunity.

Output: 3,000 MT per year.

Investment: U.S. \$894,300 foreign; U.S. \$688,750 local (estimated).

Markets: Strong. Product usage is high and needed. Export market is also significant.

Competition: Mostly imports.

Raw Materials: 75 percent imported, 25 percent available locally. Balance should improve in 2-3 years as Egyptian petrochemical industry increases production.

Profile 26

ACETYLENE PRODUCTION

Description: Joint venture to produce acetylene.

Egyptian Interest: Industrial Gases company, a 40-year-old public sector company, originally French (Air Liquide) and British.

Location: At existing plant site.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage.

Output: Acetylene equivalent to 20,000 MT per year.

Investment: Based on process data to be supplied by joint partner.

Markets: Mainly domestic, but export also possible.

Competition: Very little. Company now produces 90 percent of gas used.

Raw Materials: Natural gas and hydrocarbon feed stocks are locally available.

Table 12-2

LIST OF JOINT-VENTURE OPPORTUNITIES  
DEVELOPED BY OTHERS

Profile	Subject
A	Paints and Varnishes
B	PVC Pipes and Conduit Production
C	Sodium and Magnesium Chemicals
D	Salt Production Facility
E	Textile Printing and Dyeing Chemicals

Profile A

PAINTS AND VARNISHES

**Description:** Joint venture to produce flat paint, marine paint, primers, cellulose paint and varnish, oil paint and varnish, rust inhibitors, thinners, and driers.

**Egyptian Interest:** The Salem Company. This project may be pursued further with the Investment Authority, Ministry of State for Housing and Land Reclamation, Mr. Mohee Nagar, Undersecretary for Planning; or with Dr. Shalaby, advisor for New Communities. It may also be pursued with the possible Egyptian partner.

**Location:** New Ameriyah City or other new city; (no specific site).

**Role of Foreign Firm:** Joint-venture partner in a Public Law 43 company. Partner to provide know-how, management and equity participation.

**Project Status:** In "conceptual" stage. Identified in 1979 as possible project for new cities by a consultant for the Ministry of Development and New Communities. The PACER-ILACO Plan for New Ameriyah City also recommends this project.

**Output:** Not established.

**Investment:** Minimum of L.E. 4 million. Foreign exchange cost not specified. Probably 60-70 percent of total cost.

**Markets:** Egypt: Local.

**Competition:** Market demand is large enough to absorb additional production.

**Raw Materials:** Most will have to be imported (linseed oil, calcium carbonate, and glycerin are available locally).

Profile B

PVC PIPES AND CONDUITS

Description: Joint venture to produce PVC water pipes and electrical conduits.

Egyptian Interest: Port Said government or company affiliated with Ministry of Industry.

Location: Ismailia. No specific site selected.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage. This project was identified as part of the UNDP's Suez Canal Zone project. A preliminary feasibility assessment (the source used here) indicates the project is viable if the sales price is adequate and competitive with substitutes. Resins would be supplied by a proposed PVC plant which has not yet been built. A full feasibility study is required, particularly to see if the project is viable before the PVC plant is developed.)

Output: 3,600 MT per year.

Investment: L.E. 3.8 million (1977 prices).

Markets: Domestic. Market should easily absorb production.

Competition: Not discussed.

Raw Materials: Imported PVC resins to start.

## Profile C

### SODIUM MAGNESIUM CHEMICALS

- Description:** Joint venture to build a multi-purpose chemical extraction plant to extract:  
1) sodium sulphate by brine cooling and crystallization; 2) sodium sulphide by cake reduction; 3) sodium chloride by evaporation; 4) magnesium oxide by magnesium hydroxide precipitation and calcining.
- Egyptian Interest:** El Nasr Salines Company.
- Location:** Fayoum (80 km. south of Cairo).
- Role of Foreign Firm:** Joint-venture partner in a Public Law 43 company. Provide technology, management, and financial assistance.
- Project Status:** Considered to be a "specific" opportunity. A detailed feasibility study can be examined.
- Output:** Capacity: 200,000 tons sodium chloride; 11,000 tons sodium sulphide; 98,000 tons sodium sulphate; and 41,000 tons magnesium oxide.
- Investment:** L.E. 68 million (1979 figures).
- Markets:** Domestic demand for all products exceeds supply. Also export  $\text{Na}_2\text{SO}_4$  and  $\text{Na}_2\text{S}$ .
- Competition:** Other Egyptian firms.

Profile D

SALT PRODUCTION FACILITY

Description: The Egyptian government is offering Lake Bardaweil, a 165,000-feddan lake, for partnership with a reputable foreign aquaculture group. Management of the lake will be the responsibility of the foreign partner. One of the possible development projects is a salt production facility.

Egyptian Interest: The Governorate of North Sinai and the Misr-Aswan Fishing and Processing Company, a Public Law 43 joint venture.

Location: Northwest Sinai.

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To provide technology and financial assistance.

Project Status: In "conceptual" stage.

Output: Not established.

Investment: To be determined.

Markets: Local.

Competition: Other Egyptian companies.

Profile E

PRINTING AND DYEING CHEMICALS

Description: Joint venture to produce printing and dyeing materials for the spinning and weaving industry.

Egyptian Interest: Ghaibia Governorate.

Location: Mehala (Ghaibia Governorate).

Role of Foreign Firm: Joint-venture partner in a Public Law 43 company. To supply technology and financial assistance.

Project Status: In "conceptual" stage. Project identified by the Governorate, which passed it on to the Investment Authority for preparation of a brief project profile (the source used here). Some promotional efforts, including those by the joint U.S.-Egypt Business Council, have been held up for lack of information. Apparently no detailed studies have been prepared. Some preliminary discussions are taking place with West German firm.

Output: 2,500 MT per year.

Investment: L.E. 1.15 million.

Markets: Domestic.

Competition: Domestic and imports.

**APPENDIXES**

Appendix 1

COMPANIES AFFILIATED WITH THE  
CHEMICAL INDUSTRIES SECTOR  
OF THE  
MINISTRY OF INDUSTRY AND MINERAL WEALTH

1. The Egyptian Chemical Industries Co. (Kima)
2. Abu Zaabal Fertilizer & Chemicals Co.
3. El Nasr Co. for Fertilizer & Chemical Industries (Suez)
4. The Egyptian Financial & Industrial Co.
5. Misr Chemical Industries Co.
6. Dyeing Materials & Chemicals Co.
7. Paints & Chemical Industries Co.
8. Kafr El Zayat Co. for Insecticides & Chemicals
9. Industrial Gases Co.
10. Tanta Flax & Oils Co.
11. Transport & Engineering Co.
12. El Nasr Co. for Rubber Products (Narubin)
13. National Plastics Co.
14. Egyptian Plastics & Electrical Industries Co.
15. The Nile Matches Co.
16. El Nasr Co. for Coke & Basic Chemicals (Coke)
17. The Egyptian Wood Manufacturing Co.
18. The Egyptian Leather Industry Co.
19. El Nasr Tannery Co. (Alexandria)
20. Moharram Industrial Printing Co.
21. The Paper Manufacture Co. (Verta)
22. Abou Keer Co. for Fertilizers & Chemical Industries
23. General Co. for Paper Industry (Rakta)
24. National Paper Co.
25. Middle East Co. (Simo)
26. El Nasr Co. for Pencils & Graphite Products
27. The Egyptian Company for Paper & Stationeries (Romney)

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Appendix 2

LIST OF COMPANIES AND AGENCIES INTERVIEWED  
FOR THE CHEMICAL SECTOR STUDY

U. S. Embassy

Chamber of Chemical Industries

McKee - Kearny

U.S. AID

Chamber of Chemical Industries (Second visit)

El Nasr Company for Coke and Chemicals

General Organization for Industrial Development (G.O.F.I.)

Tanta Flax and Oils Company

El Shanti for Chemical Industries

Tanta Oil and Soap Company

Misc. Import and Export Company

Standard Engineering Company

Industrial Gases Company

SIAG Chemical and Trading Establishing and SIAG Hotels Tourisme

Chamber of Commerce - A.R.E.

The Tractor and Engineering Company

Middle East Manufacturing Company

Marinjac Investment Overseas Ltd.

Egypt-U.S. Business Council

El Tawil Trading Engineering Company

Abu Zaabal Specialty Chemicals Company

Appendix 2 (cont'd)

Engineering General Company  
El Shanti for Plastic and Egypt Plastics  
Creative Chemistry Company and Comptoir Egyptien de  
Representation (Imports and Traders)  
Pharoe Plastic Corp. S.A.E.  
Cairo Food Flavors and Essences  
Chabrawichi Perfumes and Cosmetics  
Eastern Group  
Delta Contracting Company  
Egypt Sugar and Distilling Company  
National Plastics Company  
Nile Button Company (NIBU) and M. Ghanem Company  
The General Trading and Chemicals Company  
Federation of Egyptian Industries  
Egyptian Starch and Glucose Manufacturing Company  
Modern Arab Industries  
W. Rizkallah - B. Wissa  
Transport and Engineering Company  
Al Sharif Plastics Factories  
El Nasr Export and Import  
Dyestuff and Chemicals Company  
Eugene Moros and Brothers  
General Trading and Chemicals Company

Appendix 2 (cont'd)

Kafr El Zayat Pesticides and Chemicals Company  
The Star Glue Works Shehfe and Company  
Nile Match Company  
The Egyptian Starch, Yeast and Detergents Company  
Egyptian Plastics and Electrical Industries  
Plastic Development Centre (U.N.I.D.O.)  
Reda E. Khalil (Plastic Soles)  
Egyptal (EGITAL) Polyurethane Soles and Leather/P.U. Shoes  
Nile Oil and Soap Company  
Medical Packing Company  
Shawki and Company (Med. Chemicals, etc.)  
Paints and Chemicals Industries  
El Nasr Glass and Crystal Company  
Framchem (Chemicals for agriculture and industry)  
SEMAD Company  
Misr Rayon Company - Kafr El Dawar  
United Chemical Industries  
Egyptian Chemical Materials Factory (Organotechnic)  
Arab Match Company (partnership)  
Egyptian Light Industries Company (Farag & Co.)  
El Nasr Salines  
Alexandria Oil and Soap Company  
Middle East Company for Plastics

**Appendix 2 (cont'd)**

**National Spinning and Weaving**

**Dexan Company**

**Heliopolis for Chemical Industries**