

# Chapter 13

## Hazardous Substances and Wastes





## Hazardous Substances and Wastes

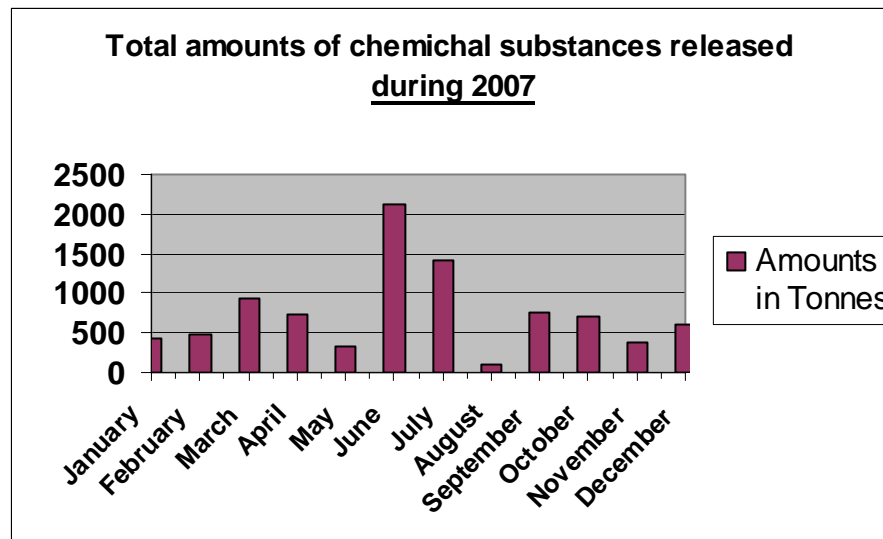
### First: Hazardous Substances

#### Introduction

Hazardous substances are those with a hazardous effect on health and environment if handled unsafely or in a manner incompliant with the safety data sheet of each of such substances. They include chemical fertilizers, different types of agricultural pesticides (insecticides, fungicides, and herbicides), as well as chemical substances used in industrial facilities such as radioactive, explosive, toxic, or corrosive substances, etc.

#### Activities made for hazardous substance control in 2007

1. EEAA participates in the control system over the entrance of hazardous chemicals used for developmental purposes (industrial, agricultural, etc.) via reviewing all customs releases in coordination with line ministries and agencies. In 2007, 1000 customs releases were reviewed, with a total of 8,947,221 tons of imported hazardous substances. In this respect, an integrated database was developed to determine types and amounts of hazardous chemical substances imported to Egypt via customs releases, in order to identify the current situation of chemicals imported into Egypt for coordination with concerned agencies on efficient use. All hazardous substances have already been surveyed from 2004 to 2007. (Figs. (13.1) and (13.2)).



Figure(13.1): Total chemical substances released in 2007

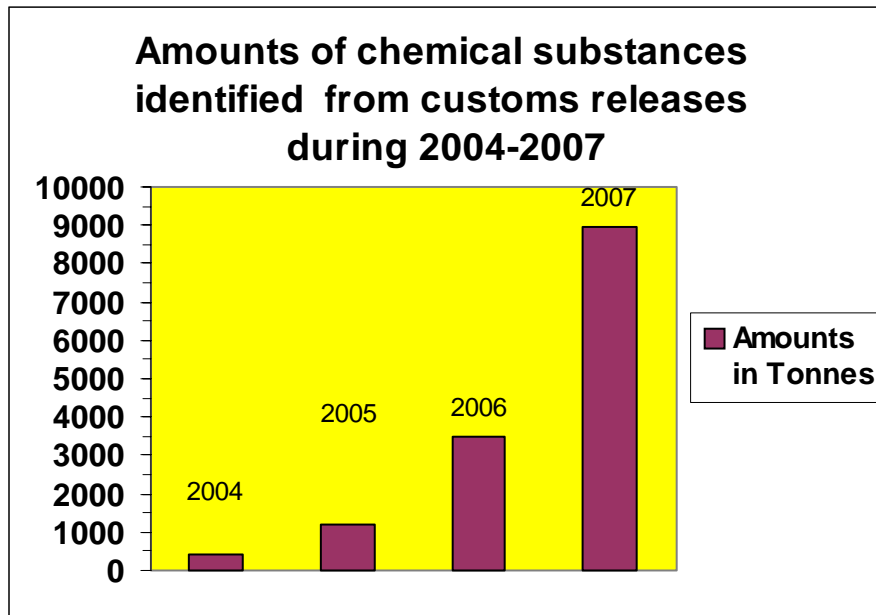
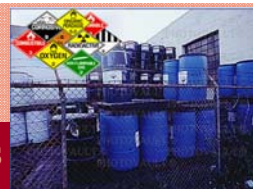


Figure (13.2): Chemical substances surveyed from customs releases during 2004-2007

2. Pesticides are hazardous substances that raise EEAA concern owing to their several risks and threats to the environment and human public health, and to being slowly decomposed, which makes them a major component of persistent organic pollutants (POPs). Accordingly, coordination was made with MOA as a competent administrative agency, as per the provisions of Law 4 of 1994 and its Executive Regulations, to survey the amounts of different pesticides (insecticides, fungicides, and herbicides).

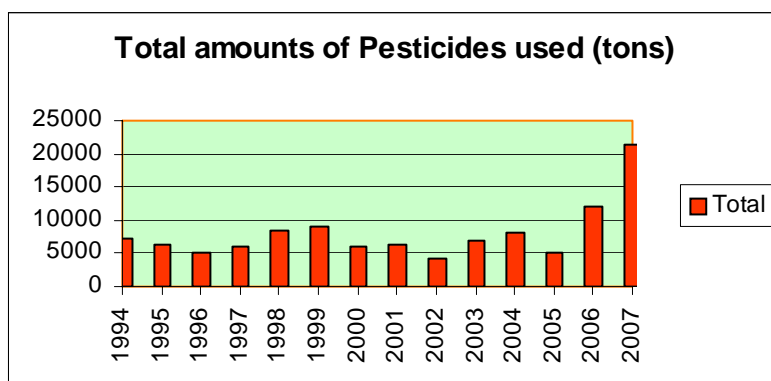
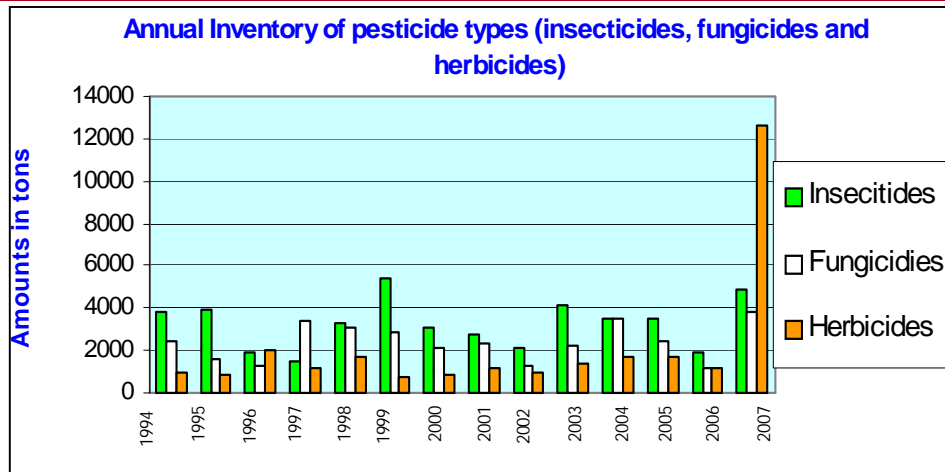


Figure (13.3): Total amount of pesticides used (in tons)



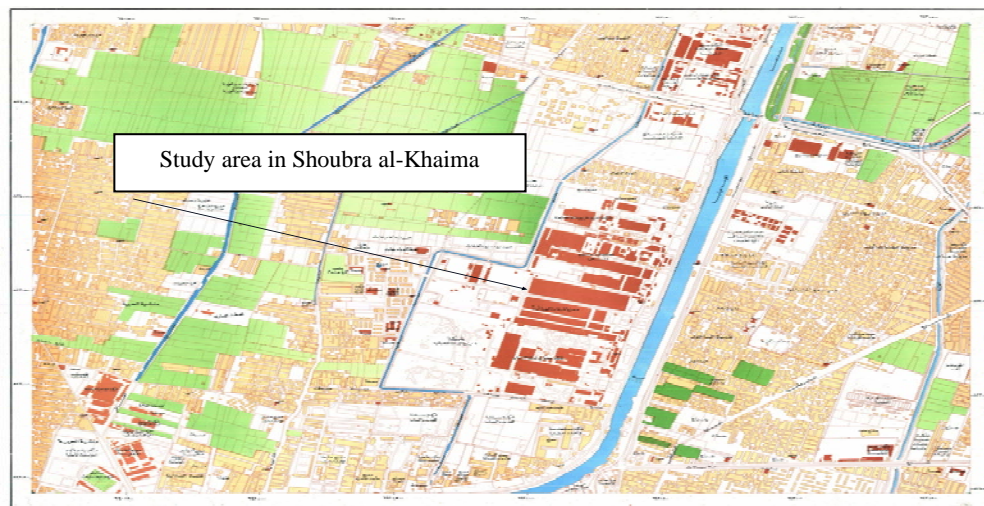
## Hazardous Substances and Wastes



**Figure (13.4): Annual inventory of pesticides (insecticides, fungicides, and herbicides)**

**Source:** Central Laboratory for Pesticides - MOA

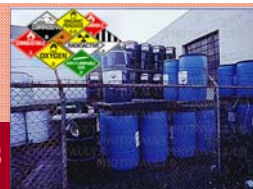
30 “Sound Management of Hazardous Substance” Component activities were carried out in Shoubra al-Khaima as one component of the Regional Environmental Management Improvement Project in collaboration with the Japanese International Cooperation Agency (JICA) as illustrated in figure (13-1) as follows:



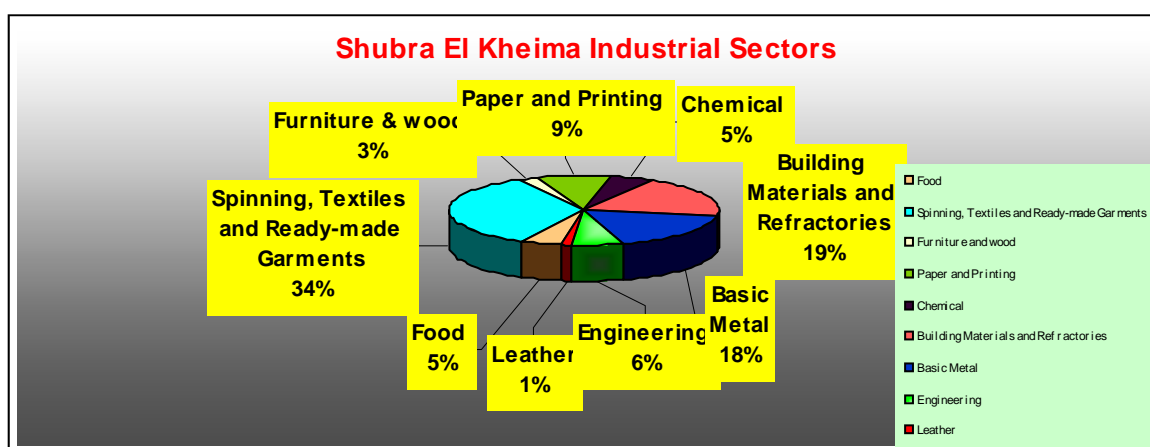
**Picture (13.1): Study area in Shoubra al-Khaima**

A– Some different industrial sectors in Shoubra al-Khaima were surveyed (Shoubra Al-Khaima Eastern and Western Districts) to prioritize methods of dealing with them in terms of POPs sources and volumes, such as polychlorinated biphenyls (PCBs). Survey was finalized (Figure (13-5)).

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B– Transformers in power stations as well as important industrial sectors and their storage areas in Shoubra al-Khaima were inventoried in order to survey transformers and condensers made during 1950-1980 (the period where PCB existed before banning). Total weight of oils expected to be polluted by PCB was measured so as to comply with Stockholm Convention on Persistent Organic Pollutants signed and enforced in May 2004.



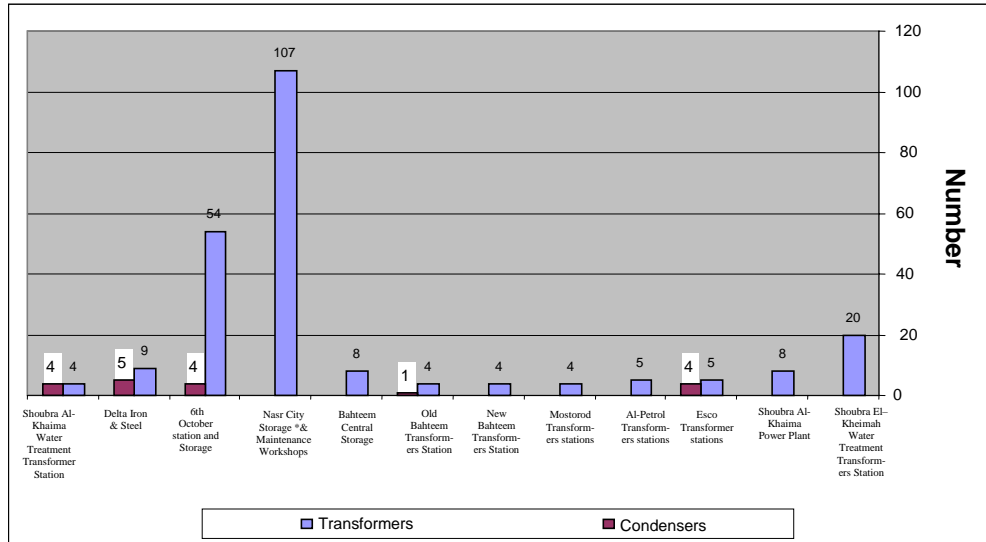
**Figure (13.5): Different industrial segments in Shoubra al-Khaima**

**Table (13.1): Numbers of transformers and condensers in power stations and their storage areas and some industrial facilities**

Sr.	Location	Number of transformers
1	Shoubra al-Khaima Water Treatment Plant	20 transformers
2	Shoubra El- Kheimah Power Plant	8 transformers (4 main and 4 sub)
3	Esco Transformer Station	5 transformers and 4 condensers
4	Al-Petrol Transformer Station	5 transformers
5	Mostrod Transformer Station	4 transformers
6	New Bahteem Transformer Station	4 transformers
7	Old Bahteem Transformer Station	4 transformers and 1 condenser
8	Bhateem Central Storage	8 transformers (operative)
9	Nasr City Storage and Maintenance Workshops	107 multi-voltage transformers
10	6 <sup>th</sup> October Station and Storage	23 transformers (operative) 31 transformers and 4 condensers (inoperative)
11	Delta Company for Iron and Steel	9 transformers and 5 condensers
12	Shoubra al-Khaima Water Transformer Stations.	4 transformers and 4 condensers



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**Figure (13.6): Number of Transformers and Condensers in Each Facility in Shoubra al-Khaima**

**Table (13.2): Number of transformers produced during 1950-1986 and transformers with no manufacturing date or any information**

Indicator	1950-1986	Manufacturing year – (unknown)
Number of transformers	47	550
Oil weight in kg	55237	136960

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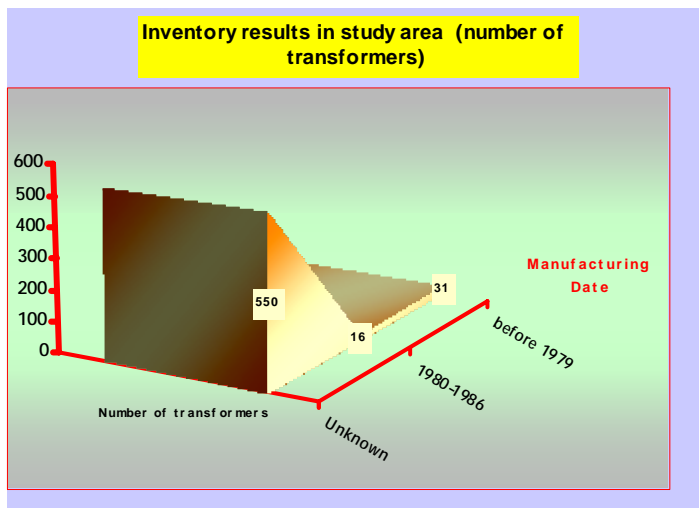
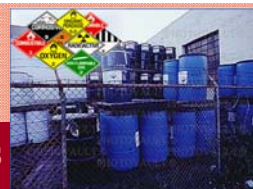


Figure (13.7): Results of inventory of number of transformers in the

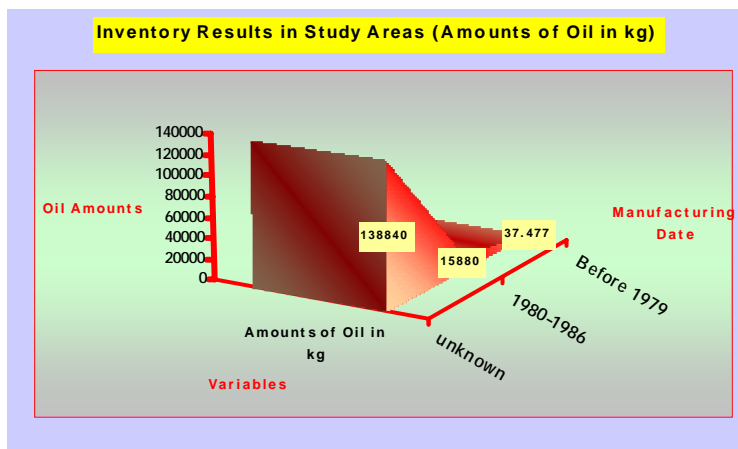


Figure (13.8): Oil Amounts Inventory Results in the Study Area in Shoubra al-Khaima

4. In terms of relevant staff's awareness raising, 30 environmental awareness programs on Integrated Management of Hazardous Substances for a number of society segments (factories, environment offices in districts and schools, etc.) were conducted for raising awareness of the dangers of these carcinogenic substances. Furthermore, 2 leaflets were issued about POPs such as polycyclic PCBs and polycyclic aromatic hydrocarbons (PAHs) to disseminate the dangers of these substances, ways of handling, and their adverse impact on health and environment.
5. Ps database was developed, including all previous studies, and POPs chemical and physical properties, sources, amounts, inventories, and ways of safe disposal.



## Hazardous Material And Wastes

### Second: Hazardous Wastes

#### Introduction

Using chemicals in modern society is a necessity to fulfill the society needs in different fields and for sustainable development. Hazardous materials and wastes which spread everywhere have great impacts on public health and environment. Accordingly, ecosystem and balance have been significantly affected.

Many materials could be recovered and recycled and are important in determining the approaches of the general framework of recycling strategy. Yet, industrial wastes receive greater attention from the general recycling system for their significant impacts on environment quality. Dealing with these impacts will be difficult if the current practices continue to increase without clear and studied prevention and/or reduction of these impacts on the long term. Industrial waste recycling is granted great interest in all countries provided that it is done according to sound and safe scientific methods to get new environmental-friendly material complying with standards.

#### Status of Hazardous Wastes in Egypt

Hazardous wastes exert a great pressure on environment and public health if they are not handled correctly and safely. Industrial wastes are the most important source of hazardous wastes as they are estimated by 300,000 tons/year. Medical wastes, including veterinary wastes, are 391,000 tons/year. Expired pesticides are the most dangerous agricultural wastes, with about 1160 tons surveyed until now.

According to the provisions of Article 25 of the Executive Regulations of Law of Environment 4/1994, MSEA, in coordination with Ministries of Petroleum, Agriculture, Health, Interior, Trade and Industry, and Electricity and Power (Atomic Energy Authority), must issue a list of hazardous wastes from the point of view of each ministry. Until 2007, lists of hazardous wastes for the Ministries of Petroleum, Agriculture, Health, Interior, and Trade and Industry have been issued.

Plastic wastes are among the most important industrial wastes in Egypt and need significant and organized efforts to deal with. Plastic is, thus, highlighted since it is widely used and impossible to dispense with. Plastic has various types which differ in components and each has special uses appropriate to its composition and characteristics. Using recycled plastic wastes is dangerous if they are used in areas other than the specified ones. International production of plastic is approx. 150 million tons/year. Egypt annually consumes approx. 1.2 million tons of plastic raw materials; of which 50 % is used in packaging (estimated by approx. 683,000 tons/year, see Table 13-3).

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Estimated amounts of recycled plastic wastes are 290,000 tons/year, 21% of which is exported (Plastic Technology Center report, Federation of Egyptian Industries, 2007).

**Table (13.3): Amounts of plastic raw materials annually consumed by packaging industry in Egypt**  
(Source: EEAA report, 2006)

S.	Raw material	Consumption rate/year
1	Polyethylene PE	225,000 tons/year
2	Polypropylene PP	200,000 tons/year
3	Polyvinylchloride PVC	135,000 tons/year
4	Polystyrene PS	75,000 tons/year
5	Polyethylene Terephthalate PET	48,000 tons/year
	<b>Total</b>	<b>683,000 tons/year</b>

## Potential hazards from manufacturing, using, and recycling plastic

### 1. High potential of air pollution during manufacturing, for example:

- a. Emissions of harmful vinyl chloride monomers (VCM) during processing PVC.
- b. Discharge of toxic gases during manufacturing polyurethane compounds, such as cyanide compound emissions which have hazardous impacts on public health and environment
- c. Exposure to bisphenol A during manufacturing of polycarbonate plastic. This compound impacts carcinogenic hormones and has genetic and genital hazards causing fertility problems in both sexes.

### 2. Improper use of plastic harms health, for example:

- a. Using plastic containers in salting fish and vegetables.
- b. Using polystyrene in manufacturing food packages where styrene leaks to food preserved in this package. Styrene has toxic effects on the nervous system and brain of those exposed to it for long periods.



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### Efforts made to mitigate the negative impacts of plastic wastes on the national level

First: MSEA, in coordination with the Ministry of Trade and Industry and the Ministry of Health, adopts some measures to limit pollution sources resulting from plastic waste recycling as follows:

1. Prevention of production and use of plastic packages, bags, packing materials made from recycled plastic or from health-banned material in packing food or medicine materials.
2. Enforcement of Minister of Trade and Supply Decree dated 25/8/1996 concerning the following:
  - a. Usage of black high-density polyethylene bags shall be limited only to garbage collection purposes.
  - b. Food merchants and distributors shall not use plastic bags in packing or possess such by any means.
  - c. Violator of the previous provisions shall be punishable by imprisonment for a minimum period of 6 months and a maximum of 2 years and a fine of minimum five hundred pounds and maximum one thousand pounds or by one of the mentioned penalties. In all cases, the amounts, subject of violation, shall be seized and confiscated.
3. Companies manufacturing or recycling plastic have to seal the products by international labels and numbers indicating the raw materials to facilitate sorting prior to recycling. Recycling companies should comply with health and environmental requirements of recycling according to this labelling.
4. Plastic bags are produced from pure raw materials, and are safe for recycling in the future.
5. Plastic safe recycling processes are organized such that they are limited to permissible raw materials to be used in industries which do not harm human health in terms of food, drinks, medicine, without polluting environment or harming other living organisms during different recycling stages:
  - a. Sorting plastic wastes according to the code of each product signifying raw materials.
  - b. Following proper scientific methods of recycling plastic wastes including the following washing methods:
    - 1) Washing by tap water then by hot water.
    - 2) Washing by alkaline solutions then by tap water to reach neutrality through measuring the pH value.
    - 3) Washing by steam, detergents, and disinfectants

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- 4) Drainage should comply with laws on draining to general sewage network (Minister of Housing Decree No. 44/2000 on issuing the amended executive regulations of Law on Discharge to the Public Sewer System and Law No. 48/1982 on Discharge to River Nile and Water Bodies).
- c. Using appropriate additives to improve the mechanic characteristics of products and following manufacturing methods appropriate to each separate raw materials according to industry basics and standards.

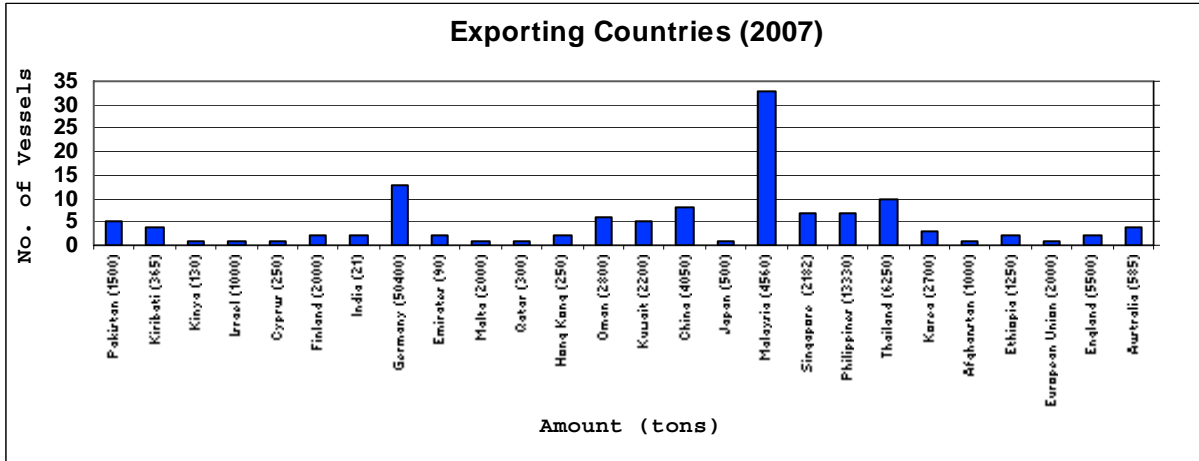
Second: MSEA participates in preparing plastic waste recycling draft strategy applied by the Ministry of Trade and Industry as the competent administrative authority of handling industrial wastes (through Plastic Technology Center, FEI). The objective is to study plastic problems in Egypt compared to neighboring countries.

### **Efforts Made on Hazardous Waste Management through International and Regional Cooperation**

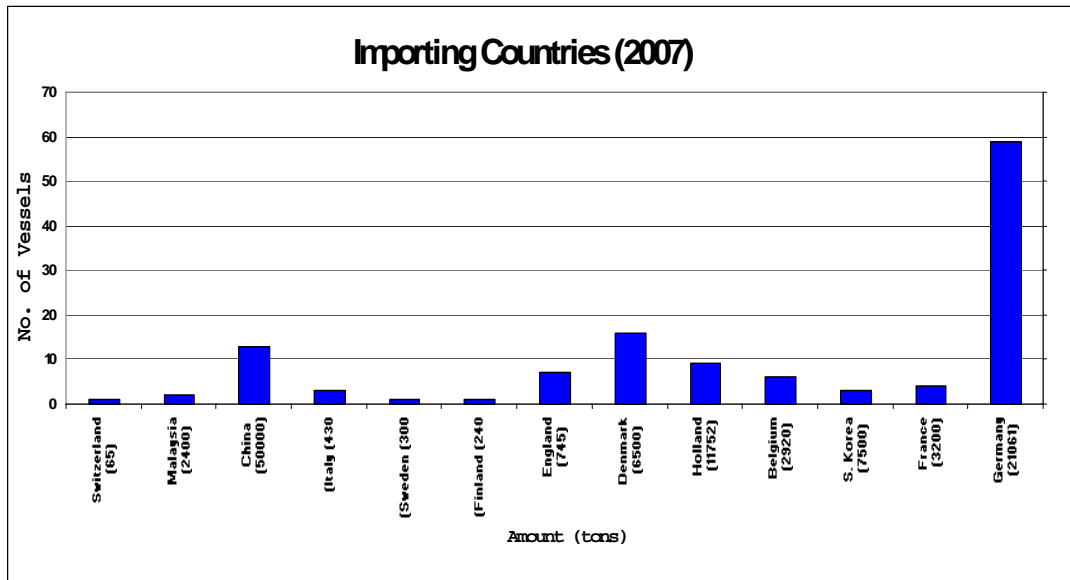
1. An agreement has been signed between EEAA and the Korean Government represented by Korea International Cooperation Agency (KOICA) to implement mercury waste management project.
2. An agreement has been signed to execute the Institutional Twinning Project between EEAA and the European Commission in the field of hazardous material and waste and solid waste management.
3. Training program on the Arab level has been provided on accountability and compensation for accidents resulting from transboundary transfer of hazardous wastes. Relevant international organizations and international insurance firms have participated in the program through Basel Convention Regional Center.
4. A pilot project to survey the industrial hazardous wastes in Tenth of Ramadan City has been implemented by Basel Convention Regional Center. The project includes surveying hazardous industrial wastes generated by industrial activities in the city, establishing a database for these wastes, and capacity building of hazardous waste classification and determination professionals.
5. Technical feasibility study on developing a central system for hazardous waste treatment in Greater Cairo has been prepared with the support of the Finnish Government.
6. An agreement has been signed between EEAA and WB to implement survey program of persistent organic pollutants (POPs), specifically PCBs, supported by CIDA.
7. In the field of following up hazardous waste transboundary movement, the prior notification system for vessels carrying hazardous wastes and passing through Suez Canal has been developed in coordination with Suez Canal Authority (in accordance with Prior Informed Consent (PIC) principle). Figures 13-9 and 13-10 show the number of vessels carrying hazardous wastes which passed through Suez Canal in 2007 from exporting countries going to importing ones.



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**Figure (13.9): Exporting countries of hazardous wastes**



**Figure (13.10): Importing countries of hazardous wastes**

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### Future Vision

Future vision of safe management of hazardous material and wastes sets a clear measurable target through establishing the integrated management system of hazardous material and wastes. The system includes all gradually prioritized management stages starting from material lifecycle; through handling hazardous material, hazardous waste generation, collection, storage, and transfer to treatment facilities to be treated, recycled, and recovered; till final disposal stage. This requires building all system capacities: technically, legislatively, institutionally, financially, and human resource development within a strategic framework including determinants and problems facing integrated management of hazardous wastes and materials in Egypt. The following sub-targets should be achieved accordingly:

1. Actual survey of locally produced or imported hazardous material amounts, and POPs (PCBs) inventory in different governorates.
2. Implementation of a program for hazardous waste survey and safe disposal.
3. Inventory of hazardous materials and wastes in the Departments of Leftovers in Customs all over Egypt.
4. Encouragement of processes preventing or minimizing hazardous waste generation through adoption of Cleaner Production Technologies, promotion of recycling and reusing, provision of appropriate facilities for hazardous material and waste treatment and safe disposal.
5. Encouragement of Private and nongovernmental sector participation in solving hazardous waste management problems.
6. Enhancement of international cooperation, implementation of international agreements organizing hazardous waste traffic, and participation in the activities of these agreements.
7. Producers of hazardous wastes must pay in principle.
8. Banning illegal trafficking in hazardous waste internationally and locally.
9. Enhancement and encouragement of local manufacturing of the tools and equipments needed by hazardous waste integrated management (collection, transfer, storage, and treatment of hazardous wastes).
10. Coordination with training, research, and education centers in universities and institutes to solve hazardous waste problem.
11. Raising awareness and education about risks of hazardous material and waste management at all levels.
12. Development of a database and information system on hazardous material management.