Chapter 3: Priority Concerns Related to Chemical Production, Import, Export, and Use.

3.1 Priority Concerns Related to Chemical Production, Import, Export, and Use

Egypt is a rapidly economically growing country with extensive use of chemicals in a wide spectrum in several sectors. While there is a high population density in the cities, a significant proportion of the population lives in rural areas where agrochemicals are extensively used. Toxic chemicals are also widely used in a multitude of different industrial sectors, such as textiles, tanning and metal finishing; mining and processing manufacturing found in every town and urbanized areas throughout the country. A growing number of chemicals are also still used in homes and surrounding domestic environment.

Pharmaceutical industry which play an important role in heath care, is consider an important industrial sector; this sector is well controlled environmentally, either from efficacy or safety point of view. Also, variety of natural products is used in traditional products, e.g. coloring additives to food. The composition of such products is known, evaluation is continuously done by Ministry of Health and Population concerning health risks and controlling of the use of these products.

Ministry of Health and Population has established a unit for chemical safety; work has been initiated to survey exposure to chemicals and to prepare a registry of chemical products; to survey chemical incidents; and to develop public awareness on problems of chemicals. The Ministry of Agriculture has excellent laboratory facilities for analysis of chemical contaminants and pesticide residues in food. The use of pesticides in Egypt has been dramatically reduced through advanced integrated pest management programme (IPM). 80 types of pesticides were banned, including Arsenic, Cadmium and lead.

Moreover, in 1999, a Ministerial decree was issued by the Ministry of Industry which restricts the handling of 145 toxic substances without permission. A database on hazardous substances and toxic chemicals in industry was established. Also, the Ministry of Industry participated in preparing the work plan for a national strategy for dealing with hazardous wastes and toxic chemicals' and also participated in a workshop jointly with the WHO and other Ministries to discuss the national programme on the chemical safety.

Furthermore, a Ministerial decree was issued to ban the use of asbestos in any new industrial establishments or expansions of existing ones. The use and handling of asbestos is currently restricted and being substituted with other materials.

It should be mentioned that the infrastructure for dealing with chemical safety in Egypt is now moving forward. An integrated chemical safety programme implemented in a coordinated manner among different responsible authorities does exist. Existing control measures provide complete coverage for the country through good coordination among Ministries and Governmental Authorities.

3.1.1. Air Pollution:

Most sources of air pollution in Egypt are of anthropic origin. These are divided into two main types: stationary and mobile sources. Stationary sources of air pollution include industrial facilities, thermal power stations and some commercial and residential activities. Air pollutants also arise from open burning of garbage and agricultural residues. Mobile sources include cars, buses, trucks and motorcycles. Other pollutants include natural sources, such as sand. The main pollutants produced are sulfur dioxide, nitrogen oxides, carbon monoxide, and particulates, volatile organic compounds (VOCs) and lead.

Moreover, the ambient air quality published data through EEAA projects (EIMP1, CAIP2), MOHP3 and the National Research Center show clearly that poor air quality prevails in some urban and industrial centers of Egypt. Air pollution severely affects areas adjacent to industrial activities as well as around heavy traffic highways, as the Cairo-Alexandria Agricultural Road.

Medium and small industrial activities, such as foundries, secondary smelters, pottery workshops, the brick industry, mechanical workshops, lime crushers, charcoal

producers, etc. are scattered within and close to urban areas, especially Greater Cairo, Alexandria, Tanta and several other cities in Egypt. Often these activities are located in informal settlements, using very old technologies with few precautions for air pollution control. They use heavy oil, coal, wood, and rubber and even waste materials as fuel releasing harmful pollutants into the atmosphere.

Furthermore, Air-borne pollutants from vehicle emissions, electricity generation and industrial production frequently exceed levels considered safe for health. Depending on their size, particulates can influence visibility as well as human respiratory functions. The fifteen million Egyptians living in Cairo and Alexandria, for example, are exposed to levels of dust and smoke in which total suspended particulates (TSP) may exceed WHO standards.

Air-borne pollution particles may contain several toxic and carcinogenic chemicals combined with other pollutants, they can cause serious lung diseases. The most serious health effect of carbon monoxide is its ability to enter the blood stream by displacing oxygen carried to the cells. Carbon monoxide-laden blood can weaken heart contractions thereby decreasing the volume of blood being pumped and significantly reducing the normal performance of an otherwise healthy person.

Lead in the air has received particular attention because of its health impacts, particularly on children. Exposure to lead in childhood associates with retarded central nervous system functioning, which persists into adulthood. Attempts are being made to relocate lead smelters to more remote areas. Lead concentrations in the air from mobile sources have recently decreased considerably due to expansion in use of compressed natural gas (CNG) and the introduction of unleaded fuel. However, there are now debates on the health effects of additives to unleaded fuel.

The "SMOG" episodes that Cairo experienced in the falls of 1999 and 2000 resulted from high levels of air pollutants in the atmosphere of greater Cairo. Average annual wind speed in greater Cairo is only six knots and the frequency of inversions is high, especially at night during winter. This means that Cairo weather conditions will continue to facilitate such SMOG episodes if air quality is not improved.

In rural areas health damage from air-borne pollution is primarily associated with open-air incineration and proximity to industrial establishments, although the toxicity of paint fumes, adhesives and suchlike products also pose health risks. Significant percentages of reported cases of pneumonia disease were detected in rural areas.

On managing and controlling air pollution from existing large industrial facilities and electricity power stations, information and monitoring shows that Shoubra EI-kheima (Qalyubia), Helwan (Cairo), Kafr EI-Zayat (Gharbia), Ameria, Max and Abu-Qier (Alexandria), the industrial area in Suez.. .etc are huge industrial areas that emit pollutants that aggravate the problem of air pollution in Egypt. Few industries have done serious efforts to control this pollution. Furthermore, control and management programs established by different projects are now acting seriously to control emissions. Power stations are another major source responsible for emitting excessive amounts of pollution into the atmosphere. Emissions of pollutants from these power stations, are greatly reduced through the use of natural gas, and could be further reduced by greater 'use of cleaner fuel and technology. Also, inspection site visit for operating industrial activities aiming the assurance of the compliance with regulations and standard.

Also there is an increase in source monitoring to detect rates of pollution emitted from these huge industrial establishments. There is comprehensive database information about existing industrial areas, locations of the industries in all Governorates, new industrial areas in the satellite cities, such as 10th Ramadan, 6th October, Sadat City...etc, in addition to electricity power stations and fuel use in various areas. An environmental information system based on a GIS is acting now to follow-up the environmental compliance of the industries in these cities. However, there is a need to conduct environmental auditing and some risk assessment case studies for all existing industrial establishments and power stations. This will provide policy-makers and executing authorities with enough data on the real situation of pollution discharge points, air pollution control technologies, where they exist, industrial processes and technologies that need to be upgraded, research needs and other important items.

EEAA with other concerned Ministries, mainly the Ministry of Petroleum, have made efforts to control air pollution emitted from huge industrial establishments where:

a) Institutional: an agreement has been signed between the Ministry of Petroleum and the Ministry of Electricity stipulating that power plants will use natural gas as a fuel.
b) Economic and Financial Instruments: the proposed economic instruments for reducing and managing cement dust aim at supporting increased investments into environmentally friendly and eco-efficient technologies in

the cement industry. This encompasses a number of major activities mainly imposing a differential product charge on each produced ton of cement according to the environmental performance of each cement plant, applying tradable TSP emission permits for cement firms, tax breaks for cement firms investing in mitigation measures and soft loans to obtain cleaner technologies. The main outcome of this proposal would be improving the competitiveness of Egyptian cement in international markets through implementation of cost-effective PPMs.

c) Internationally: the Global Environmental Facility (GEF) is being approached to access the Clean Development Mechanism (CDM) to supply these industries with up-to date technologies to protect the atmosphere.

EEAA has an on-going program for establishing new environmentally friendly industrial cities; Egypt's has five cities currently enrolled as environmentally friendly industrial zone. These five cities are: Borg AI-Arab, AI-Sadat, AI-Obour, 10th of Ramadan and the 6th of October. More than 70 percent of industrial establishments in the five cities had complied with the required environmental standards, while ten percent of establishments are currently implementing pollution control projects [(2)].

Managing and controlling air pollution of existing large industrial facilities and electricity power stations is a program that aims at formulating management schemes for sustainable development in the existing and new industrial areas of the satellite cities, developing control programs and implementing control technologies to reduce pollution emissions from their sources, adopting new and renewable sources of energy to reduce the environmental degradation, and finally strengthening the air quality management programs for industrial areas.

The major activities of this program include developing and encouraging local industries to produce and use air pollution control technologies, submitting the EIA study as a requisite for both licensing new industries and choosing the location for power stations and industrial activities, developing buffer zones and use of cleaner technology as well as air pollution control measures according to the measures taken to protect air quality in the location and the region, and encouraging the use of solar energy and wind force for generating electricity. This will result in reducing the emissions of air pollutants from thermal power stations generating electricity.

3.1.2. Water Quality:

Water quality problems in Egypt vary among various water bodies depending on: flow, pattern of use, population density, extent of industrialization, availability of sanitation systems and the social and economic conditions. Discharge of untreated, or partially treated, industrial and domestic wastewater, leaching of pesticides and residues of fertilizer and navigation are often factors that affect the quality of water.
The Ministry of Irrigation and Water Resources is mandated to control and manage all fresh water resources in Egypt including the surface and subsurface water. In addition to construction, supervision, operation, and maintenance of all the irrigation structures and drainage networks, also it is responsible for providing all other sectors with their needs of good quality fresh water in due time.

The Environment Law No.4 of 1994 has been issued to protect the environment in Egypt. Law No.4 refers to Law 48 of 1982 for pollution abatement on the water resources in Egypt and mandates the Ministry of Irrigation and Water Resources to implement the law in collaboration with other concerned Ministries. Law 12, 1984 is the law governing the management and operation of the irrigation and drainage systems in Egypt.
Moreover, the Ministry of Irrigation and Water Resources has prepared a National Water Policy till the year 2017 including three main policy themes: a. optimal use of available water resources; b. Water quality protection and pollution abatement; c. Development of new water resources in cooperation with the Nile Basin riparian countries. Various interested or affected individuals, organizations, and government entities took parts in the policy development prior approval by the Miniseries Cabinet and people's assembly. Along the same line the Government completed Land Water Master Plan for the whole country including activities related to water and land use.

Furthermore, National Water Quality Monitoring Network Programs of water quality monitoring started early on both the Nile and agriculture drains. However, all these programs were not fully coordinated together to describe the overall water quality status. Additionally, irrigation canals and groundwater were not included. To remedy the situation, a jointly funded project National Water Quality and Availability Management Project (NWQAM) with Canadian International Development Agency (CIDA) is being conducted by the National

Water Research Center (NWRC) of MIWR for seven years period starting from 1998. The objective of the National Water Quality Monitoring component of this project is to rationalize water quality monitoring activities into a sustainable national monitoring program.

3.1.2.1. Pollution of inland Water:

Drainage water in Egypt may be polluted from three main sectors: agriculture, industry, and domestic. Contamination arises from both point and diffuse sources. Inadequate industrial and domestic wastewater treatment plants and the rapid increase of the population and industrial activities have created significant pollution problems with serious health implications.

The impact of pollution are many and diverse but the general picture is the deterioration in the ecological quality of aquatic systems such as phosphorus induced eutrophication and threats to human health and well-beings from nitrates, pathogens, pesticides and other hazardous substances. These pollutants also offset the planned reuse scheme by reducing the amount of drainage water available for reuse for reclamation projects in the future.

Currently the government is reusing around 5 billion cubic meters of agriculture drainage water and 0.5 BCM of treated wastewater. However, the government faces multidimensional challenges in sustaining the current reuse and promoting more drainage water reuse over the next decades. The challenge is to develop pollution control plans that are cost effective, compatible with the state of social and economic development and provide achievable benefits.

The policy theme is realized on preventive measures and long-term policies. The preventive measures are carried out through the regular assessment of the water quality status and suitability for various uses in addition to laws enforcement to protect water resources against pollution.

The Ministry of Irrigation and Water Resources established and operates a national program of water quality monitoring in the Nile, canals and drains and lake Nasser. The Central Laboratory carries out the substantial lab work for environmental quality management affiliated to National Water Research Center. The monitoring program includes 300 locations for surface water and 230 locations for groundwater. On the other hand, the long term policies to control pollution include: coverage of open conveyance system passing through urban system to closed conduits; coordination

committee with other concerned Ministries were formulated to put priorities for wastewater treatment plants due to budget limitation; and the introduction of environmentally safe weed control methods (mechanical, biological and manual) and banning the use of chemical herbicides. Subsidies on fertilizers and pesticides were removed and some long lasting effect agricultural chemicals were also banned. Public awareness programs are now taking place about the importance conserving Egypt's water resources in terms of quality and quantities.

On the other hand access to safe drinking water and sanitation expected to better protect the water resources from pollution. During the last 20 years, 220-wastewater treatment plants were established to increase the potentiality from 1 million m3/day to 8.2 million m3/day (25 lit/day/Person to 110 lit/ day/ person). With regard to drinking water, 1900 drinking water treatment stations were established to increase the potentiality from 5.8 million m3/day (120 lit/day/person) to 18 million m3/day (275 lit/day/person) covering 90% of the population.

3.1.2.2. Pollution of Ground Water:

The main source of ground water pollution is attributed to man made activities such as discharge of industrial wastes and drainage of agrochemicals. The Research Institute for Groundwater, as a representative of the MIWR, in cooperation with the Government of the Netherlands has established a Groundwater Quality Monitoring Network where, general trends and overall picture of the groundwater quality were withdrawn from the results of analyzing samples from the 230 wells constituting the network. High concentrations of total dissolved solids (TDS), sulphate, and nitrate have been observed in the reclaimed areas towards the fringes of the Nile Basin. The high salinity front from those areas shows a clear trend of moving towards the central parts of the old land. The central parts of the Nile Delta and Valley as well as the Deserts show better quality. Only few numbers of samples exceeded the WHO limits for drinking water. The main attribute of these areas is high formation-inherited iron and manganese concentrations resulting of highly reduced environment of the confined aquifer of the Nile Basin. The Western Desert shows the least exceeding of the quality standards. High salinity was the main quality problem for the groundwater of the Eastern Desert and Sinai.

3.1.2.3. Drinking Water Contamination:

Potable Water Supply

Despite the rapid population growth in Egypt, the percentage of the population with access to municipal water supply has increased over the past two decades due to large investments in the water sector. Based on the Statistical Year Book 1993-1992, an estimated 90 percent of households in urban areas and almost 72 percent of households in rural areas have access to piped water. In populous cities, such as Cairo, Alexandria, Port Said and Suez, 91.8 percent of households have access to piped water, whereas this is the case for 85.8 percent of urban households in Upper Egypt. Rural areas, and especially those of Upper Egypt, are the most inadequately served. Only 59.2 percent of households in rural Upper Egypt have access to piped water. The parts of the population that have no access to piped water obtain their water from public standpipes (often connected to groundwater wells), street vendors or directly from canals and the River Nile.

3.1.3.Soil Contamination

3.1.3.1. Soil Contamination:

According to published research [(2)], vehicle emissions affect the soil of the agricultural land around traffic roads. A strip of at least 40 m parallel to the Cairo-Alexandria Agricultural Road receives air pollutants, mainly lead, carbon monoxide, nitrogen oxides and sulfur dioxide. These pollutants fall on the plants as well as passing directly into the soil. Pollutants carried by irrigation water are also a major source of soil pollution. An estimated 50 percent loss of productivity of agricultural land was recorded at Helwan and Shoubra EI-Kheima. Severe damage to plants has been reported in areas close to the industry in Kafr EI-Zayat, Edfu, Abu Za'abal and others. Toxic heavy metals accumulate in the tissues of vegetation grown adjacent to sources of air pollution, such as lead smelters and near traffic roads.

It should be mentioned that pesticides is considered the main source for soil pollution Integrated pest management in agriculture (IPM) is a valuable component of a sustainable agricultural system, where the nationally policy is currently based on the reduction of dependence on agriculture pesticides and enhancement of cultural practices, combined with proved biological and alternative control technologies. A

plant protection-coordinating steering committee for the recognition and evaluation of IPM components was established in the Ministry of Agriculture.

The future national development strategy for IPM will focus on the efficient use of natural enemies, new innovative approaches through molecular biology in the critical identification of pest strains, development of induced resistance plant varieties through biotechnology, the establishment of computerized IPM website and the assessment of pesticide risks and benefits.

Moreover, the term 'soil degradation' refers to weakness of the capability of soil to Produce agricultural products. There are various forms of soil degradation:

a. Displacement of soil material by water and wind, which is significant in Egypt.
b. Chemical degradation of soil resulting from loss of nutrients or organic matter,
   Salinization and pollution.
c. Physical degradation of soil where the process that caused soil degradation is

Compaction, sealing and crusting, water logging, and subsidence of organic soils.

3.1.4. Hazardous Waste Treatment:

3.1.4.1. Industrial wastes:

Industry is the main source for hazardous wastes. The generation of hazardous wastes is not confined to large-scale industries. Small-scale industry, small workshops, garages and very small production units collectively produce large quantities of hazardous wastes. Their volume is usually difficult to monitor and quantify. Further more, transport services, hospitals, research laboratories and even household are sources sometimes of dangerous materials.

The types of hazardous wastes generated from industrial activities in Egypt are varied according to the industrial sector. The main industrial sectors are textiles, chemicals, pesticides, fertilizers, petrochemicals, pharmaceuticals, paper, pulp, steel, metallurgical and food. The chemical industry is by far the main source of hazardous wastes in the developed regions in Egypt. Recent estimates have indicated that about 50% of all industrial activities is concentrated in Greater Cairo and about 40% in Alexandria. The rest is in Delta and Upper Egypt, and New Cities.

The Ministry of Industry surveyed and documented the solid wastes from industrial activities of the public sector companies and disposal methods of those wastes including the hazardous wastes. Currently, a list of industrial hazardous wastes is being prepared in order to issue a Ministerial Decree to regulate the handling and disposal of those hazardous wastes according to Basel Convention. Industrial wastes (including hazardous wastes) are generated from about 24,518 establishments distributed nation-wide. Types and impacts of wastes differ according to the activity, technology uses and location of each establishment.

A study was conducted to establish a database on heavy metals in industrial wastewater. The study covered 70% of industrial establishments. Greater Cairo has more than 51 % of the total industrial activities, followed by Sharkeya Governorate, Alexandria Governorate then the rest of all other Governorates. It is expected that those three Governorates are the greatest generators of industrial wastes. However, due to lack of funding, the study was not completed.

The current and future activities of the Ministry of Industry include projects on collection and onsite separation of industrial wastes, relocation of lead smelters, tanneries and textiles from Cairo to new industrial zones, recycle, reuse, and safe landfill of industrial wastes.

Lacking the necessary treatment and disposal facilities, it has frequently been the case that hazardous industrial wastes generated by these industries has been disposed in the nearby desert areas or transported to public dump sites mixed with municipal waste. Scavengers at dumpsites are exposed to serious health hazards when scavenging hazardous substances searching for recycled waste products. The main obstacles impeding the implementation of most of the projects are the lack of funding and lack of trained workers in that field.

During 1999, Ministry of Environment initiated a 3-year demonstration project to establish a hazardous waste landfill in the Governorate of Alexandria. The project focuses on the construction of the landfill and mobilizing the participation of large quantity generators across the Governorate funded by Finida (Finish Government)

The completion of the draft national hazardous waste list during 1999 was one of the most significant initiatives implemented, where all competent authorities is now following this list for better control and safer handling of such wastes.

3.1.4.2 Healthcare wastes (HCW):

HCW disposed with other municipal wastes had created serious health and

environmental problems in Egypt. EEAA in cooperation with the Ministry of Health and Population and Cairo University had developed a pilot demonstration project for an integrated environmentally sound management of health care wastes.

The national programme for integrated healthcare waste management demonstrated safe incineration at Cairo University Hospitals. Limits for the safe emissions from HCW incinerators will be issued and reviewed within the modification of the executive regulation of law 4/94.

3.1.5. Occupational Health:

The non-adherence to rules requiring the use of appropriate protective clothing during use, handling and application of chemicals has been a major cause of problems. Where some of the legislation that supports such program includes:

1. Law 453/1954 is responsible for regulating industrial and commercial activities and is executed by the Ministry of Industry.
2. Labor Law 137/1981 and its executive regulations and the Ministerial Decree of the
3. Minister of Labor 55/1983 to protect the working environment.
4. Law 4/1994 for environmental protection regulates the activities causing pollution and degradation of the Egyptian environment. The Egyptian Environmental Affairs Agency (EEAA) is the key responsible part/for executing the aforementioned law and has the authority to monitor and implement it.
5. Moreover, Law 59/1960, which limits radioactive usage and is executed by the Ministry of Health and Law 3/1982 for the proper planning of industrial zones and is executed by the Ministry of Planning.
6. Other efforts have been done towards introducing public awareness campaigns through issuing booklets, seminars, and conferences. Furthermore, programs supported by the NGOs activities are now playing a positive role in these campaigns.

3.1.6.Chemical Accidents:

(EEAA) is now focusing on developing risk assessment programs through the cooperation of different authorities, these programs will be focusing on developing and improving hazard and risk assessment methods, promoting harmonization of

methods and terminology among different industrial sectors, encouraging mutual use and acceptance of assessment outcomes as a basis for risk management, and promoting international cooperation in assessing the risks of specific chemicals through different conventions. This program will be active in the areas where high environmental exposure of hazard does exist. Moreover, classification of substances of new industrial chemicals inorder to improved cooperation and information exchange on national level, monitoring data and assessment methodologies will also be conducted by developing voluntary measures to address the risk management of some existing chemicals. Furthermore, developing approaches that encourage industry to develop chemicals that are more environmentally friendly "green chemicals" or "environmentally sustainable chemicals" and establishing a network of experts at the national level that can be called upon at any time to share expertise and experience on environmental emergencies solutions is one of the main aim of risk assessment approaches. Ministry of Interior Affair – Civil Defense Authority is the main responsible body for controlling chemical accidents.

3.1.6.1. Industrial

Few industrial accidents are reported.

3.1.6.2. Transport

Most of the reported incidents have been associated with tankers carrying petroleum products, concentrated acids and chlorine .It should be mentioned that EEAA with the cooperation of the Egyptian Environmental Policy Program (EEPP) has developed a guidelines for the transportation of hazardous waste including permission for hazardous waste transportation (requirements, license, means of transportation), manifest system and labeling system.

3.1.7.Storage and Disposal of Obsolete Chemicals:

Obsolete pesticides constitute an immediate threat to the health of humans and livestock, particularly since they are often stored in populated areas, which may sooner or later leak into and contaminate groundwater and the environment in general. The absence of designated storage and disposal sites has contributed to indiscriminate dumping. Depending on the quantities being generated, some of the wastes are kept on the premises. The security at such storage sites is usually low, increasing the risk of scavenging of dangerous materials by scavengers. Although the use of existing stocks of pesticides has been restricted. Currently, there is a supreme committee for safe disposal and effectively management of obsolete stock pesticides, where MOE & MOA is the lead agencies for such committee'.

3.1.8. Nile River Contamination:

- **Nile River from Aswan to Cairo:**

Water quality is a term used to describe the overall water quality status along River Nile. Where monitoring conducted by Nile Research Institute (NRI) and reported in the National Environmental Action Plan 2002/2017, that the survey (detection) includes nine parameters (DO, pH, TS, BOD, $N0_3$, TSP, Turbidity, feacal coliform and temperature deviation). It has been proven that about 71 percent of the sampling sites along the River Nile during winter season show good quality of water, while the remaining sites indicate a medium quality of water. On the other hand the Water Quality Information (WQI) calculation during summer shows that only 43 percent of the sampling sites have good water quality while the rest of the sites have medium water quality, Moreover, the published results of monitoring the Nile and its branches according to the same report shows that organic pollution load, such as ammonia, nitrate and phosphate, in the Nile is within permissible limits and that E-coli bacteria are also below the law limits.

- ***The Damietta and Rosetta Branches:***

The Damietta Branch receives nutrients and organic loads, as a result of discharges from the Talkha fertilizer industry and agricultural drains especially near the Faraskour dam. The drainage at Meet AI-Kholei village also receives sewage water that population residing in this area disposes. This sewage water finally discharges in the Damietta branch, Rosetta branch starting from downstream Delta barrage up to Kafr EI-Zayat receives high concentrations of organic contaminants and nutrients, this is a result of the discharge of partially treated wastewater from Giza through Muheet and Rahawy drains. The industrial area at Kafr EI-Zayat city discharges some toxic chemicals. It is also worth mentioning that both branches receive huge amounts of raw or partly treated sewage disposed from sanitary drainage plants located in some cities and villages near the River Nile.

The Water Quality Information (WQI) for Damietta and Rosetta branches during winter and summer seasons of the year 2000 shows that during winter, water enters the Damietta branch from the Nile with good quality and then it deteriorates downstream the branch till it becomes in the medium condition. The extremely low flow condition, which occurs during low demand wintertime, in addition to discharging' wastes from different pollution source along the branch can explain changes in WQI along the branch. The same trend of water quality index occurs in Rosetta branch where the water deteriorates in the downstream and reaches the worst

condition at the site located 120 km downstream the branch. The branch at that receives pollutants from five drains (EI Rahawy, Sabel, EI-Tahreer, Zaweit EI-Bahr and Tala) as well as from industrial effluents.

3.1.9.Persistant Organic Pollutants (POPs):

Persistent Organic Pollutants (POPs) are chemicals that:

• Are extremely stable and persist in the environment,

• Bio-accumulate in organisms and food chains,

• Are toxic to humans and animals and have chronic effects such as disruption of Reproductive, immune and endocrine systems, as well as being carcinogenic, and,

• Are transported in the environment over long distances to places far from the points of release.

With the evidence that POPs are transported to regions where they have never been used or produced, the international community decided in 1997 to work towards the establishment of a convention that will serve as an international, legally binding instrument to reduce and/or eliminate releases of twelve POPs, as identified in the UNEP Governing Council Decision 19/13C. The initial list of POPs contains the nine pesticides and the decision also includes PCBs (mainly used in electrical equipment) and two combustion by-products, (dioxins and furans).

Pesticides now classified as POPs started to be used on a large scale after World War II in agriculture and for disease vector control. Crop protection and disease vector control strategies became dominated by the application of these pesticides. The control of disease vectors (such as malaria mosquitoes) by pesticides saved the lives of millions of people. The negative impact of pesticides on agro-ecosystems as well as on the environment and human health started, however, to become increasingly evident in the 1950s.

Stockholm Convention on Persistent Organic Pollutants (POPs)

This convention was adopted on May 22, 2001, and the Intergovernmental Negotiating Committee that developed it continues to meet annually to prepare for a "quick start" for the first meeting of the Conference of Parties following entry into force. The overall objective is to protect human health and the environment from POPs. Where, Parties are required to take action on a group of 12 specified chemicals

including intentionally produced pesticides and industrial chemicals (aldrin, chlordane, dieldrin, DDT, endrin, heptachlor, hexachlorobenzene, mirex, PCBs, toxaphene) and unintentionally produced by-products of industrial and combustion processes (dioxins, furans, hexachlorobenzene, PCBs). Specific goals are set for both types of POPs as well as for POPs present in stockpiles and wastes.

For intentionally produced POPs, the convention goal is elimination of production and use. Each Party must take action to eliminate or restrict production and use of each chemical, as specified in the convention, and restrict any related trade. Some exemptions are specified, many of which are time-limited and have reporting and other requirements. Parties having regulatory and assessment schemes for new industrial chemicals or pesticides must take regulatory measures to prevent the production or use of new POPs. Parties with assessment schemes for existing industrial chemicals or pesticides must use the convention's screening criteria to identify possible POPs as early as possible in their assessment programs.

The goal for unintentionally produced POPs is to reduce their total releases derived from anthropogenic sources, continuously minimizing and, where feasible, ultimately eliminating such releases. Parties must: develop an action plan within 2 years of entry into force of the convention to identify, characterize and address the release of these POPs; implement the action plan; promote the application of measures to achieve realistic and meaningful levels of release, reduction or source elimination; promote the development and, as appropriate, require the use of substitute or modified materials, products and processes to prevent the formation and release of these POPs; promote and, as appropriate, require the use of best available techniques (BAT) for new sources within 7 specified industrial source categories with comparatively high potential for POPs formation and release, and phase-in such requirements within 4 years of entry into force; promote the use of BAT for new sources within 13 specified industrial source categories with potential for POPs formation and release; promote the use of BAT for existing sources within all 20 specified industrial source categories; and promote the use of best environmental practices (BEP) for all new and existing sources within all 20 specified industrial source categories.

The third convention goal is to ensure the environmentally sound management of stockpiles of intentionally produced POPs, and of wastes and products and articles

upon becoming wastes that consist of, contain or are contaminated by intentionally or unintentionally produced POPs. Parties must: develop and implement strategies to identify stockpiles, products and articles in use, and wastes containing POPs; manage stockpiles in an environmentally sound manner until they are deemed to be wastes; manage wastes in an environmentally sound manner; dispose of wastes in a way that destroys the POP content, or otherwise in an environmentally sound manner; prohibit recovery, recycle, reclamation, direct reuse or alternative uses of POPs; require that transport of these materials across international boundaries take into account international rules, such as the Basel Convention; and develop strategies for identifying contaminated sites and while remediation is not required, if it is attempted, it must be done in an environmentally sound manner.

Parties must promote and facilitate public awareness and education, participate in research, development, monitoring and cooperation, and involve stakeholders in developing and implementing implementation plans. In the future, new POPs will be added to the convention by applying scientific criteria and a specified process for evaluating candidates proposed by Parties. The effectiveness of the convention will be evaluated using data on regional and global environmental transport of POPs and on their presence, levels and trends in environmental and biological media. The convention establishes a financial mechanism to assist developing countries and countries with economies in transition in meeting the incremental costs of implementing the convention obligations and specifies the GEF as the principal entity of the interim financial mechanism.

The current statues of POP's pesticides, industrial chemicals and unintended by-products on national level for Egypt are:

Name of Chemical	***Banned Year***
1. DDT	Banned in 1996
2. Aldrin	Banned in 1996
3. Dieldrin	Banned in 1996
4. Chlordane	Banned in 1996
5. Endrin	Banned in 1996
6. Heptachlor	Banned in 1996

7. Hexachlorabenzene	Restricted according to Ministerial Decree No. 88/1999 by Ministry of Industry and Banned in 1996 by Ministry of Agriculture for agricultural Use.
8. Mirex	Banned in 1996
9. Toxaphene	Banned in 1996
10. Polychlorinated Biphenyls (PCBs)	Banned by EEAA and the Ministry of Health
11. Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD)/ (PCDF)	Banned by EEAA and the Ministry of Health

Table 3-A: **Priority Concerns Related to Chemicals**

Nature of problem	***Scale of problem***	***Level of problem***	***Ability to control problem***	***Availability of statistical Data***	***Specific chemical creating concerns***	***Priority ranking*** [1]
Air Pollution	National	High	Medium	Insufficient	SOx,NOx, CO,CO2, H.Metals, O3,H.C, Smoke,TSP	1
Pollution of Inland Waterways	National	High	Medium	Insufficient	H.C&Bect.,H.Metals, Pesticides,	2
Marine Pollution	National	Medium	Medium	Insufficient	Oil, H. metals & Bect.	3
Ground water Pollution	Regional	High	Medium	Sufficient	H.C&Bect, H.metals, Pesticides,	1
Soil Contamination	Local	Medium	Low	Insufficient	Acidity, H.metals, Pesticides	4

Chemical Residues in Food	National	High	High	Sufficient	Color, oxidizing & preserving agents	1
Drinking Water Contamination	National	High	High	Sufficient	Bect., H. Metals, Micro Organisms	1
Hazardous Waste Treatment/ Disposal	National	High	Medium	Insufficient	Hazardous Chemicals, Pesticides	3
Occupational Health (Agriculture)	Local	Low	Low	Not available	Pesticides	5
Occupational Health (Industrial)	National	High	Medium	Insufficient	Carcinogenic Toxic Chemicals & H.Metals	3
Public Health	National	High	High	Insufficient	Pb,Cd,Hg, Pesticides	1
Chemical Accidents: Industrial	National	Medium	Medium	Insufficient	Flammable Substances & Explosive Suspense	3
Chemical Accidents: Transport	National	High	Medium	Insufficient	Flammable Substances, Toxic gases & Vapors	3
Unknown Chemical Imports	National	Medium	Medium	Not available		4
Storage/ Disposal of Obsolete Pesticides	National	High	Medium	Not available	Hazard chemicals, Pesticides	4
Chemical Poisoning/ Suicides	Local	High	Low	Not available		4

Persistent Organic Pollutants	National	High	Medium	Insufficient	DDT, Aldrin, Chiorodane, Dieldrene, Endrin, Heptachlor, HCB, Mirex, Toxaphene, PCBc, PCDD/ PCDF	1

(1) ***Provide relative ranking from 1 to 5:***

1= most severe problem

2= second most severe problems

3= third most severe problems

4= fourth most severe problems

5= fifth most severe problems