

United Nations Industrial Development
Organization (UNIDO)

The Challenges of Sustainable Industrial Development in Egypt

*A Country Paper for The World Summit
on Sustainable Development (WSSD)*

**Prepared by
Prof. Dr. Amin Mobarak
Chairman of Industry and Energy Committee
The Egyptian People's Assembly**

**Cairo, Egypt
October 2001**

Table of Contents

List of Acronyms

Executive Summary

1. Introduction

1.1 Definition of Sustainable Development

1.2 Economic Dimension

1.3 Social Dimension

1.4 Environmental Dimension

2. Development of (manufacturing) industry and achievements in the various dimensions of Sustainable Development

2.1 Historical Background

2.2 Performance of Manufacturing Industry in Egypt

2.3 Importance of Manufacturing

2.4 The Role of SMEs

2.5 Location

2.6 Manufacturing Growth

2.7 Production Value

2.8 Export Trends

2.9 Industry's Percentage Share in the Grand National Product

2.10 Investments

2.11 Productivity Norms

2.12 Industrial Production Value

2.13 Labor Wages and Labor Force

2.14 Geographic Criteria in the Industrial Development Process

3- Policies Directed at the Development of Industry

3.1 Industrial Development Strategies

3.2 Public Sector Industrial Enterprises

3.3 Privatization

3.4 Achievements in the Privatization of Law 203 companies and Assets

3.5 Industrial Development

3.6 Egypt's Strategic Orientation

4- Policies Directed At Industrial Environmental Management

4.1 Egypt's Environmental Policy

4.2 Legislation and Regulations

4.3 The Project of Protection of Environment in the New Industrial Cities

5- Policies Directed at Technology Transfer, particularly EST

5.1 The Ministry of Industry and Technological Development

5.2 The Korean approach to Technology Development

5.3 Policies for Cleaner Production and Environmentally Sound Technologies

5.4 Transfer of Publicly Owned Technologies Especially ESTs

5.5 The Mediterranean Cooperation

6- Experience with integrated policies and programs

6.1 Introduction

6.2 Support for Environmental Assessment and Management (SEAM)

6.3 Egyptian Pollution Abatement Project (EPAP)

6.4 Industrial Modernization Program (IMP) and Industrial Modernization Center (IMC)

6.5 The Energy Conservation and Environmental Protection (ECEP)

7- Major Constraints and Obstacles in Enhancing the Contribution of Industry to SD

7.1 Constraints regarding Human Resource Development

7.2 Technical Constraints

7.3 Legislative Constraints

7.4 Economic Constraints

8- Multilateral and bilateral support programs that are enhancing the contribution of industry to SD

8.1 EEAA International Conventions

8.2 Multilateral and Bilateral Programs

9- Reflections and future directions for the country

9.1 The Five year Action Plan of MSEA/EEAA (2002-2007)

9.2 Development Strategy Outline

10- Conclusion

Acknowledgment

References

Appendix (1)

Appendix (2)

Appendix (3a)

Appendix (3b)

Appendix (3c)

List of Acronyms

DRTPC	Development Research and Technological Planning Center
ECEP	Energy Conservation and Environmental Protection
EEAA	Egyptian Environmental Affairs Agency
EEIF	Egypt Environmental Initiatives Fund
EIB	European Investment Bank
EMU	Environmental Management Unit
EPAP	Environmental Pollution Abatement Project
EPF	Environmental Protection Fund
FDI	Foreign Direct Investment
FINNIDA	Finnish International Development Agency
GDP	Gross Domestic Product
GNP	Grand National Product
GOFI	General Organization for Industrialization
IMC	Industrial Modernization Center
IMF	International Monetary Fund
IMP	Industrial Modernization Program
LE	Livre Egyptiane (Egyptian Pound = 0.24 US\$)
MITD	Ministry of Industry and Technological Development
MOE	Ministry of Education
MSEA	Ministry of State for Environmental Affairs
MVA	Manufacturing Value Added
NEAP	National Environmental Action Plan
NGOs	Non-Governmental Organizations
NIPPP	National Industrial Pollution Prevention Program
RBO	Regional Branch Office
SD	Sustainable Development
SEAM	Support of Environmental Assessment and Management
SFD	Social Fund for Development
SME	Small Medium Enterprises
UNIDO	United Nations Industrial Development Organization
WB	World Bank
WSSD	World Summit for Sustainable Development

Executive Summary

Realizing the importance of manufacturing, Egypt looks at industry development as vital for economic and social development and for increasing the growth rate and improving the quality and productivity of the industrial sector. In 2001, manufacturing output represented more than 20% of the Gross Domestic Product (GDP) employing about 20% of the active labor power. The Manufacturing Value Added (MVA) in 2001 was 61.65 billion LE represented about 12% of the Gross National Product (GNP). The MVA per capita for the same year was 934 LE. Private sector share of MVA was 87.9% while the public sector share of MVA was 12.1%. The process of industrialization in Egypt depends on utilizing technology, natural resources, and labor. The competitive advantage that Egypt has is the abundant labor and as a result, the labor-intensive exports represent a significant portion of the exported manufactured products.

Egypt relies in its development process on micro, small, medium, and large size enterprises. According to recent information from GOFI the registered industrial establishments are categorized as follows: 21541 micro units, 1264 small units, 774 medium units, and 1290 large size industries totaling 24869. The informal industrial sector counts between 25 to 30% of the industrial production.

The Egyptian government gives considerable attention and support to young investors and entrepreneurs through several programs mainly the Social Fund for Development. There is 170 thousand entrepreneurs working on micro and small projects with a total finance of 685 million LE based on a revolving fund all over the Egyptian governorates.

The geographical distribution of industrial enterprises vary from region to another. While 41% of the industrial production is concentrated in Greater Cairo, Delta has 17%, Alexandria has 16.8% and finally Canal Zone has 14.2% of the industrial production. That means that 89% of the industrial production is located in Cairo and Northern regions, while 11% is in Upper Egypt. For social reasons, the Egyptian government is giving more attention to Upper Egypt and hence the industrial development in Upper Egypt has amounted to 29% in the last ten years.

The industrial production value has reached 168 billion LE in 2001 with a growth rate of 299% over 1991 figures. Exports reached 8.8 billion LE during 2001 with an increase rate of 126% over 1991 levels. The investments allocated to the industrial sector valued 144 billion LE with an increase rate of 89% over 1991 figures. Labor wages reached a rate of 63% increase compared to year 1991 and labor force working in the industrial sector rose at 45% rate.

The Egyptian industrial development strategy focuses on directing investments to new regions and granting incentives and relative advantage to remote areas. The privatization process has begun in 1991 to transform publicly owned enterprises to private hands. The Ministry of Public Enterprises has achieved the privatization of 45% of the portfolio for commodities and services sectors. Sales techniques varied from selling to anchor investor, employee shareholder association, and the stock market.

Industrial development in Egypt is characterized by two main trends. The first is the establishment of new technologically competitive industries, and the second is the expansion and renovation of existing industries to increase their productivity.

The Ministry of State for Environmental Affairs (MSEA) with its executive arm the Egyptian Environmental Affairs Agency (EEAA) are responsible for carrying out the environmental policy of the Egyptian government. Their main focus is to prevent all sources of pollution and to protect Egypt's natural resources. The environmental policy of Egypt seeks to achieve environmental protection through the establishment of proper institutional, economic, and legislative frameworks at the national, regional, and local levels. After the enactment of Law 4 of 1994, it became necessary to make balance between development and the environment through sustainable development. This Law compels new establishments and all existing ones to make an assessment for the environmental impacts of industrial establishments.

The Egyptian government has initiated several important policies in order to develop and implement environmental management programs and projects. Examples include the Support for Environmental Assessment and Management (SEAM) project which is funded by Britain's Department for International Development (DFID) and the Egyptian Pollution Abatement Project (EPAP) project which is funded by the World Bank, FINNIDA, European Investment Bank (EIB) and EEAA.

However, there are some constraints and obstacles in enhancing the contribution of industry to sustainable development. Some of these constraints are related to Human Resource Development mainly the increasing rate of population which leads to poor quality of education and other main services. Other constraints are technical that related to limited technical knowledge, high price of conducting research, high price of imported pollution prevention technologies, lack of trained technical staff, and non-utilization of cleaner production technologies in manufacturing enterprises. Other constraints are legislative such as lack of coordination between authorities responsible for pollution monitoring. The last category of constraints are economic such as hard currency limitations, fluctuations in raw materials market prices, governmental control over the exchange rate of foreign currency, and lack of global market companies.

MSEA and EEAA have developed a new five year action plan 2002-2007. This future plan includes 14 programs related mainly to industrial development and sustainable development. Some of these programs aim at protecting the River Nile and water resources by controlling the industrial waste. Some other programs aim at industrial pollution abatement in the new industrial cities. Other programs aim at establishing environmentally friendly technology transfer by introducing ESTs.

The Ministry of Industry and Technological Development has introduced a ten year strategy for upgrading, renovation, and modernization of the Egyptian industry. About 50% of the renovation projects suggested is for exports and 40% of the new plants is for export.

In general, Egypt has achieved a big progress regarding sustainable development in industry especially in the environmental dimension. However, big efforts should be focused on implementing applied research and development to industry especially ESTs. This can be done by increasing the share of funding R & D and technology transfer from the meager value of 0.6% of GDP to 2.5% of GDP.

The Challenges of Sustainable Industrial Development in Egypt

1- Introduction

The Egyptian economy had, for a long time, especially after 1952 revolution, relied heavily on public sector enterprises. For about forty years, public enterprises were the keystone in running the Egyptian economy. In 1991, the Egyptian government started the economic reform and structural adjustment program with support from International Monetary Fund (IMF) and the World Bank (WB). The key economic sectors that needed reform and adjustment are privatizing public enterprises, trade liberalization and export development, and promotion of an environmentally sound technology ¹. The Egyptian government has, in the last ten years, done tremendous efforts towards liberalization of economy and building strong infrastructure. The academia has identified three main dimensions of sustainable development. The three dimensions are economic, social, and environmental dimensions. The future committee of the Friedrich Ebert Foundation introduced a similar concept for sustainable development which is a triangle of three elements:

- 1) Economic performance
- 2) Social stability and social cohesion
- 3) Environmental sustainability ².

1.1 Definition of Sustainable Development:

The World Commission on Environment and Development WCED (Brundtland Commission) has defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Therefore, sustainable development means thinking of the future.

1.2 Economic Dimension:

The Egyptian economy has done a big progress in the last ten years (1990-2000). Appendix (1) contains tables that demonstrate economic and financial indicators ³. Table (1a) gives information about the progress of nominal GDP, real GDP growth rate, share of private sector in GDP, unemployment rate, and average annual inflation rate. Table (1b) also gives some economic and financial indicators like total revenues, total expenditure and overall balance.

Table (2) presents the gross domestic product at factor cost. It includes GDP over year till the year 2000. This table gives the progress of the total commodity sector over the years which includes agriculture, industry and mining, petroleum and products, electricity, and construction. It also gives the total production services which are transportation, trade, finance and insurance, and finally hotels and restaurants. In addition to the total social services such as housing and real estate, utilities, social insurance, government services, and social and personal services. A pie chart for the GDP factor cost break down for the year 2000/2001 is shown in Figure (1).

From Figure (1), it can be seen that industrial sector represent 20% of GDP. This a relatively small value when compared with industrial countries, where this factor may lie between 30 and 40%.

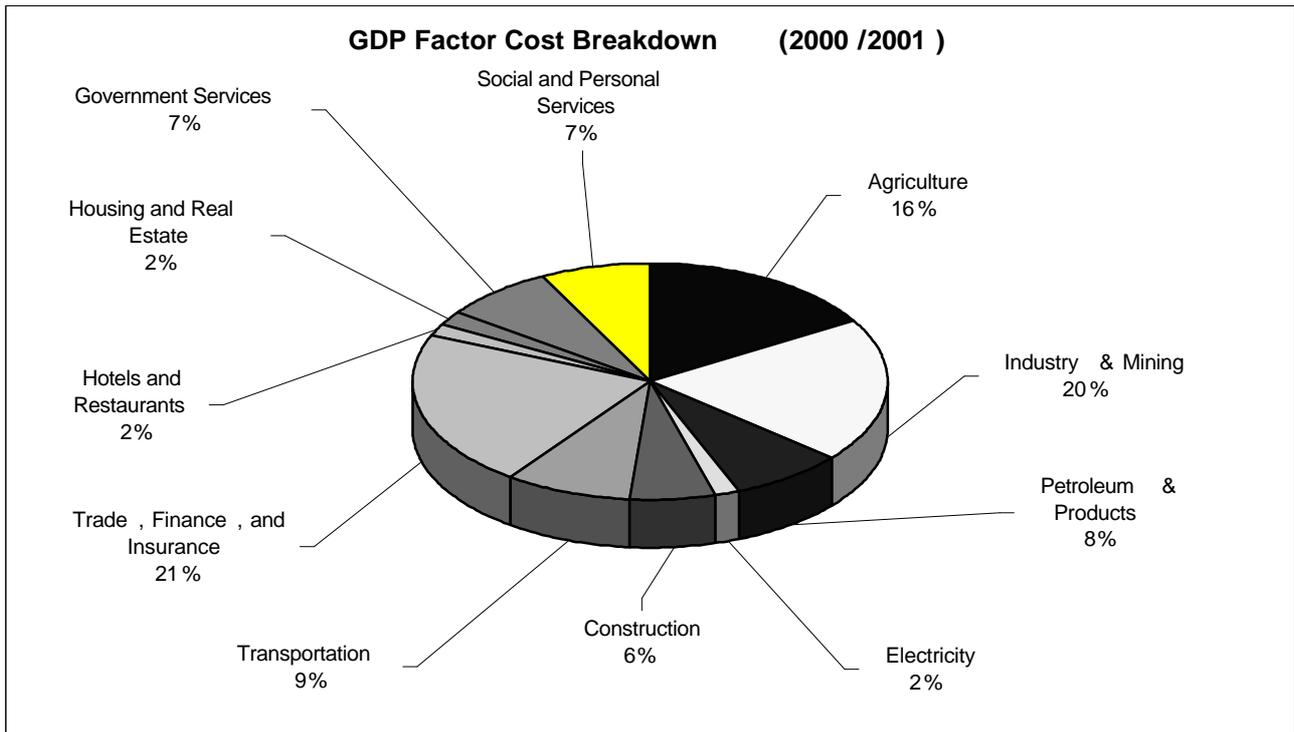


Figure (1) GDP Factor Cost break down (2000/2001)

Table (3) gives information about generated electricity and cement and steel production which are relevant for industrial development.

1.3 Social Dimension:

Regarding the social aspect, Egypt is giving a lot of attention to the poor people and has a lot of programs with international community for poverty alleviation. Also Egypt follows a social policy since a very long time to subsidize some important commodities for the poor people such as bread, electricity, and petroleum products. Also education is free of charge for all levels of education however, such subsidies do not always go the right persons and may impair the quality, especially in the case of education where we suffer from the standard of the graduates especially in technical education (industrial, agriculture, and commerce schools). Also, the Labor Law is very biased towards the working force. For example, it is very difficult to dismiss any worker even if he does not meet the obligations assigned to him. Accordingly, the privatization process was rather difficult despite the progress achieved.

In recent years,⁴ an impressive increase has been achieved in the life expectancy at birth for both men and women (65.9 years and 67.2 years respectively). The infant mortality rate has fallen considerably (from 108 per thousand in 1961 to 38 per thousand in 1993).

In addition, there were almost equal primary and secondary enrollment ratios for girls and boys. 1996 figures indicate that for every 100 literate men there were 66 literate women. In 1997, Egypt was ranked the 70th in the world with per capita income of US\$ 1,180. About 20% of households live in poverty while 7% live in absolute poverty. The Human Development Report of UNDP (1995) places Egypt in the group of medium human development countries. Relevant indicators in this respect are: life expectancy (62 years), adult literacy (51%), access to safe

water (86%), and sanitation (50%). Egypt's population has increased from nearly about 48.3 million in 1986 to about 65 million in 2000 with an average annual growth rate of 2.1%. The labor force was about 28% of the total population and the official unemployment rate was about 9.4% in 1995/1996 which was a small decrease from about 10% in 1992/1993. The unemployment rate reaches 22.3% among secondary school graduates, while it reaches 8.7% among university graduates. The unemployment rate among males is about 21.3% while it is about 15.6% among females.

1.4 Environmental Dimension:

In the environmental sector, a lot of efforts have been done to improve the quality of air, soil, and water streams and through this report the efforts done in the environmental sector will be addressed with a special reference to industry. The development of industry will have negative impacts on environment if industrial establishments do not comply with environmental laws and regulations.

2- Development of (Manufacturing) Industry and Achievements in The Various Dimensions of Sustainable Development (SD)

2.1 Historical Background:

Egypt knew organized manufacturing in the nineteenth century when Mohamed Ali took over (1805 –1849). He wanted to build a strong country so that he sent students to Europe to learn the latest applications of modern science. Then Egypt started building big industries relying on foreign expertise and technology. In 1952 the Kingdom came to an end and the republic was announced. In the fifties and sixties Egypt was in alliance with the Soviet Union and started a new wave of manufacturing relied mainly on governmental efforts (social economy) and even most of the big industries have been nationalized. The goal was to achieve self-satisfaction and to build a strong and a broad industrial base focusing on the domestic market. After the Egyptian-Israeli War in 1973 and the peace agreement in 1979 (Camp David Peace Treaty) Egypt witnessed a new wave of manufacturing with the contribution of private sector (Free Economy). The manufacturing philosophy during that period was to encourage export activities to international markets ⁵.

2.2 Performance of Manufacturing Industry in Egypt:

The Egyptian manufacturing sector is concentrated on quite a few industries. Seven industries account for over 80% of establishments in the manufacturing sector. The three largest industries are textiles, food and beverages, and furniture followed by non-metallic minerals, metal production, chemicals and basic metals. The manufacturing sector is the keystone for economic and social development and therefore, the Egyptian government looks at manufacturing as the key-player in increasing the growth rate and improving the performance of quality and productivity of the industrial sector. Industry is the dynamic engine for growth essential for rapid economic and social development. In 2000-2001, manufacturing output represented more than 20% of the Gross Domestic Product (GDP), employing about 20% of the active labor power. Industrialization is also an effective mean for modernizing the society.

The following table (2.1) gives information about GDP, Manufacturing Value Added (MVA) per capita, MVA per GDP for both the public and the private sector, and total industrial production⁶. The Grand National Product (GNP) has increased from 266.5 billion LE in 1996-1997 to 478.3 billion LE in 1999-2000.

Table (2.1) (All Values in Billion LE)

Item	1996-1997	1999-2000	2000-2001
GDP	234.5	282.2	296
Industrial Production	103	163	168
MVA	43.4	56.18	61.65
Share of MVA/GNP	10.7%	11.9%	12%
MVA per capita LE	723	864	934
Private Sector share as a percentage of MVA	73.7%	86.7%	87.9%
Public Sector share as a percentage of MVA	26.3%	13.3%	12.1%
Share of industry in GDP	18.5%	19.6%	21.1%

The values mentioned are based on 1996-1997 prices.

Table (2.2) gives the rate of growth for the public and private sector and the total as a percentage of MVA over the years 1997-2001.

Table (2.2)

Item	97/98	98/99	99/00	00/01
Percentage increase in public sector	-15%	-3.2%	-21.1%	-3%
Percentage increase in private sector	15.9%	13%	14.3%	9.5%
Average percentage increase in total	7.8%	9.7%	7.9%	7.8%

Industrialization in Egypt depends on utilizing technology, natural resources and labor. Egypt is a country with very limited natural resources. Most of manufacturing technologies are imported. The comparative advantage that Egypt has is the abundant labor. Labor-intensive exports represent a significant portion of the exported manufactured goods.

2.3 Importance of Manufacturing:

Manufacturing has great importance in any society and in Egypt in particular for many reasons such as:

- 1- Creating jobs for people and decreasing the negative impacts of unemployment.
- 2- Developing the skills and knowledge of workforce of different industries.
- 3- Achieving high added value.
- 4- Achieving economic prosperity and raising the standard of living for all individuals.
- 5- Increasing the production and service capacity in the society
- 6- Contributing in decreasing the need for imports gap.

Manufacturing is an inevitable matter for Egypt. With the continuous increasing in population and scarcity in resources, there is no other way but to invest in manufacturing.

2.4 The Role of SMEs:

There are many definitions and classifications for small and medium size industries and they may vary from one country to another. According to the data obtained (July 2001), from the General Organization for Industrialization (GOFI)⁷ which is affiliated with the Ministry of Industry, there are four categories of the size of the establishment according to the amount of investment. These categories are:

1. Micro: less than 2 million LE
2. Small : from 2-5 million LE
3. Medium: from 5-10 million LE
4. Large: more than 10 million LE

Table (2.3) gives the number of establishments for different types of industries according to the above classification. Thus, there are 21541 micro units, 1264 small size units, 774 medium size units and 1290 large size industries totaling 24869 establishments.

These are the formal registered sectors and do not include the informal sectors. The informal sector in Egypt may account for 25 to 30% of the industrial production.

Table (2.3) Distribution of Industrial Establishments - Number of Establishments

Registered Establishments at GOFI	Volume of Investments LE				Total
	Less 2 mil.	2-5 mil.	5-10 mil.	More 10 mil.	
1- Spinning, Weaving and Garments	3752	230	148	215	4345
2- Leather	1192	28	16	13	1249
3- Food Industries	3983	310	197	346	4836
4- Basic Chemicals and their products	1800	228	119	189	2336
5- Engineering Industries	4644	217	133	272	5266
6- Basic Metal Industries	381	28	23	47	479
7- Wood and its products	2411	28	17	21	2477
8- Paper and its products & printing and publishing	1318	70	34	65	1487
9- Building materials and Ceramics	1619	70	40	85	1814
10- Other Process Industries	399	52	41	26	518
11- Poultry and Fishery	12	-	-	-	12
12- Extraction of Iron materials	-	-	-	1	1
13- Mines and Quarries	30	3	6	10	49
Total	21541	1264	774	1290	24869

The Egyptian government has paid a lot of attention towards micro and small enterprises. The aim was to create young entrepreneurs and to encourage them for private activities. This was very essential because of the old policy of the government to find governmental and public sector jobs for all graduates that made them reluctant to develop small businesses and to prefer governmental jobs. One of the main goals of the Egyptian Social Fund for Development is to promote entrepreneurship, especially in SMEs and micro enterprises⁸.

Table (2.4) shows the industrial projects financed by the Social Fund for Development over the years 1992-2000⁹.

Table (2.4)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Projects	2449	3017	3920	2135	1519	1321	1661	1524	2068
Loans in Million LE	25.71	37.3	107.9	54.6	42.1	41.1	54.0	56.6	89.2

In addition, the micro, small, and medium size enterprises are financed through governmental organ loans and grants especially from the USAID. There is 170 thousand entrepreneurs working on micro and small projects with a total finance of 685 million LE based on a revolving fund all over the governorates of Egypt. The average loan for each plant is 4000 LE. However, the number of clients that is interested to get this service and did not receive it is estimated to be 2.15 million clients with a ratio of 93% of the total number of clients. If the clients of the social fund are included, this number will reach 89% of the total fund¹⁰.

The financial gap to cover all the interested clients will be 8.5 billion Egyptian Pounds. One of the projects working on this revolving fund is the Businessmen Association in Alexandria which

is working on lending small workshops to get the necessary finance to promote, or innovate or expand the existing project. In addition, the National Bank for Development has some projects in this field.

Recent information regarding the industrial development of the registered enterprises at GOFI ¹¹ regarding the period 1991-2001 has been obtained.

Table (2.5) gives the cumulative industrial development over the years 1991 –2001. This table includes development of investment value in billion LE for the industrial enterprises also the development of the number of enterprises, number of workers, and finally the wages.

Table (2.5) The Cumulative Industrial Development of the Registered Enterprises

Item	Unit	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Development of investment value in the registered industrial enterprises	Billion LE	76	79	82	86	92	96	100	103	111	135	144
Development of the number of registered enterprises	Number	17473	18845	20320	21082	21591	22158	22751	23288	24064	24884	25262
Development of labor in registered enterprises	Thous. workers	953	991	1039	1070	1115	1153	1178	1205	1295	1355	1384
Development of the wages of registered enterprises	Million LE	5455	5651	5926	6090	6347	6511	6665	6820	7268	7663	8868

Table (2.6) gives for the different industrial sectors the number of enterprises, the production value, the number of labor, and the wages as registered till June 2001.

The Distribution of the Registered Industrial Enterprises till June 2001 According to Industrial Activity – Money in Million LE

Table (2.6)

Activity	Number of enterprises	Production value	Investments	Labor	Wages
Mines, quarries, oil drilling and refining	71	3776	7779	32519	381
Foodstuff, beverages and tobacco	4972	35395	20933	219098	1087
Textiles, clothes and leather ware	5665	18185	17191	400318	1592
Wood, wood products and upholstery	2492	1071	840	35451	97
Paper, paper products, printing and publishing	1509	4599	3912	53930	265
Basic chemicals and allied products	2401	18550	15765	199860	1113
Building materials, ceramics and refractories	1839	8879	13709	96261	1032
Basic metallurgy	477	12783	14395	73194	448
Metallurgical products, machinery and equipment	5317	60436	49252	261322	2836
Other process industries	519	697	236	11593	17
Total	25262	164271	144012	1383546	8868

2.5 Location:

Regarding the location of industrial establishments, table (2.7) shows the Geographic Distribution of the Registered Industrial Enterprises till June 2001.

Table (2.7) Money in million LE

Region	Governorate	No. of enterprises	Production Value	Investments	Labor	Wages
Greater Cairo	Cairo	8514	34802	29013	359907	1664
	Giza	2383	22776	18553	153055	787
	Kalubeya	1895	9764	9573	121623	698
Delta	Menoufeya	491	6819	5410	32088	177
	Gharbeya	1487	4792	3451	92202	470
	Kafr El Sheikh	310	2216	490	5917	91
	Damietta	902	9052	2280	13840	49
	Dekahleya	1305	4978	4276	42260	209
Northern Upper Egypt	Minya	263	502	368	8193	27
	Beni Souef	109	1247	1114	5003	27
	Fayoum	128	532	379	6192	23
Central Upper Egypt	Assiut	526	1464	934	13531	65
	New Valley	6	13	7	704	2
Southern Upper Egypt	Red Sea	51	86	330	5026	50
	Sohag	268	937	972	10543	71
	Quena	151	2192	4357	21147	290
	Aswan	151	1214	3310	15357	125
Canal Zone	Port Said	287	5128	1966	18455	80
	Suez	89	3591	6634	21503	225
	Esmaeleya	131	1473	1607	13065	90
	Northern Sinai	46	339	1603	1469	15
	Southern Sinai	6	144	1178	2682	31
	Sharkeya	3075	22667	19633	153600	1225
Alexandria Zone	Alexandria	2207	23048	22379	209164	2190
	Matrouh	10	64	32	502	4
	Beheira	471	4531	4161	56518	182

From this table, it can be seen that 41% of the industrial production by value is concentrated in Greater Cairo, 17% in Delta, 16.8% in Alexandria, and 14.2% in Canal Zone. This means that from Cairo and north 89% of the industrial production is located, while for northern, central, and southern Upper Egypt only 11% of the industrial production is located. This is the reason why the government policy is encouraging investment in Upper Egypt with tax exemption up to 20 years.

2.6 Manufacturing Growth:

As for manufacturing growth, table (2.8) gives information about the development of industrial production value, the value of industrial exports, and the industrial share of the GDP.

Table (2.8)

Item	Unit	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Development of industrial production value	Billion LE	51	60.2	67.3	77.3	95.5	103	118	142	147	163	168
Value of industrial exports	Billion LE	3.9	5	4.4	4.3	7.4	6.7	6.9	6.1	7.3	8	8.8

Industry's percentage share in the GDP	%	16.5	16.7	17.2	17.5	17.7	18.1	18.6	19.5	19.6	19.7	20.1
---	---	------	------	------	------	------	------	------	------	------	------	------

2.7 Production Value:

According to the information obtained from the General Organization for Industrialization (GOFI), the production value has reached until June 2001 a gross value of LE 168 billion with a 299% rate of increase over 1991 figures. The major surge having been realized during 95/96 where the percentage increase exceeded 102%, then the increase proceeded to reach 229% during the year 2001.

2.8 Export Trends:

Exports reached a value rate of LE 8.8 billion during 2001 with an increase rate of 126% over 1991 levels.

2.9 Industry's Percentage Share in the Gross Domestic Product:

The industrial sector percentage share in the gross domestic product was valued at 20.1% during the first six months of year 2001, and it becomes reflected from such significant share during the last ten years the marked role which industry plays in the national economy.

2.10 Investments:

Investments allocated to the industrial sector valued L.E 144 billion at an increase rate of 89% according to current exchange rates compared to investments expended during 1991. The greatest percentage of industrial investment was with respect to the metallurgical industries (excluding the oil and mining sectors), which reflects the major importance of this sector in the national industrial strategy.

2.11 Productivity Norms:

Labor productivity which stood during 1991 at L.E 8,049 reaching L.E 114,045 during year 2000 with a development rate of 130%. The pound productivity stood in 1991 at L.E 14.00, reaching L.E 20.00 in year 2000, at an increase rate exceeding 20%. Capital productivity which developed at a rate of 14% during the ten year period extending from 1991 till year 2000.

2.12 Industrial Production Value:

The industrial production value amounted aggregately to L.E 164 billion in year 2001 with an increase rate of 113% with year 1991 as base year. The greater increase was with respect to the engineering industries sector in which such increase reached 250%, whereas the pertinent increase as to the metallurgical industries sector stood at 162%

2.13 Labor Wages and Labor Force:

Labor wages realized a 63% proportional increase compared to year 1991, and the increase in labor force working in the industrial sector rose at a 45% rate.

2.14 Geographic Criteria in the Industrial Development Process:

The Industrial development norms (increase in the number of industrial firms) in upper Egypt amounted to some 29% over the ten year period from 1991 till 2000, the increase rate being predominant in the southern upper Egypt region, whence it reached 48 %, reflecting the state's ever increasing concern to develop the upper Egypt governorates, with special emphasis on the

southern upper Egypt region. This is an important action for sustainable development since most of the terror acts stem from Upper Egypt due to lack of job opportunities.

The comparative investments distribution over the different governorates was seemingly more regulated, as investments allocated for the Cairo and Alexandria governorates were reduced, while investment shares allocated for the Red Sea, Beni Souef, Fayoum, Sohag, Aswan and North Sinai governorates were increased.

3- Policies Directed at the Development of Industry

The development of industry in Egypt has passed through many different phases beginning from the sixties till the year 2000, depending on the political atmosphere in the different decades and the transformation from the social economy to the free market economy. Most of the developing countries have passed through this transformation. This transformation has its impact on industry since it was almost public sector in the early sixties and after the fall of the Soviet Union. Most developing countries with the help of the World Bank and IMF have begun structural adjustments and privatization programs.

Table (3-1) gives the evolution of industrial policy in developing countries (1960-2000) which is also typical to Egypt¹².

Table (3-1): The evolution of industrial policy, 1960-2000

1960s –1970s	1980 – 1995	1995 – 2000
Intervention and regulation	Market-orientation and deregulation	Industrial governance
Self-sufficiency and indignization public ownership	Foreign direct investment (FDI)	Privatization and FDI
Import controls and tariff protection	Trade and investment liberalization	Promotion of clusters
Inward-driven industrialization	Outward Orientation	Supply-side support from SMEs
Industrialization to achieve structural transformation	Promoting efficient industries	Global competitiveness

3.1 Industrial Sustainable Development Strategies:

The strategy of the Egyptian government regarding sustainable development in industry focuses on directing investments to new regions and granting incentives and relative advantages to remote areas.

This Strategy depends upon the following¹³:

- Any new project must be subjected to an Environmental Impact Assessment before final approval;
- All polluting activities are being relocated from residential areas to other, more suitable, sites; (e.g. tanning, leather, and Cement industries)
- Industrial Zones are being established in all Governorates for the new investments;
- Production technologies are being improved to minimize the use of raw materials, energy and, as possible, cans, which may be wasted in production;
- Clean technologies and cleaner production will be used as pollution prevention procedures;
- Production quality technologies are being adapted by applying ISO 9000 series and environmental system 14,000 series, whenever it is possible;
- Cooperation is being supported and enforced between industry and scientific research centers, universities, and international programs and organizations in the area of environment and sustainable development.

3.2 Public Sector Industrial Enterprises:

Regarding the strategy for public sector industrial enterprises, in 1991 a new Ministry of Public Enterprises was established aiming at the privatization of the public sector. Big progress has been done in this direction. At the beginning of the 80s, about 80% of the industrial production was public, now about 85% of the industrial production is in private hands.

3.3 Privatization:

Egypt had started to transfer its public enterprises to private ones at the beginning of the Egyptian comprehensive Economic Reform Program. This was a transformation from central planning and semi-central planning to market economy and market mechanism starting from 1991, after a long series of partial transformations that started after the October War in 1973. This partial transformation was activated in the 80s, but it was still partial. From 1991 to 1996 a number of preliminary steps were taken. These steps included the preparation of public opinion, preparation of the legal framework and the beginning of privatizing a number of public enterprises through the Stock Market. Three enterprises were sold to a strategic investor. Egypt started with companies in sectors producing commodities and services before other sectors, such as banks, financial sector, insurance companies, communications and utilities for reasons related to the Egyptian culture.

3.4 Achievements in the Privatization of Law 203 Companies and Assets ¹⁴:

Since 1996, Egypt started the broad and comprehensive process of transformation, with total sales to date adding up to 142 enterprises out of 314 governmental enterprises destined to be privatized. In addition, 38 production factories were sold and leased as units of enterprises. Ministry of Public Enterprises has almost achieved the privatization of 45% of the portfolio for commodities and services sectors. Thirty-two large enterprises out of 142 were sold as assets. Their assets were divided and sold according to their geographical locations. Thirty enterprises were sold majority to Employee Shareholder Association. Thirty-eight enterprises in various activities were sold on the Stock Market. Twenty six enterprises in different activities were sold to anchor investors (strategic partner) in sectors such as: chemical industries, food processing industries, metallurgical industries, hotels, tourism and others. Less than 50% of the shares of 16 enterprises were sold. As for 26 anchor sales, majority stakes up to 90% were sold with a 10% stake sold at discount to ESAs. The total of what have been sold is 180 enterprises and plants.

In 1981, the number of workers in the public sector totaled 1274 thousand, and in 1991 it became 1325 thousand of which 1063 (80%) were employed in the 314 companies subjected to the Public Enterprise Law No. 203. The remaining public sectors not subjected to the law are the banking, insurance, aviation, electricity, telecom, military production, and Suez Canal sectors. The number of workers employed today by public enterprises under the Public Enterprises Law totals 519,000, a decline of 50% from the previous level.

The data is for year 2000, after applying optional early retirement to 159,000 employees over 50 years of age.

The privatization strategy of Egypt is contributing to sustainable development in industry since governments have other jobs rather than management of industrial production. The privatization procedure is progressing however, other countries (e.g. Germany) have closed this file in much shorter time.

3.5 Industrial Development:

Industrial development in Egypt is characterized by two main trends, the first is the establishment of new technologically competitive industries, and the second is the expansion and renovation of existing industries to increase their productivity.

Industrial development is the mainstay for establishing production base and maximizing the export capabilities of the national economy. Hence, it is given top priority as a commanding factor in building a competitive economy in the face of international variables and economic groupings of industrialized states. A growth rate of not less than 9% in the fourth 5-year plan is targeted which would progressively rise to an average of 11% until 2017.

3.6 Egypt's Strategic Orientation:

The strategic orientation in this respect calls for a package of policies to be adopted, chief of which are as follows ^{15,16}:

1- Continue to provide conditions necessary to improve the investment climate, in conformity with the evolution of local and surrounding conditions in order to encourage Egyptian, Arab and foreign capital to invest in industrial activities.

These activities can attract advanced technology, particularly to the new communities and reinforce infrastructure there, allowing for wider spreading and entrenchment of industries.

2- Encourage small and medium-size industries and support their role as originators of finished products or as feeders or complementary to large- size industries. Provide for spreading these industries all over the governorates.

3- Provide research units at production sites, in collaboration with academic scientific institutions, specialized centers and the Scientific Research Academy, to upgrade production processes through modern scientific and technological applications.

4- Expand export-oriented industries, and give due attention to the study of foreign market needs for new commodities. Industrial product exporters are to be assisted in promptly obtaining the incentives prescribed under the Tax Refund and Direct Refund Regulations.

Attract multinational companies to direct investments for export. Make use of the advantages available to some Egyptian products in opening new markets for Egyptian industries.

5- Protect Egyptian industry against illicit competition caused by subsidies granted by certain countries to their products or market dumping. Provide for wider expansion of integrated industrial complexes of all types. Extend technical, management and marketing assistance to small and medium-size industries.

6- Improve productivity and quality standards for industrial commodities, by enhancing institutional and regulatory framework and utilize productive measurements of production factors. Provide for the exploration of idle production capacities in the industry sector. Direct industrialization to unconventional fields of production and embark into new industrial areas in line with world industrial progress. Allow for the achievement of technological advancement, exchange experience in the field of technology research, development and transfer in the industrial sector, with international institutions, with emphasis on the enlisting of Egyptian experts abroad. Create extension units for transferred technology in industrial activities.

7- Rationalize consumption of energy, by using energy-saving production techniques, periodical maintenance to minimize waste, and expanding the use of thermal insulation, thermally-closed circuits and new and renewable energy.

8- Upgrade and update database, particularly relating to geographically existing industrialization potentials, design potentials and feeder industries. Encourage the manufacturing of main components of major industrial projects. Create companies that can act as main contractors, and direct them towards intensifying local industrialization.

Upgrade architectural design bureaus and engage them in the process of first sample making. Provide necessary finance for this process from the development budget.

9- Protect the environment against industrial pollution by using clean technology.

10- Redistribute production and industrial activities in order of priority. Relieve production operation of procedural burdens. Expand export-oriented industries. Encourage investors to establish basic industries and give due attention to ongoing and specialist training for industry staff. Draw up basic rules and criteria to assess these policies through periodical measurement of sustainable growth rate in terms of productivity, profitability, development, innovation and provision of new employment opportunities.

11- Achieve appropriate regional distribution of industrial activities and optimum utilization of production capacity of existing plants. Technologically upgrade such plants and their ability to promptly respond to changing conditions, particularly in production varieties.

All the above will be possible especially in the light of the stability and economic liberalization already achieved, and entry into the field of modern petrochemical and chemical industries.

Expand pharmaceutical, engineering and electronic industries. Also, reinforce conventional industries, with emphasis on small-size, supplementary, software and other non-conventional industries.

4- Policies Directed at Industrial Environmental Management

The period 1999-2000 witnessed the most important environmental initiative in Egypt since the ratification of law 4/1994, that is the elimination of polluted industrial wastewater discharge to the River Nile. The initiative was done by the Ministry of State for Environmental Affairs (MSEA). In addition to the launch of the Environmentally Friendly New Industrial Cities Program in five cities in order to introduce cleaner technological practices and reduce current pollution loads.

4.1 Egypt's Environmental Policy¹³:

Sustainable development entails a pattern of growth in which future generations are no worse off than present ones in terms of the economic, social, and environmental assets they possess as well as the living standards they enjoy. In this respect, environmental protection and a balanced use of natural resources must constitute an integral part of the development process. In Egypt, as the available natural resources must support a rapidly increasing population, the continuous improvement of the protection and management of the environment within the overall context of the principles of sustainable development, is an evident necessity.

The ministry of State for Environmental Affairs (MSEA) with its executive arm, the Egyptian Environmental Affairs Agency (EEAA), meet this challenge by continuously striving for the integration of the environmental dimension into national policies, plans and lines of actions.

This is carried out with an immediate focus on the reduction of pollution and the protection of Egypt's natural resources through effective environmental management.

The environmental policy of the Government of Egypt seeks to achieve environmental protection through the establishment of proper institutional, economic, and legislative frameworks at the national, regional, and local levels.

4.2 Legislation and Regulations:

The Egyptian Environmental Affairs Agency (EEAA), originally established in 1982, was restructured with new mandates by Law 4 of 1994 for the Protection of the Environment. According to Law 4 of 1994 for the Environment, EEAA is responsible for applying the environmental measures to prevent or control pollution. The environmental problems in Egypt are indirect consequences for development which did not take into account the environmental dimension. It became necessary to make balance between development and environment through sustainable development. This balance was enforced by Environment Law 4/1994. The Act compels new establishments and any extension in existing establishments to make an assessment for the environmental impacts of industrial establishments.

4.3 The Project of Protection of Environment in the New Industrial Cities:

The establishment of new industrial cities is a practical alternative to curb the pollution problems of the old cities. This not only decreases problems in the over crowded areas but also helps to spread urbanization in the new cities that have enough land space. The new cities allocate enough space for industrial and urban expansions in the long term, and allocate suitable sites for building populated area and public services, such as utilities, streets, markets, parking and green areas, means of transportation and amusement facilities. The program of Eco-friendly industrial cities¹⁷ aims at boosting the initiatives of cleaner production in the industrial establishments.

The following table (4.1) is a summary of information of the industrial establishments (IE) that have taken steps to improve their environmental performance, and the money spent on the environmental projects.

Table (4.1) Money in Million LE

City	Total No. IEs	IE already complied	IE in complying process	Costs of environ. projects	Expected dates of compliance
10 th of Ramadan	706	690	16	391	Dec. 2000
6 th of October	478	420	58	176	March 2001
Sadat	168	136	322	30	July 2001
Al Obour	52	39	13	283	June 2001
Borg al-Arab	298	177	121	41	July 2001
Badr	113	33	80	52	Dec. 2001
New Bani-Swafe	29	21	8	39	Dec. 2001
New Salhya	44	25	19	49	Dec. 2001
New Damietta	76	19	5	83.5	Dec. 2001
Total	1964	1560	404	1344.5	

5- Policies Directed at Technology Transfer, Particularly EST

5.1 The Ministry of Industry and Technological Development:

Technological development was added to the functions of the Ministry of Industry which had to formulate new policies and programs and setting up technological establishments that have the capabilities to flourish the process of industry modernization. In addition to open cooperation channels and participation with international companies and technological centers. In addition, the ministry of industry seeks to procure domestic and foreign financial resources for the purpose of granting necessary loans and studies for the aim of modernizing industry.

The Ministry of Industry had taken several important decisions regarding technological development ¹⁸.

- Analyzing industrial sectors and the impacts of international agreements on them.
- Establishing technological centers for weaving, food, and leather industries.
- Establishing engineering company for the purpose of designing products and production lines.
- Preparing a presidential decree that sets up an authority for industry technological development.
- A decision was made that established the industry development board.
- A mutual cooperation agreement was signed with the center for agriculture research in the field of the development of food industries.
- Initiatives were taken to improve the condition of the two agreements of European Partnership and Industry Development Program.

5.2 The Korean Approach to Technology Development:

The Korean approach to technology development is a good example which Egypt can follow. This program is based on the industrialization of the country which is based on science and technology.

Table (5.1) gives the steps of industrialization for different decades beginning 1960. The table indicates also how science and technology have contributed to the industrialization process

Table (5.1) ¹⁹

Year	Industrialization	S&T development
1960	Develop import-substitution industries. Expand export-oriented light industries. Support producer-goods industries.	Initiate S&T education Construct Scientific and technological infrastructure Promote foreign technology imports
1970	Expand heavy and chemical industries. Shift emphasis from capital imports to technology imports. Strengthen export-oriented industrial competitiveness.	Expand technical training Improve institutional mechanism for adapting imported technology. Promote research applicable to industrial needs.
1980	Transform industrial structure to advanced and balanced form. Expand technology-intensive industry. Encourage human resource development and improve productivity of industries.	Develop and acquire top-level scientists and engineers. Perform national R&D projects efficiently. Promote industrial technology development
1990	Promote adjustment of industrial structure and technical innovation. Promote efficient use of human and other resources. Improve information network.	Realign national R&D projects. Strengthen demand-oriented technology development system. Internationalize R&D systems and information networks. Construct S&T infrastructure.

5.3 Policies for Cleaner Production and Environmentally Sound Technologies:

The policies suggested to acquire Cleaner Production (CP) or Environmentally Sound Technologies (EST) could be summarized in the following:

- 1- Increasing Awareness and Applying Pressure – The Role of Media & NGOs.
- 2- Training and Planning – The role of Industry and Experts.
- 3- Financing and Establishment – The Role of International and National Organizations.
- 4- Coordination and Follow-up – The Role of the Governmental Institutions and/or Businessmen Associations.

The four steps required for cleaner production are illustrated and summarized in table (5.2)²⁰

<u>Awareness</u> Role of Media & NGOs	<u>Training & Planning</u> Role of Industry & Experts	<u>Financing & Establishment</u> Role of international and national funding organization	<u>Implementation, coordination, follow-up</u> Role of Gov., Institutes and Businessmen
<ol style="list-style-type: none"> 1. Cultivation of environmental culture & CP concept. 2. General awareness of citizens rights in clean environment. 3. Awareness of citizens role to apply pressure on industry. 4. Applying pressure on industry & officials to use CP. 	<ol style="list-style-type: none"> 1. Forming a task force in each industrial establishment on CP. 2. Training task force on establishing information base on CP. 3. Training task force on new tools, e.g., (LCA) to assess different production alternatives. 4. Make comprehensive PAAP. 	<ol style="list-style-type: none"> 1. Mobilization of international resources to contribute in CP projects. 2. Promotion of CP concept among national banks. 3. Training of bank's staff on dealing with CP projects. 4. Establishment of special funds mechanism for 	<ol style="list-style-type: none"> 1. Avoiding of stringent laws that may cause industry to collapse. 2. Allowing enough time to switch to CP. 3. Training Governmental officials on CP. 4. Establishment of Governmental or non-governmental organization for the support and coordination of CP projects

Figure (5.2) Steps of Introducing Cleaner Production (CP)

5.4 Transfer of Publicly Owned Technologies Especially ESTs²¹:

This was the theme of an expert committee held in Kyongju, Korea in Feb. 1998. There are many ESTs owned by governments. In this meeting, it was argued to facilitate the transfer of this technology not only between north and south but also between south and south. This transfer should be based on soft loans and grants.

5.5 The Mediterranean Cooperation²²:

In June 2001, a workshop on industry and sustainable development was held in Barcelona. The workshop was an expert meeting aiming to exchange knowledge, experience, and achievements regarding projects which contributed to SD in industry and pollution abatement in industrial enterprises around the Mediterranean.

6- Experience with Integrated Policies and Programs

6.1 Introduction:

In 1999 and with support of the United States Agency for International Development USAID, an environmental policy program was initiated to support MSEA in developing and implementing policy measures with the objective of ensuring effective and sustainable environmental protection and natural resources management²³. The focus was given to institutional development, integration of an environmental dimension into national policy planning and development and addressing the economic and financial constraints facing environmental control and pollution prevention. In addition to addressing the issues of cleaner and more efficient energy use, the reduction of industrial pollution, solid waste management and environmentally sustainable tourism.

As environment cuts across the activities of all ministries and institutions, public and private, the MSEA has signed six cooperation protocols with other partners such as the ministries of Interior, Education, Manpower and Immigration, as well as the Social Fund for Development, the Federation of Egyptian Industries, and the 10th of Ramadan City.

The EEAA has established Regional Branch Offices (RBOs) in several regions in order to support its role in monitoring the industrial activities that may harm the environment.

As for partnerships with other international partners, in 1999, the EEAA has worked with Department for International Development in the UK for the aim of assisting Dakahlia and Sohag Governorates in preparing their environmental action plans and their solid waste management strategies. In addition, capacity building programs were designed with cooperation with Finland in the field of industrial pollution abatement. These programs were initiated in Cairo, Alexandria, Qalyubia, and Suez, where the majority of Egyptian industries are located. With respect to environmental financial mechanisms, three packages have been already established with the objective to promote investments for pollution abatement and to implement cleaner technology initiatives in the industrial sector.

a) The Environmental Protection Fund (EPF)

The establishment of the Environmental Protection Fund aims at leveraging investment in the environmental sector. The Fund represents an important strategic tool designed to generate the resources required for implementing environmental projects and programs.

b) Egypt Environmental Initiatives Fund (EEIF):

The aims of this fund are to promote sustainable and sound environmental management practices among small and medium enterprises (SMEs) and non-governmental organizations with a particular focus on the soil and water quality sectors.

6.2 Support for Environmental Assessment and Management (SEAM)

The Support for Environment Assessment and Management (SEAM) is being implemented under the National Industrial Pollution Prevention Program (NIPPP). This project is a multi-disciplinary environmental project being funded by Britain's Department for International Development (DFID). This project is being implemented by the Egyptian Environmental Affairs Agency (EEAA) through the Technical Co-operation Office for the Environment (TCOE) and Entec a UK engineering and environmental consultancy. This project has implemented some successful case studies in the manufacturing industries (private and public).

6.3 Egyptian Pollution Abatement Project (EPAP)

The Egyptian Pollution Abatement Project (EPAP) is one of the main projects of the Egyptian Environmental Affairs Agency (EEAA). The main goal of EPAP project is assisting the Egyptian industry to comply with the environmental laws. EPAP is a joint project of the World Bank (WB), Finnish International Development Agency (FINNIDA), European Investment Bank (EIB) and EEAA.

6.4 Industrial Modernization Program (IMP) and Industrial Modernization Center (IMC)

The IMC²⁴ is an initiative of the Government of Egypt to help prepare the industrial sector for the challenge that will follow the introduction of free trade conditions and exposure to global markets. The industrial sector will have to embrace modernization of production methods to help them prepare for free trade and assistance will be provided to industry through the Industrial Modernization Center, the executive arm of the IMP.

This paper focuses on the work that IMC will undertake in its first six months of operation, that is, up until the end of March 2002. Budgets are provided as well as staffing needs and details are given of the various programs of activity to be initiated.

The IMP is funded by grants of EURO 106 million from the Egyptian Government, EURO 74 million of contributions from the private sector in Egypt and EURO 250 million provided by the European Union. IMC will help eligible SMEs modernize and upgrade their operating systems and methods and assist them with improved access to new markets. Eligible SMEs are privately

owned, show potential for growth, operate in manufacturing or service sectors, employ more than ten people and be legally established.

The IMC program activities and finance are found in Appendix (2)

6.5 The Energy Conservation and Environmental Protection (ECEP)

This project is financed through USAID for conservation of energy in Egyptian industry private and public sectors and to implement some measures for prevention of industrial pollution. The private sector was managed by Development Research and Technological Planning Center (DRTPC) in Cairo University while the public sector was managed by El-Tebin Metallurgical Institute.

The following table (6.1) gives a summary of the implemented projects between 1993-2000 and the money spent on them for private companies.

Table (6.1)

#	Company	Application	Feasibility Summary			Monitoring Summary		
			Equipment Cost, US\$	Annual Savings, US\$	SPB* Years	Equipment Cost, US\$	Annual Savings, US\$	SPB, Years
1	Arab Aluminum Company	CCS,WHR, IR	770,000	236,804	3.2	850,000	443,310	1.9
2	Arab Pharmaceutical Glass Co.	CCS	144,693	34,310	4.2	167,000	38,880	4.2
3	ALUMISR	COG	483,000	183,000	2.6	540,000	154,285	3.5
4	EIPICO	EMS	293,700	145,568	2	309,000	197,500	1.6
5	Orient/Asfour	CCS,WHR	351,366	77,647	4.5	367,265	224,043	1.6
6	7UP (Now : Cairo Beverages and Industries, Coca Cola)	PFI	92,000	50,000	1.8	50,000	49,480	1.0
7	Arab Contractors Medical Center	PFI	228,000	57,524	3.9	201,314	53,886	3.7
8	GIZA CABLES	PFI	135,000	43,283	3.1	108,527	57,550	1.9
9	Cairo Beverages and Industries (Coca Cola)	PCS	578,367	131,196	4.4	Under Installation		
10	RAMSES HILTON	HEL, EMS	212,000	91,000	2.3	Under Monitoring		
11	EL RASHIDI El Mizan (6 th October City)	WHR	100,000	32,258	3.1	Under Start-up		
12	ORIENT Glass	WHR, PCS, CCS, IR	2,594,298	1,486,000	1.7	Under Monitoring		
13	Private-Sector Bakeries (40 bakeries)	Switching to natural gas	200,000	122,000	1.63	Under Monitoring		

* SPP stands for Simple Payback Period

CCS: Combustion Control System

IR: Insulation and Refractories

EMS: Energy Management Systems

PCS: Process-Control Systems

WHR: Waste-Heat Recovery Systems

COG: Cogeneration

PFI: Power-Factor Improvement

HEL: High-Efficiency Lighting

The measures which have been implemented to improve energy efficiency and to minimize industrial pollution includes environmentally sound technologies and good house keeping practices like control of combustion system of boiler, waste heat recovery systems, cogeneration, high efficiency lightning, insulation and refractories, power factory improvement, process control systems and energy management systems.

7- Major Constraints and Obstacles in Enhancing the Contribution of Industry to SD

One of the major constraints in achieving effective environmental management of Egyptian manufacturing industries has been the fragmentation of decision-making in terms of both geographic boundaries and allocation among various uses. Major players that affect decisions concerning the adoption of cleaner production techniques include manufacturing and service industries, governmental agencies, and environmental advocate groups. The interactions between industrial development, urban growth, and infrastructure support services have not received systematic attention from the multiplicity of agencies involved. Thus, wholly unrelated decisions on industrial development in a specific region inevitably produce negative impacts on the environment and other development activities²³.

There are specific categories of constraints that deserve mentioning:

7.1 Constraints Regarding Human Resource Development^{15,16}:

- a) The Egyptian population is increasing with rate 2.1 % which means an increase of 1.3 million inhabitants per year. This puts a large pressure on the education at all levels since, by constitution, education is free of charge at all levels.
- b) Accordingly the Ministry of Education (MOE) should build between 1500-2000 schools per year to absorb the new comers and to keep the number of pupils per class in a proper number (now up to 60 pupils per class).
- c) The public universities have a very large number of students which amounts to over 40,000 students in the commerce faculty in Cairo University alone (equivalent to 6 properly sized universities), (The American University in Cairo is about 6000 students and 30 students per class).
- d) The technical education which is responsible for the labor force in industry is at a very poor level of quality due to the high number of students per class and the poor quality of workshops and laboratories. However, there are some bright spots in vocational training centers in the ministries of Industry, Electricity, Petroleum, Construction and last but not least, the Mubarak-Kohl project in the Ministry of Education for application of German Dual system of vocational training in Egypt.
- e) The education in public universities needs updating and upgrading.

7.2 Technical Constraints:

- a) Limited technical knowledge concerning the application of appropriate technological measures within each individual subsector activity.
- b) The relatively high price of conducting research into the techno-economic feasibility of applicable option in the local market.
- c) The unavailability of an experienced technical base to provide for local alternative measurers.
- d) The high cost of imported pollution prevention technologies as well as lack of trained technical staff at the factory level to oversee the continuous operation and maintenance programs required for this instrumentation.
- e) The lack of technology awareness and the programs dealing with technology innovations and technological development all over the world.
- f) Increase of demand on technology in private, public, and government. For example, use of computers, use of software for warehouses, salaries and wages, etc.

- g) Lack of governmental encouragement to invest in hi-tech projects and electronics.
- h) Lack of funds for research and development especially in the technology sector. The budget for research and development is 0.6% of the GDP while it reaches between 3 and 5 % in industrial countries.
- i) Non-utilization of cleaner production technologies in manufacturing enterprises.
This is due to:
 - lack of integration in the production process
 - inadequacy of industrial infrastructure
 - scarcity of expertise
 - The prevailing management attitudes with respect to expenditures on cleaner production measures.

7.3 Legislative Constraints:

- a) The law regarding the Intellectual Property Rights and inventions is discussed now in the Egyptian Parliament and should be issued as soon as possible to give support for companies using innovative and new technologies. Also, to encourage multinational companies to invest in Egypt.
- b) The lack of technical capacities within the higher environmental authority in the country to monitor and execute the required environmental legislative duties and tasks.
- c) Lack of coordination between the authorities responsible for pollution monitoring and the variation in the degree of executive power given to each individual authority through the existing legal framework.
- d) The new Law for Taxation includes a lot of reforms which influences the industry and export too much. The government has promised to present this law to the Parliament at the next legislation period.

7.4 Economic Constraints:

- a) Hard currency limitations within each sector that restrict the upgrading of programs.
- b) Fluctuation in product and raw materials market prices which affect the operating of the companies in general.
- c) The export policy should be changed especially regarding the extra fees and taxes which impair the competitiveness of the Egyptian export products.
- d) Governmental control over the exchange rate of foreign currency.
- e) Lack of global market companies like the model of Japan and Korea which enhances the export and gives information about foreign markets and how Egyptian products can penetrate them.

8- Multilateral and Bilateral Support Programs that are Enhancing the Contribution of Industry to SD

8.1 EEAA International Conventions:

Egypt has ratified 64 international conventions concerning different environmental issues. Some of these conventions deal with global climate change, desertification and the protection of biodiversity, the transboundary movement of hazardous waste, and the depletion of the ozone layer and pollution abatement in industry.

8.2 Bilateral and Multilateral Programs:

The bilateral program (SEAM) program Support of Environmental Assessment and Management is multi-disciplinary environmental project being funded by Britain's Department for international development (BDFID) and implemented by EEAA through the technical cooperation office for the environment (TCOE) and Antec a UK engineering and environmental consultant.

According to this program, cleaner production initiatives have been successfully undertaken in the textiles, Foods processing and edible oil and soap sectors.

32 factories were audited and 21 demonstration projects implemented at a cost of 1.6 million Sterling pounds and an average payback of 6 months. Examples of interventions include water and energy conservation, eco-labeling for textile exports, sulfur black dyeing combined scour-bleach processing, oil and fats recovery, HACCP and recovery of cheese whey.

Over the next few years, SEAM will focus on low cost cleaner production opportunities in micro, small and medium size enterprises in the four Governorates.

Appendix (3a) gives some of the projects implemented through SEAM

The Egyptian pollution abatement project (EPAP) is one of the main multilateral projects of the Egyptian Environmental Affairs Agency (EEAA) its main goal is assisting the Egyptian industry to comply with environmental laws. EPAP is multilateral project between the Egyptian government (EEAA), the World Bank (WB), the Finnish Agency for International Development (FINNIDA), and the European Investment Bank (EIB).

The investment component (soft loans) is as follows:

- The World Bank 35 million US\$
- The European Investment Bank 15 million Euro
- FINNIDA 26 million FM
- EEAA 13 million LE

The table in appendix (3b) gives details of the companies which have signed subloans from the World Bank Pipeline.

In addition, some examples of the Environmental Pollution Abatement Project (EPAP) in the Egyptian industry, the use of cleaner production and conservation of energy materials and water are also given in appendix (3b).

In Appendix (3c) details of the projects financed through the European Investment Bank (EIB) are given in the table and also some examples are illustrated.

9- Reflections and Future Directions for the Country

9.1 The Five-year Action Plan of MSEA/EEAA (2002-2007)²³

MSEA and EEAA have developed a new five year action plan covering the period 2002-2007 and comprises 14 programs reflecting the priorities of MSEA and the Egyptian government, and incorporating current initiatives thus insuring their sustainability. The plan specifies the policy measures to be achieved through each of the 14 programs, as well as the projects to be implemented together with necessary legislative development and the different participating ministries and organization both public and private.

Three programs are very much related to industrial development and SD in industry. Program number (2) which protects the River Nile and water resources has the main objective of improving quality of water resources by controlling industrial waste. Most of the work has been done regarding the industrial waste management in the river Nile. However, the effort should be continued especially in the water streams in Delta.

The Program number (5) environmentally friendly industrial cities is aiming at industrial pollution abatement in the new industrial cities. Some successful projects have been implemented Appendix (2) while still a lot of work should be done to introduce cleaner production all over the Egyptian industry. The program number (6) environmentally friendly technology transfer has the aim of introducing ESTs and cleaner production to the Egyptian industry. The MSEA and its executive organ EEAA have already achieved big steps for industrial pollution abatement in Egypt, however, a lot of effort should be continued in the future to cover the rest of industry and especially the informal sector.

9.2 Development Strategy Outline

The successful completion of the economic stabilization stage was the real breaking point for the Egyptian economy. It was inconceivable for the country to proceed towards an export-oriented economy, operating along free market rules, until a reasonable progress has been made in deregulating old administrative and legislative infrastructure, restructuring the economy and reforming macro-economic indicators under three consecutive five-year plans from 1982 to 1997. Nor was it conceivable that, without the necessary preparations already carried out over the last fifteen years, the ambitions which have been, until the near past, mere wishful thinking, could have come true.

Examples of these ambitions include:

- a) Generate employment opportunities of about 600,000 jobs per year to accommodate new comers to the labor market.
- b) Provide channels of communication and interaction between Egyptian and world economies.
- c) Build partnership relationship based on mutual understanding and trust between the government and the private sector.
- d) Provide an Egyptian product, compliant with international quality standards, and capable of penetrating non-traditional markets under severe competitive conditions.
- e) Egyptian economy to be awarded international certificates for having created an outstanding investment environment.
- f) Entry by Egypt into the business world, following the removal of several barriers such as taxation, custom tariffs, logistics charges for shipping and aviation transportation, and information banks.

It follows, therefore, that pre-requisites have been fully met for comprehensive development phased out in four successive 5-year plans covering a period of 1997 years up to 2017. These plans seek to achieve a package of goals, through a physical and development strategy. This strategy is translated into several maps for Egypt covering all economic, demographic, social and regulatory criteria. These maps seek to coordinate various elements of physical development by taking into account available and potential resources in the promising regions of Egypt, for optimum utilization. They also seek to find elements of attraction to redistribute population in accordance with the expected growth elements in the new regions.

Successful implementation of these elements and criteria will lead to achieve the following^{23,25,26} :

- 1 - Extend the scope of development to the entire area of the country, explore its wealth and provide opportunities for settling millions of Egyptians outside the narrow valley, which accounts for maximum 5.5% of the total area of the country, thus raising the ratio of inhabited space to 25 %. The next twenty years represent an important phase for such expansion. Areas rich in national resources are to be opened, and increasingly utilized, population is to be settled down at locations which will be integrated and inter-linked in the long run.
- 2 - Based on the national assets accumulated over years, raise growth rate from the annual average real growth rate prevailing during the last 15 years of approximately 4.8% to an annual average of approximately 6.8% over the fourth 5 year plan (1997- 2002) then to an annual average of 7.6% over the following 5-year plans up to 2017.
- 3 - Redouble Gross National Product (GNP) once each ten years, to reach in 2017 more than fourfold its present level, i.e. from approximately LE 257 billion (US dollar 76 billion) at present to LE 1.100 billion (about US dollar 324 billion at the end of the seventh 5- year plan in 2017).
- 4 - Raise per capita share of GNP from its present level of about LE 4,270 (US dollar 1,250) to at least LE 13,750 (US dollar 4.100) in 2017.
- 5 - Accelerated development allows trade balance deficit to be managed so that improvement will start from the fourth 5-year plan, reaching break-even point at the end of the fifth, scoring a remarkable surplus during the sixth, and a substantial surplus in the seventh, while achieving a current and gross surplus in the balance of payments throughout all the coming plans.
- 6 - Strive to develop a package of flexible economic, financial and monetary policies, to accommodate changing conditions and bring inflation down to minimal possible levels, which should not exceed, 5% per annum in spite of rising growth rate.
- 7 - Endeavor to achieve a balanced general budget, by gradually bringing about a continuing and growing surplus, in the framework of an economic stability that provides the best climate for productive development, i.e. to expand production bases and services at growing rates, which will lead, in turn, to stable local currency rates against foreign currencies, taking into account interactive market forces.
- 8 - Approximately 550.000 employment opportunities are planned to be generated, in order to accommodate annual increase in population and detract from the balance of unemployment until it reaches zero point at the end of the fourth 5-year plan (1997-2002). With the employment of 97-98% of the workforce, unemployment will not be allowed to accumulate. In other words, manpower is expected to rise from its present level of 15.8 million to 26.8 million at the end of the seventh 5-year plan in 2017.

To realize these goals an annual average investment of at least LE 100 billion is required over the coming 20 years. At least 25% of GNP will be required to meet such volume of investments. Therefore, the development strategy envisages to achieve the following:

- Mobilize national resources in such a way as to raise local savings gradually to break- even point with investment in the fifth plan, then to a higher level in the sixth and seventh plans.
- Use foreign investments as a source of financing to bridge the gap between investments required for sustainable development and local savings at around 5% which are to be gradually brought down to break-even point. Foreign investments, for which a favorable climate, involving various types of exemptions and facilities, is provided, play an important role in development, in conjunction with national capital as they provide advanced technology and sophisticated management expertise.

- Continue to encourage the private sector to play its role as a principal partner in the development process in such ways that are proportionate to its planned share of investment, i.e.; approximately 75% of the fourth 5-year plans, and 80% of the following three plans up to 2017. As the government share is to be limited to 25% and 20% of the volume of investments respectively, it is planned to stimulate private sector to participate in investments in those areas traditionally undertaken by the government such as infrastructure projects including, inter alia, roads, airports, seaports, power stations and miscellaneous service activities.

Following the completion of the privatization program, the government's role will mainly be confined to the creation of a favorable climate for the private sector to play such role, by removing all remaining barriers that face or undermine its effectiveness and ability to widen its scope of activity. The government's role, will, then, be limited to the following :

- A limited number of basic services and strategic projects.
- Give special attention to the social aspect of the development process, by setting-up a social security network, to guarantee protection to the poor brackets of the community.
- Support research and development institutions to cope with the most up- to- date scientific and technological innovations.
- Set up a time-schedule, to ensure maximum utilization of the grace period granted to developing countries prior to the enforcement of the World Trade Organization's new regulations. This will entail the reconditioning the status of several industries, particularly the pharmaceutical industry and service sectors, in order to cope with the coming stage. Such objectives and goals are very demanding and require good governance and high managerial skills at the highest level. Also, radical improvements in the quality of education and oriented research and development for sustainable industrial development to produce high quality products at competitive prices which can compete at the local market and the foreign markets.

A recent modified ten-year strategy for upgrading and modification of the Egyptian industry is suggested by the Ministry of Industry and Technological Development²⁵.

According to this strategy, and after implementing the IMC and the ministry of industry projects for renovation and modernization of the Egyptian industry, the following can be achieved:

Table (9.2) Money in Billion LE

Year	2001-2002	2011-2012
Grand National Industrial Production		
Existing plants	175	231
After renovation	0	86
Total Industrial Production	175	317
Industrial GDP		
Existing plants	64	87
After renovation	0	44
Total Industrial GDP	64	131
Industrial Exports		
Existing plants	10	5.1
After renovation	0	25.5
Total Industrial Exports	10	75.6

50% of the renovation projects are for export and 40% from the new plant is for export. These goals are very ambitious and several constraints should be removed to achieve the strategy.

10- Conclusion:

Egypt has achieved a big progress for sustainable industrial development especially in the fields of the protection of the environment and pollution abatement for the industrial sector. The stakeholders should make an action plan regarding science and technology and the private sector should invest more in research and development since its contribution at the moment is minimal while the government is spending 0.6% of GDP on science and technology. The stakeholders should follow the East Asian model for technology transfer (South Korea) as given in table (5.1). This model can be implemented with some modifications to suit the local conditions and to include the environmental dimension which is essential for sustainable industrial development.

Acknowledgement:

The author would like to thank the State Minister for Environmental Affairs, EEAA and its staff for their help and for providing the recent documents. The author is also grateful for the Minister of Industry and Technological Development and GOFI for delivering their recent plans and strategies for industrial development. Also thanks to the Ministry of Planning, Ministry of Economy, and CAPMAS for their help and the provision for precious information. Thanks also to the UNIDO staff in Cairo and Vienna for their help. Last but not least thanks to Mr. Farag Abulhoda, the researcher in the Egyptian People's Assembly for his help in preparing and typing the report.

References:

- 1- Country Service Framework – Egypt, UNIDO, April, 2001.
- 2- Friedrich Ebert Foundation, Three Goals One Path, Bonn 1998.
- 3- Economic Bulletin, Ministry of Economy, July 2001
- 4- Report of the General Committee of the Egyptian Parliament on Social Development, June 2000.
- 5- National Bank for Investment, Commission of Deepening Domestic Industrialization, “Towards Harmonized Path for Deepening Domestic Industrialization, 2000
- 6- Ministry of Planning, “The National Plan for Economic and Social Development” 2000/2001
- 7- General Organization for Industrialization (GOFI), Special Report, June 2001, Egypt.
- 8- Dr. H. El-Gamal, “SMEs and Micro Enterprises”: Strategies for Job Creation in Arab Countries Illustrated by Case Studies, Arab Regional Industrial Forum, Nov. 1999, Cairo, Egypt
- 9- Memorandum of the Technological Support Center, Social Fund for Development, 2001
- 10- Ministry of Economy and Foreign Trade, “The Situation of Financing Micro and Small Projects in Egypt”, March 2001
- 11- General Organization for Industrialization, Report on Industry’s Achievements along Ten Years, September 2001, Egypt
- 12- UNIDO 1999, African Industry 2000: “The Challenge of Going Global”, Vienna, UNIDO
- 13- MSEA, EEAA, The Annual Report 2000-2001
- 14- Privatization in Egypt, Quarterly Review, April – June 2001 Privatization coordination support unit, Cairo
- 15- Report of the Committee of Industry and Energy in the Egyptian Parliament on “Technology and Development and the threshold of the 21st Century”, Feb. 1999
- 16- Report of the General Committee of the Egyptian Parliament on “The Strategy of Technological Development in Egypt”, June 2000.
- 17- Dr. Ahmed Hamza, Publication by the Egyptian Pollution Abatement Project (EPAP) 2001
- 18- Policies, Decisions, and Achievements, Ministry of Industry and Technological Development, Oct. 1999 – Feb. 2001.
- 19- David Bennett et al, Meeting Technology Needs of Enterprise for National Competitiveness, UNIDO Forum on Management of Technology, May 2001, Vienna, Austria
- 20- Dr. Yehia El Mahgary, The Second Issue of the EPAP Newsletter, June 2000.
- 21- Proceedings of the Conference: “The Role of Publicly Owned Technologies in the Transfer and Diffusion of ESTs”, Feb. 1998, Kyongiu, Korea.
- 22- “Status and Trends of Industry and Sustainable Development in the Mediterranean Region”, Proceedings of a Conference held in Barcelona, 27-29 June 2001
- 23- The National Environmental Action Plan of Egypt 2002/17, Draft Report, June 2001.
- 24- Industrial Modernization Program, Egypt and European Union in Partnership, Special Report 2001.
- 25- Ministry of Industry and Technological development, the Ten years strategy for renovation of Egyptian industry and its implementation plan, September 2001
- 26- State Information Services web site, (www.sis.gov.eg)

Appendices

Appendix (1):

Table (1a): Economic and Financial Indicators – Annual Series								
	94/95	95/96	96/97	97/98	98/99	99/2000	2000/2001 Projections	
Real Economy								
Nominal GDP at Market Price (LE Billions)	204	229	256	280	302	337	365	
Real GDP at Market Price (LE Billions) *	156	164	173	271	287	302	316	
Real GDP Growth Rate	4.7	5.0	5.3	5.7	6.1	5.1	4.9	
Real GDP Growth Rate (Per Capita)	2.5	2.9	3.4	3.7	3.7	--	--	
Share of Private Sector in GDP	64.3	65.5	68.8	70.7	74.9	73.1	--	
Unemployment Rate	9.6	9.2	8.8	8.5	8.2	7.9	7.6	
Average Annual Inflation	9.4	7.3	6.2	3.8	3.8	2.8	2.4	
End of Period yr./yr. Inflation Rate	9.9	8.3	4.8	4.1	2.9	2.5	2.2	
Savings – Investments								
Gross Domestic Savings (LE Billions)	30.6	29.1	37.0	44.0	47.0	--	--	
Gross Domestic Investments (LE Billions)	33.1	36.8	45.2	54.6	60.0	--	--	
Gross Domestic Savings	15.0	12.7	14.5	15.7	15.6	--	--	
Gross Domestic Investments	16.2	16.1	17.7	19.5	19.9	--	--	

Figures Revised.

1 / Excludes Petroleum and Tourism sectors.

* Starting 1997/98 GDP uses 1996/97 as base period. Previous years are based on 1991/92 as the base period.

Table (1b): Economic and Financial Indicators - Annual Series							
Fiscal Sector	93/94	94/95	95/96	96/97	97/98	98/99	99/2000
	In Percent of GDP – Unless Otherwise Stated						
Total Revenue (LE million)	52,567	55,719	60,893	64,498	67,963	73,279	79,385
Total Expenditure (LE million)	56,264	58,256	63,889	66,826	70,783	86,009	95,096
Overall balance (LE million)	-3,697	-2,537	-2,996	-2,328	-2,820	-12,730	-15,711
Total Revenue	30.0	27.3	26.5	25.2	24.4	24.3	23.6
Tax Revenue	17.9	16.8	16.7	15.8	15.8	15.9	15.5
Total Expenditure, of which:	32.2	28.6	27.9	26.1	25.4	28.5	28.3
Current Expenditure	26.2	23.0	22.3	20.7	19.9	20.0	20.4
Investment Expenditure	6.1	5.5	5.5	5.5	5.6	8.4	7.8
Primary Balance 1a/	7.3	6.0	5.7	5.1	4.3	1.22	1.74
Overall Budget Balance	-2.1	-1.2	-1.3	-0.9	-1.0	-4.2	-4.7
Government Domestic Debt (LE billion)	96	105	114	126	137	147	164
Domestic Debt / GDP 1b*/	54.8	51.2	50.0	49.0	48.8	48.7	48.9

1a/ National budget deficit net of interest payments.

1b* End of period debt stock. Does not include public enterprises and public economic authorities debt.

Table (2): Gross Domestic Product at Factor Cost 1/							
	(In current prices)						
(LE Million)	94/95	95/96	96/97	97/98 #	98/99 #	99/2000 #	2000/2001 Projections
Total GDP	191,010	214,185	239,500	262,220	283,145	316,198	343,278
Total Commodity Sector	93,750	104,684	118,532	130,509	138,589	160,088	175,424
Agriculture	32,050	36,968	42,325	45,878	49,360	52,520	55,935
Industry & Mining	33,330	37,936	43,383	48,798	55,225	61,212	67,795
Petroleum & Products	15,120	14,760	15,854	16,803	12,775	23,300	26,584
Electricity	3,750	3,980	4,220	4,470	4,569	4,853	5,178
Construction	9,500	11,040	12,750	14,560	16,660	18,203	19,932

Total Production Services	62,250	69,850	77,552	84,336	93,059	100,730	108,485
Transportation 2/	19,700	21,500	22,695	24,507	26,300	27,949	29,666
Trade, Finance, and Insurance	39,700	45,109	51,027	56,665	63,077	67,856	73,205
Hotels and Restaurants	2,850	3,241	3,830	3,164	3,682	4,925	5,614
Total Social Services	35,010	39,651	43,416	47,375	51,497	55,380	59,369
Housing and Real Estate	3,450	3,816	4,375	4,860	5,412	6,003	6,638
Utilities	690	843	915	1,038	1,179	1,305	1,444
Social Insurance	120	140	165	185	214	236	259
Government Services	15,100	17,220	18,900	20,662	22,352	23,876	25,446
Social and Personal Services	15,650	17,632	19,061	20,630	22,340	23,960	25,582

Source: Ministry of Planning

1/ Does not include net indirect taxes

2/ Includes Suez Canal

Figures Revised

Table (3): Energy and Construction (Annual profile)							
Electricity							
(Thousands of MWH)	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Generated Electricity	48,604	51,328	54,469	57,656	62,336	67,865	72,908
Utilized Electricity	40,577	43,258	46,281	49,130	53,227	56,557	60,547
Industrial	18,243	19,167	20,073	20,727	22,080	21,701	23,303
Commercial & Household	15,461	16,140	17,467	18,962	20,556	21,751	23,552
Other	6,873	7,951	8,741	9,441	10,591	13,101	13,692
Cement and Steel							
(Thousand Tons)	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Cement Production	16,445	16,937	18,111	19,253	20,972	22,259	23,588
Cement Imports	--	1,131	1,797	2,310	2,914	5,169	3,206
Cement Exports	273.0	267.0	428.0	410.0	91.0	33.0	46
Domestic Consumption	16,172	18,001	19,480	21,153	23,727	27,076	26,748
Steel Bars Production 1/	1,858	1,592	1,454	1,350	1,804	1,863	--
Import Bars Sales 1/	312	457	306	319	392	--	--

Source: Ministry of Public Enterprises, and Holding Company for Mining and Refractors.

1/ Excluding private sector production and sales. Source CAPAMS.

Appendix (2)

IMC Programmes Activity

Component One: Policy and Finance

Activity within this component will focus on the planning and launching of five projects.

Project (1): To strengthen the Ministry of Industry and Technological Development (MITD)

Project (2): To identify the principle regulatory obstacles in the business environment restricting private sector growth,

Project (3): To identify structural shortcomings in the provision of finance to SMEs,

Project (4): Review policies effecting competition and consumerism,

Project (5): Review SME demographic surveys available and plan to address any identified gaps.

Component Two: Trade & Foreign Direct Investment

Component Three: Competitiveness/Management & Training

Component Four: Business Resource Centres

Component Five: National Quality/Institutional Support/ Cluster & Information

Program Cost

Budget lines	Amount (million EURO)
Technical assistance to enterprises *	208
Business resource centers	105
Institutional development	82
Policy support and coordination	30
TOTAL	425

Note:

* This budget line includes activities of business upgrading, training, export development and foreign direct investment promotion

Source: Specific Financing Agreement between the European Community and the Arab Republic of Egypt

Source of funds

Source	Percentage
European Union	58.8
Government of Egypt	24.0
Private Sector *	17.2
TOTAL	100.0

Note:

* This source of funds is generated through a cost-sharing arrangement with the beneficiary enterprises

Source: Specific Financing Agreement between the European Community and the Arab Republic of Egypt

Appendix (3a)

A Sample of the SEAM Projects:

1) Waste Reduction by Improved Quality Control and HACCP Implementation - Edfina Company for Preserved Foods, Alexandria, Egypt

Waste minimization through improved quality control procedures was implemented at Edfina Company for Preserved Foods, Alexandria. A number of interventions costing LE 65,200 have yielded annual savings of LE 382,622. Quality control training and implementation of Hazard Analysis and Critical Control Point (HACCP) system will lead to improved product quality and

further savings. Although it is difficult to quantify at this stage further savings of LE 550,000 could be expected in the short term.

A summary of the cost benefits that have been quantified for the four interventions is given below.

Intervention	Costs LE	Annual Savings	Payback Months
Improve packaging of fruit jam	18,000	206,256	1
Improve packaging of vegetable paste	13,950	57,750	<3
Modifications to vegetable processing	10,750	49,720	<3
Improve pest control	22,500	68,896	<4
Total	65,200	382,622	2

In addition to the above costs LE 33,230 was spent on-line monitoring equipment and a further LE 40,000 was spent on quality control training and HACCP implementation. Although the direct benefits of improved quality control practices are difficult to quantify it is expected that in the short term at least a further 2% of wasted raw materials and products will be recovered yielding savings in excess of LE 550,000.

2) Water and Energy Conservation:

Edfina Company for Preserved Food, Alexandria, Egypt

Kaha Company for Preserved Food, Kaha, Egypt

Energy consumption was reduced through a number of low cost interventions at both Edfina Company for Preserved Food (Edfina) and Kaha for Preserved Food (Kaha). Total cost of implementation at both factories was LE 462,185 and resulted in annual savings of LE 548,572. At Edfina additional measures to reduce water usage were implemented at a cost of LE 98,165 and yielded annual savings of LE 119,400.

3) Oil and Fats Recovery at Tanta Oil and Soap Company, Tanta, Egypt

A range of waste minimization opportunities has been identified and are currently being implemented by Tanta Oil and Soap Company in Tanta, Egypt. To date, this has involved a total investment of LE621,247 resulting in annual savings of LE 637,020 and a saving in capital investment of the wastewater treatment plant of LE 500,000.

Benefits and Achievements:

- Water consumption has been reduced by 23%.
- IWWTP capital investment costs have been reduced by about LE 500,000.
- Annual recovery of oil, ghee, fats and animal feed totaling LE 517,020
- Working conditions improved in the animal feed and fatty acids production unit.
- Oil and grease concentrations in the final effluent reduced by 99%.
- BOD loads in the final effluent reduced by 85%.

4) Waste Minimization at Sila Edible Oil Company, Fayoum, Egypt

Waste minimization opportunities have been identified and are currently being implemented by Sila Edible Oil Company, in Fayoum, Egypt. To date, this has involved a total investment of LE 621,300 and resulting in annual savings of LE 1,557,110. Proposed expenditure on the wastewater treatment plant has also been reduced from LE 1.5 million to LE 549,800.

Benefits and Achievements:

- Maintenance costs have been reduced by 10%.

- Water consumption has been reduced by 46%.
- Wastewater treatment requirements have been reduced by 66%.
- Boiler fuel consumption has been reduced by 48%.
- Annual recovery of oil, soap stock and meal, valued at LE 692,650
- Discharge compliance achieved (law 93).

5) Eco-friendly Processing and Obtaining Eco-labels

Misr for Spinning & Weaving Co., Mahalla, Egypt

Giza Spinning, Weaving, Dyeing & Garments Co., Giza, Egypt

Under the SEAM project, eco-friendly processing has been introduced at the following factories:

- **Misr for Spinning and Weaving Co., Mahalla El-Kobra** is a public company, the largest in the Middle East. It has an average annual production of 48,000 tons, of which approximately 50% is exported. The factory occupies an area of 600 acres (including residential area) and has a workforce of over 30,000. It processes cotton, wool, synthetics and blends to produce a wide range of products, including ready-made garments, yarns, finished fabrics, bandages and blankets.

- **Giza Spinning, Weaving, Dyeing and Garments Co.**, is privately owned, with an average annual production of 1,440 tons, approximately 95% of which is produced for export. The factory is on a 25 acre site and has a workforce of around 2,400. The main products are cotton, polyester ready-made garments, yarns and finished fabrics. This case study gives a step-by-step description of what action were taken to achieve eco-labels for each of these factories.

Appendix (3b)

A Samples of the Egyptian Pollution Abatement Project (EPAP):

The following table gives the World Bank Pipeline for the EPAP project.

World Bank Pipeline

Company	Name of Project	Project Cost US \$
<i>Companies signed subloans</i>		
Abu Kir Fertilizers Co.	Reduction of nitrogen oxides stack emissions from the nitric acid plant	0.977
Neeasae	Conversion of mercury dosing to argon flushing	0.238
Transport & Engineering Co.	Conversion of the manual radial tire spraying to automatic	0.375
Goldentex Co.	Wastewater treatment plant	0.17
Egyptian Plastic & Electric Co.	Collection system for the acid fugitive vapor and vapor fumes treatment	0.990
Misr Aluminum	Fume Treatment	4.9
Cairo Poultry – Koki	Wastewater treatment plant	1.21
Egyptian Salts & Minerals Co. – Emisal	Washing and distillation of sodium chloride salt	3.044
Delta Fertilizers & Chemicals Industries (Talkha)	Replacement of the high presser stripper and carbamate condenser in the urea unit	2.26
El Nasr Fertilizers & Chemicals (Semadco)	Completion of wet scrubbing recovery unit and recycling of ammonium nitrate	0.4
Tanta for Oil & Soap	Reduction of hexane emission by supply of desolventizer toaster unit and paraffin oil unit	0.27
Total		14.834

A sample of projects which were financed through the World Bank package and adopted Cleaner Technology of In-process Modification leading to apparent influence on the environmental situation in the company through EPAP project.

- 1) **Conversion of TL and TLD fluorescent lamps production lines from mercury dosing to Argon flushing (Alexandria).** The estimated project cost is US \$ 0.3715 million (LE 1,263,100 million). Reduced Mercury emissions from 0.4 t/y to 0 t/y reaching 100% difference after implementing the project.

The project mainly can be described as:

- Replacing the Mercury Dosing at the “washing position” by Argon Flush in the vacuum equipment of the pumping machine in TL and TLD production lines in Fluorescent Factory.

The environmental impacts of such project were:

- Reduction of mercury emission from the Fluorescent Factory to comply with work environment regulations of Law 4 of 1994 (mercury 0.05 mg/m³)
- Protection of workers health by the reduction of exposure to mercury vapors.
- Yearly savings reached about 280,000 LE.

- 2) **Conversion of the manual radial tire spraying process to automatic process in a tire manufacturing plant (Alexandria).** The estimated project cost is US \$ 0.469 million (LE 1,60 million). This reduced Heptane emissions from 10.7748 t/y to 0.26937 t/y reaching 97% difference after implementing the project.

The project mainly can be described as:

- Conversion of the manual radial tire spraying process which is conducted in open atmosphere to an automatic process conducted in an enclosed area.

The environmental impacts of such project were:

- Reduction of air emissions due to the volatility of the spraying materials (mainly Heptane)
- Improving work environment and protection of workers health
- Improving the efficiency of the spraying process
- Yearly savings reached about 259,200 LE

- 3) **Replacement of wet Fume treatment system by dry fume treatment “Dry Process” in Aluminum factory (Qena).** The estimated project cost is US \$ 4.9 million financing from the World Bank from total project cost US \$ 48 million. This reduced HF, SO₂, and dust emissions from 140,220,1150 t/y to 70,20,150 t/y respectively reaching 50, 90, 85% respectively difference after implementing the project.

The project mainly can be described as:

- The project is a new technology called “Dry Process” in which the efficiency of the adsorption process reaches 99%.
- This technology depends on the adsorption theory. Reaction is carried out between generated and drawn gases for production cells and between Alumina ore used in the Aluminum industry.
- This process is performed in special reactors in which Alumina is atomized counter currently against the gases. After this process, the gases effluent become clean, where the process efficiency is ranging from 98% - 99%.

The environmental impacts of such project were:

- The process is dry where no water is used and hence no wastewater results
- Complete recovery of fluorides by using the adsorption of Alumina.

- Saving (equivalent 7 million LE annually) in the reduction of raw materials (Cryolite, Aluminum hydroxide, Caustic soda, and Sodium carbonate).
 - Reducing gas emissions from the aluminum production cells by 99.8% (Hydrogen fluoride, carbon monoxide, carbon dioxide, sulfur dioxide)
 - Saving 200m³/hr of water which was used previously in the wet process.
 - Saving of maintenance costs (rehabilitation of corroded units due to exposure to chemicals used in wet process)
 - Reducing energy consumption
 - Improving the environmental and health conditions
 - Protecting the ambient environment from harmful gases resulting from the aluminum extraction process.
- 4) **Installation of new sanitary ware furnace with capacity 4000 t/y in ceramic and porcelain company (Cairo).** The estimated project cost is US \$ 1.61 million (LE 5,500,000).

The project mainly can be described as:

- Installation of sanitary ware furnace working with natural gas with a capacity of 4000 t/y instead of the old damaged old Kiln (no. 2) that used oil LPG.
- Linking the furnace with municipal natural gas piping system inside the company

The environmental impacts of such project were:

- Increasing of the energy efficiency
- Improvement of working conditions

It can be noticed that the funds through the World Bank are not directed to certain field of investment nor to a certain location among Egypt. However, it is penetrating all industrial sectors, assessing in implementation of different scope projects all over the governorates of Egypt. This can be attributed to the flexible legibility criteria which facilitates the job of Project Implementation Unit (PIU) in EPAP, in directing different investments to the suitable packages.

Appendix (3c)

The following table gives the projects financed by the European Investment Bank (EIB)

Companies disbursed from EIB		
Misr Aluminum Company	Fume treatment "dry process"	Euro 5 million
Total		Euro 5 million
Companies pending EIB approval		
Tanta for Oil and Soap (Tanta & El Mahala Elkobra factories)	Conversion from heavy fuels to natural gas for steam boilers	Euro 0.545 million
El Nasr Company for Wool and Selected Textiles (STIA)	Conversion from heavy fuels (mazout) to natural gas for boilers	Euro 0.336 million
Kafr El Dawar Power Station, Behera Electricity Company	Complete rehabilitation for unit No. 3-110 M.W	Euro 7.728 million with EIB financing 60% of the total project cost
Total		Euro 5.5104 million

A Sample of Projects to be Financed by EIB:

Herewith, a sample of projects which are under study through the European Investment Bank (EIB) package that will implement Cleaner Technology.

- 1) **Conversion from HFO to NG at Oil & Soap factory**, with estimated project cost 0.545 million Euro.

The project mainly can be described as:

- Replacement of the existing burners in boilers with others to work with natural gas
- Linking boilers with municipal natural gas piping system, including infrastructure, piping valves, safety valves, and fire fighting systems.

The environmental impacts of such project were:

- Effective reduction of NO_x, SO_x and CO emissions resulting from combusting HFO.
 - Increasing the efficiency of boilers and reducing its maintenance costs.
 - Annual costs saving due to low cost NG and increase in energy efficiency
- 2) **Revamping of Power station 110 M Watt** with estimated project cost 6 million US \$ with maximum financing of 5 million Euro through EIB (Kafr El-Dawar). Reducing CO₂, Sox, and Nox emissions from 476218, 7631, 1221 t/y to 53514, 6012, 962 t/y respectively.

The project mainly can be described as:

- Rehabilitation of automatic control and measuring equipment.
- Increasing the efficiency of thermal insulation systems and cooling systems
- Replacement of burners to work with NG-HFO dual system.
- Natural Gas piping connecting the municipal network to the boilers.

The environmental impacts of such project were:

- Effective reduction of NO_x, SO_x and CO emissions resulting from combusting HFO.
- Annual cost saving due to low cost NG and increase in energy efficiency.
- Reducing the consumption of mazot by 32,377 ton of mazot yearly

Within the scope of directing the EIB funds to other fuel conversion investments, EPAP succeeded in identifying natural gas conversion projects for 4 companies with total estimated cost of 2.2 million Euro.