



5- Fresh Water

Introduction:

Water pollution is any change in the natural, chemical or biological characteristics of water that affects its suitability, or renders it unsuitable, for the different uses. Surface waters (rivers and canals) are exposed to pollution as a result of discharging untreated liquid wastes into them. Pollution is not limited to surface water, but impacts groundwater as well, as contamination has become a problem in many areas due to increased usage of chemical fertilizers and pesticides in agriculture. Moreover, the discharge of different waste types (e.g. municipal wastewater and industrial effluents) into areas unsuitable for such purpose results into waste leaching into groundwater. Water with high concentrations of nutrients such as phosphates and nitrates leads to what is known as “eutrophication”, or the increase of nutrients in water, leading to

the growth of different algae and plants, such as water hyacinth, water lettuce and water cabbage, among others. Growth of such flora increases in warm weather and slow water streams. Eutrophication causes different harms to fish wealth in water bodies and bed organisms by blocking sunlight from reaching all parts of the water column thus leading to unbalanced oxygen cycle in water. Growth of different plants helps create a suitable environment for the reproduction of mosquitoes, snails and other insects that carry many diseases.

River Nile Water Quality

Surface and ground water qualities are monitored through monitoring networks, where natural, chemical and microbiological indicators are used to determine water quality. These networks include:

- Ministry of Water Resources and Irrigation (MWRI) network including 232 monitoring sites along the Nile River, canals and drains in addition to 203 monitoring points for monitoring groundwater quality;
- 69 monitoring sites along the River Nile managed by EEAA laboratories in the different governorates; and
- 154 monitoring sites on the Nile River, its two branches and some main canals such as Mahmoudia, Ismailia and Ibrahimia, as well as some large canals (Bahr Muweis, Bagoureya, Qased, Bahr Shebeen) that directly branch off the River Nile at Al-Qanater Al-Khaireya fed by Tawfiqi and Monoufi main canals. There are also some monitoring points along Bahr Youssef canal in Beni Sueif in addition to 20 monitoring points in Fayoum Governorate that are all located on Bahr Youssef canal. Monitoring is undertaken monthly by the Ministry of Health and Population (MoHP) Environmental Monitoring and Work Environment Studies Center .

Lake Nasser Water Quality

The lake is 500 km long, 350 km of which is located within the Arab Republic of Egypt, while 150 km is located in the Sudan (Lake Nubia). Bays of significant importance for fisheries in the lake are around 85 (48 to the east and 37 to the west). There are varying activities along the lake including tourist activities (6 tourist floaters), industrial activities (represented in fish processing) in addition to limited agricultural activities.

Monitoring results in 2006 have indicated no considerable change in the Lake water

quality compared to 2005 due to limited development projects around it. The results also indicated no pollution from pesticides, fertilizers or heavy metals. Monitoring results showed that the average organic substances concentration was in most months less than Environment Law water quality permissible levels; a sign that water quality in the lake has not been affected by exist-

Water Quality in the River Nile and its Branches

ing industrial or agricultural activities.

According to analyses by MoHP Environmental Monitoring Center and EEAA Central Laboratory, 2006 Nile water quality monitoring results showed the following:

1. Average organic substances concentration represented by the biological oxygen demand (BOD5) was less than the applicable guideline (6 mg/l) in all governorates except Damietta where BOD average concentration exceed the limits by less than 1 mg/l. This is likely because of the agricultural drainage from el-Sarw El-A'la drain. Fig. (5-1) shows a comparison of average BOD concentrations in the different governorates.

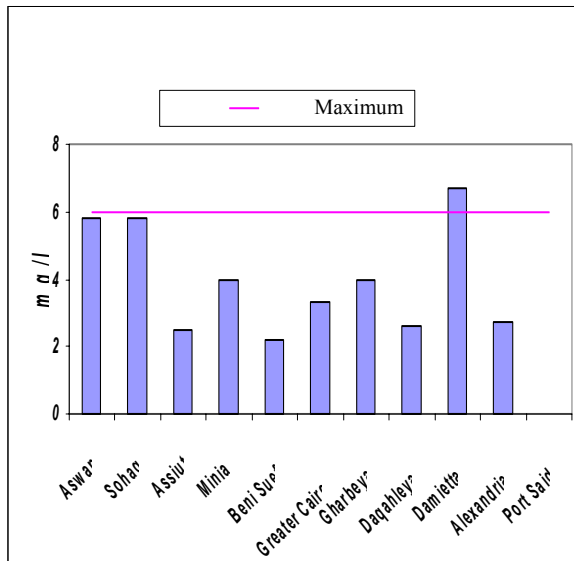


Fig (5-1) BOD averages in Egyptian

Fig. (5-2) shows a comparison of BOD average concentrations over 7 years (2000 - 2006) indicating a general decrease in 2006 compared to previous years in Assiut, Minia, Beni Soueif, Gharbeya and Alexandria.

Although BOD average concentrations were higher at Aswan, Sohag and Port Said in 2006 than in 2005, it is still less than the permissible limit (6 mg/l).

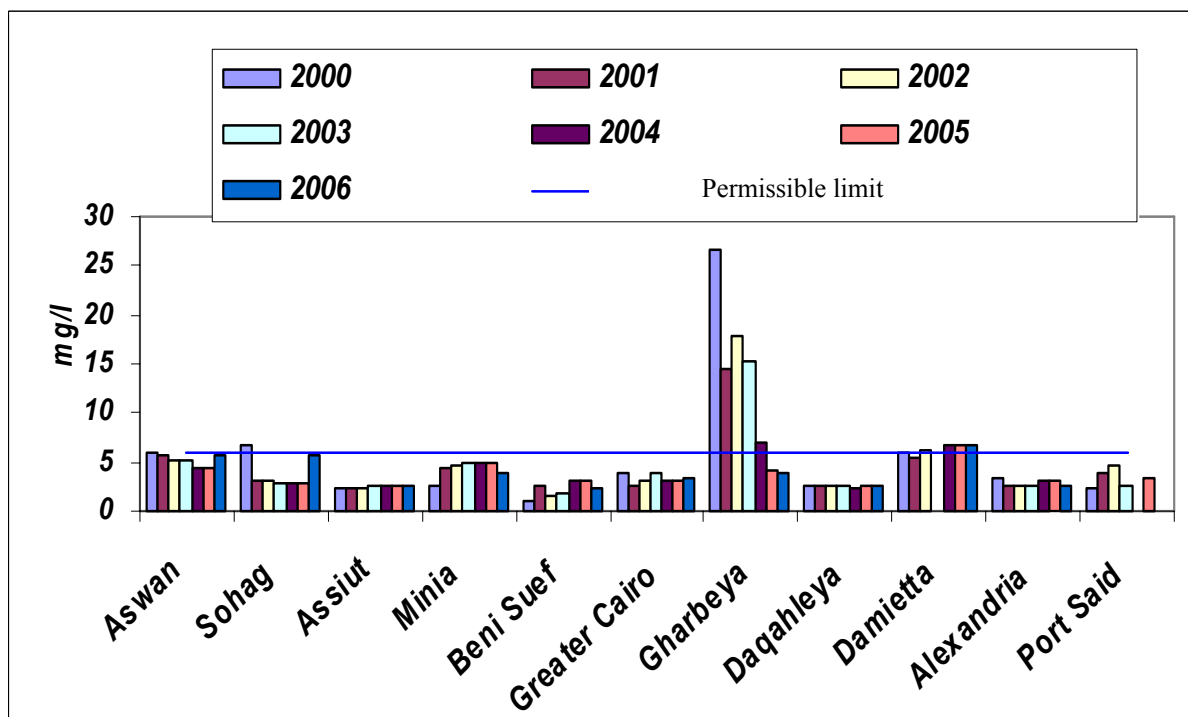


Fig (5-2) Average organic load results expressed in BOD in Egyptian governorates (2000 – 2006)

2. Results have shown that average organic substance concentration expressed by COD in Nile water in most governorates was less than the permissible limits (10 mg/l). This is due to efforts to control industrial liquid effluent drainage into the river and the compliance of most industrial facilities located along its banks. However, there was a slight increase in average COD concentration in Gharbeya governorate and a significant increase in Greater Cairo, Damietta and Alexandria. This may be due to the discharge of industrial effluents into the Nile by some non-compliant food factories, in addition to the discharge of municipal wastewater (untreated and detergent-carrying wastewater) and other wastes into the river. Fig. (5-3) compares average COD concentrations in the different governorates in 2006.

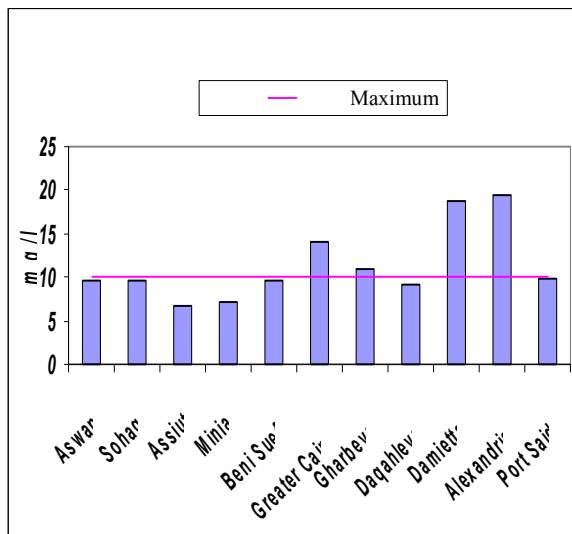


Fig (5-3) COD averages in Egyptian

Fig. (5-4) shows a comparison of COD average concentrations during the last 7 years in different governorates highlighting a significant improvement particularly in Gharbeya and Damietta governorates.

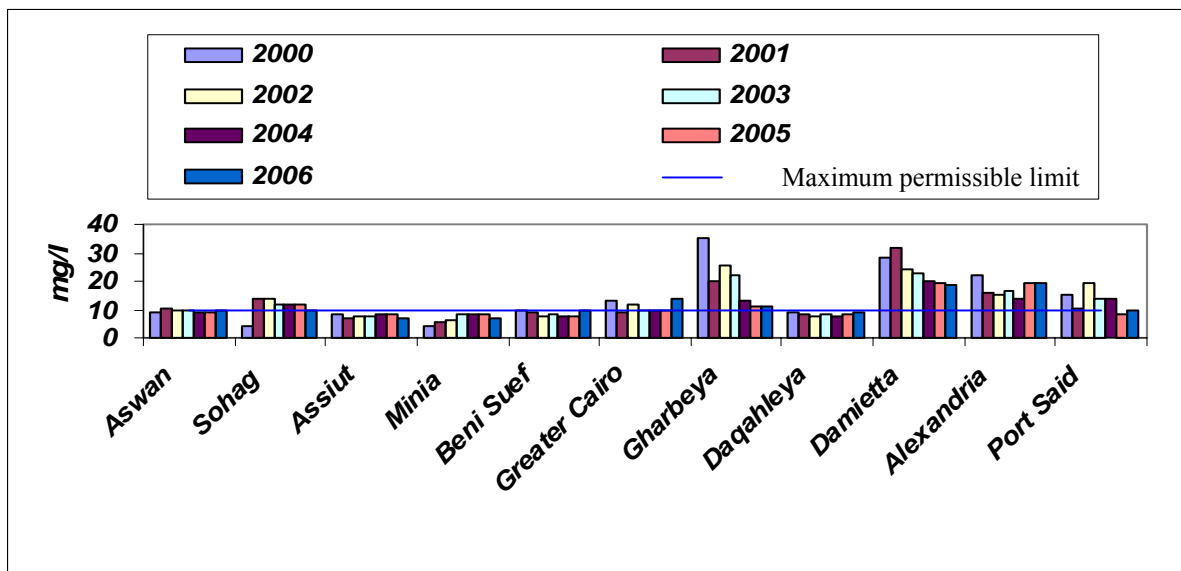


Fig (5-4) Organic load averages expressed in COD in Egyptian Governorates (2000 – 2006)

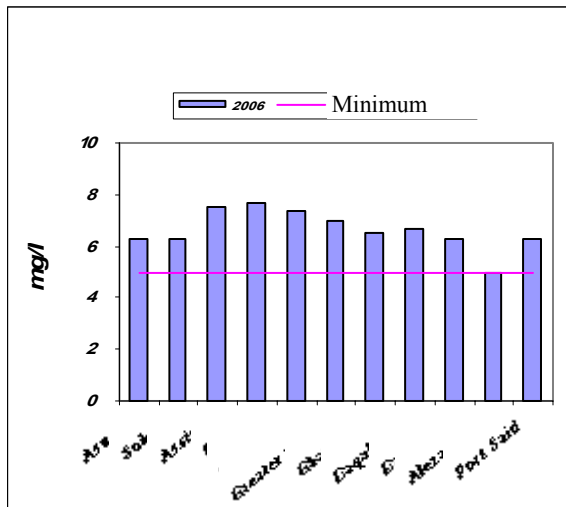


Fig. (5-5) Dissolved Oxygen Averages in Egyptian Governorates in 2006

- Monitoring results have shown that average dissolved oxygen concentrations (DO) in all governorates are still higher than the minimum limit for water quality guidelines (5 mg/l) as shown in Fig. (5-5) which is good sign for water quality.
- Nutrients (ammonia, nitrates and phosphates) concentrations were within permissible limits at most monitoring locations. Although Ammonia concentrations were less than the permissible limit (0.5 mg/l), however they exceeded such limit at 4 locations on Damietta Branch ranging between 1.26 – 2.25 mg/l. I has also exceeded the limits at 5 locations on Rashid Branch ranging between 0.541 – 0.908 mg/l. This may be due to agricultural drainage containing municipal wastewater discharges into Damietta and Rashid Branches. Nitrate average concentrations ranged between 0.002 and 9.4 mg/l, whereas the permissible is 45 mg/l. Results have also

shown that phosphate average concentrations ranged between 0.030 – 0.50 mg/l.

- Inorganic substance (fluorides and sulphates) concentrations were within permissible limits at all monitoring stations, where fluoride concentrations ranged between 0.20 – 0.45 mg/l and sulphate concentrations ranged between 9.9 – 66.6 mg/l, whereas their permissible limits are 0.5 and 200 mg/l respectively.
- Total Dissolved Solids (TDS) concentrations ranged between 145 – 416 mg/l, whereas the permissible limit is 500mg/l.
- Heavy metals (iron, manganese, lead, chromium and cadmium) concentrations were less than the permissible limits, as they were less than the lower limits the analysis device could measure. However, iron concentration amounted to 0.71 mg/l (still less than the permissible limit) in Daqahlia monitoring station. This may be due to the sanitary drainage from Nasseria village. Manganese maximum concentration was 0.30 mg/l (less than the permissible limit (0.5 mg/l)) at one monitoring location on Rashid Branch in Kafr El-Sheikh, which may be due to discharges by Edfina Company in Matobus drain.

Efforts Implemented to Protect the River Nile and Canals from Pollution

- Discharging industrial effluents into the River Nile has been stopped in 91 facilities with a total discharge volume of 4,952bn m³/year (99.64% of total industrial discharges into the river). This took place either by closing the drainage outlets or through environmental compliance where discharging has been com-

pletely stopped in 61 facilities that sued to discharge 81,205 million m³/year (1.63% of total discharges into the river). Furthermore, 30 facilities with treatment systems have environmentally complied. These are regularly inspected and are currently discharging according to Law 48/1982 permissible limits with a total discharge volume 4,871 billion cubic meters per year (representing 98.1% of total discharges into the Nile).

2. Non-compliant discharges in 25 facilities are currently being stopped, with a total of 17,755 million cubic meters per year (representing 0.36% of total discharges into the river). This is being implemented as follows: 10 facilities are currently implementing a compliance plan until 2007, with a total discharge volume of 4,574 million cubic meters per year (0.09% of total industrial effluents discharged into the Nile). Providing technical and financial support of LE 67 million to the remaining 15 facilities discharging 3,181m³/year (0.27% of total drainage) in order to achieve environmental compliance is currently being considered.
3. Industrial effluent (direct or indirect) into Manzala Lake results from 13 industrial facilities, making 0.08% of the total drainage into the lake (industrial, agricultural and sanitary drainage). 8 industrial facilities environmentally complied, now draining as per the provisions of Law 48/1982. Coordination is being made currently for other facilities to comply.
4. Industrial effluents discharged into Lake Borollos represent 1.25% of the total discharges (agricultural, sanitary and industrial) into the lake. MSEA has investigated the environmental situation of 16 industrial facilities and the means to provide them with financial and technical assistance to help them achieve environmental compliance with Law 48/1982 permissible limits. This has resulted in environmental compliance of 5 facilities that are currently discharging within Law 48/1982 permissible limits. Coordination has been made with the Ministry of Investment where LE 200 million was allocated to achieve environmental compliance in three business sector companies. MSEA is currently coordinating with the German Construction Bank (KFW) to provide an LE 30 million soft loan for environmental compliance in 8 private sector companies.
5. Industrial effluents into Lake Mariout (0.43% of total discharges) come from 6 industrial facilities directly/indirectly discharging into the lake. Two facilities have environmentally complied and currently discharge within Law 48/1982 permissible limits. Another 2 facilities are currently implementing an environmental compliance plan until 2007. MSEA, through support from the "Industrial Pollution Prevention Project II" is currently working on funding the remaining two companies in order to achieve environmental compliance thus completely eliminating illegal discharges into the lake.
6. For controlling municipal wastewater discharges from villages, 219 priority villages deprived of sanitation services were identified in the framework of MSEA vision to direct its support to those villages directly discharging into the Nile, Rashid and Damietta branches and into the north-

ern lakes in order to mitigate pollution resulting from discharging sanitary drainage into water bodies as a result of informal village sanitation systems. A comprehensive list including 1,165 villages was compiled based on the joint views of the Ministries of Housing and Utilities, Water Resources and Irrigation, Health and Population and MSEA in order to develop a comprehensive plan for establishing wastewater treatment plants. Priority was given to villages discharging into the Nile and water courses, followed by villages with high subsurface water table.

7. With respect to wastewater discharges from river floaters, a docking station was established in A'qab area, east Aswan, at a cost of LE 5 million for collecting wastewater discharges from river floaters at a rate of 900 cubic meters per day, in addition to an associated 4.5 km discharge line ending at a treatment plant. Treated water is currently used in irrigating a 69-feddan tree forest. A new docking station has also been initiated south Luxor/Mereis Bridge with the purpose of establishing a tourist, investment, cultural and developmental activity for attracting tourism, providing job opportunities and upgrading the docking station area. This project would provide capacity for receiving wastewater discharges from floating hotels completely preventing them from reaching the Nile.