Pollution of river water in Iraq

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Abstract. One of the main problems resulting from undertaking an intensive housing programme and establishing farm drainage schemes in Iraq, is water pollution of the two main rivers. The pollution took place for the following reasons: (1) there are a large number of pumping stations along the Tigris River near Baghdad discharging drainage water from the agricultural areas directly into the river; (2) there are a number of sewage pipes connected to the storm drainage network discharging directly into the main river; (3) there are some natural old drains crossing heavily populated areas, carrying all kinds of effluent directly into the main rivers; (4) there are a number of private agencies for the removal of sewage from houses by tankers, and these unload into the main river.

Pollution de l'eau des fleuves en Irak

Résumé. Un des principaux problèmes résultant de la mise en oeuvre d'un programme de construction intensif et de l'établissement de réseaux de drainage pour l'agriculture en Irak, concerne la pollution des deux fleuves principaux. Cette pollution s'est manifestée pour les raisons suivantes: (1) il y a un grand nombre de stations de pompage le long du Tigre, aux environs de Bagdad, qui envoient les eaux de drainage provenant de terres agricoles directement dans le fleuve; (2) dans les zones urbaines, nombre d'égoûts sont directement raccordés au réseau destiné à l'évacuation des pluies, réseau qui se décharge directement dans le fleuve principal; (3) il existe d'anciens drains naturels à travers des zones à population dense, qui charrient toutes sortes de déchets vers les fleuves; (4) de nombreuses sociétés privées se chargent de l'enlèvement des ordures ménagères par camions qui sont déchargés dans le fleuve.

INTRODUCTION

Iraq is known by its two main rivers, the Tigris and the Euphrates. The basin of these two rivers was called in olden days Mesopotamia, which was famous for its agricultural product with very high rate of yield. The high productivity of crops was due to the fertility of the soil and the freshness of the river water.

Due to continuous cultivation of the lands for thousands of years without taking any measures for providing them with a drainage network and for leaching the soil, the soil was affected by salt and became very poor and the productivity became very low. In the meantime the quality of water in the river has been also affected and the problem of pollution appears to be due to many reasons which are explained later on.

Although the problem of river water pollution is not very serious at the moment, if neglected, it could reach a dangerous point in a very short period due to the vast development programmes undertaken during recent years, and due to the activities undertaken in many fields, especially in agriculture, industry, and intensive housing schemes. All these activities affect to different degrees the quality of the water in the rivers. Therefore, the Government of Iraq has paid great attention to this problem so that necessary measures could be taken. The problem is getting serious, most rapidly near big towns.

This study will concentrate on the pollution of the Tigris River water in Baghdad city for the following reasons:

(1) Baghdad is a big city, the capital of Iraq, and it has been subject to fast development in recent years.

(2) The increment of the population in this city has been 84 per cent during the l twelve years.

(3) The area covered with intensive housing schemes has rapidly increased during recent years.

(4) Baghdad has a rapidly developing industrial sector which has its affect on the pollution of the river.

(5) The Tigris is the biggest river in Iraq and the only one crossing the city from north to the south.

POLLUTION OF TIGRIS RIVER WATER IN BAGHDAD

The Tigris crosses Baghdad and divides it into two areas, the eastern area called Rasafa a the western called Karkh.

The population of Baghdad city is estimated to be 2 863 000 at the present time. The population was 1 554 186 and 1 984 142 in 1965 and 1970 respectively.

The Tigris is the biggest river in Iraq, its discharge in Baghdad city reaches 6000 m^3/s the flood season (April–May), but in summer it is about 400 m^3/s.

During historical times the Tigris River was famous for its fresh water, but nowadays this is not the case. Salt from cultivated areas adjacent to and up river from Baghdad moved towards the river and poured into it through a number of pumping stations instal- ed directly on the river. Dirty water also found its way to the river through either rain o sewage disposal pipes, and effluents from a huge number of factories all over the area of Baghdad also poured into the river.

Preliminary studies showed that the problem of pollution may cause many diseases lik cholera, liver diseases, tenesmus, and poliomyelitis, etc., therefore, measures were taken t study the problem in depth by experts in order to limit the bad effects.

Generally, it may be stated that the main sources of pollution of Tigris River water in Baghdad are due to the following sectors: 1st agricultural sector, 2nd industrial sector, 3rd housing sector.

The agricultural sector

Agricultural areas adjacent to and up river from Baghdad city are affected by salinity. Th soil became very poor and its productivity became very low due to continuous cultivation for thousands of years without the provision of drainage networks.

The Revolutionary Government of Iraq has prepared a vast programme for drainage schemes covering all the country including the areas adjacent to Baghdad city. Some of these schemes have already been implemented, and a number of pumping stations have been installed along the Tigris River in order to pump saline drainage water into it causing a big rise in the percentage of salinity in the river water. At Baghdad the percentage reaches 350 ppm during the summer season and 230 ppm during the flood season (April–May

If the system of disposing of drainage water into the river goes on for another two decades, it is estimated that the problem of pollution will be so serious that its effect on yield and the productivity of the soil will be very harmful.

Preliminary studies have been made to recognize and define the affect of each pumping station on the river water and to take the measures necessary for changing their positions after diverting the outfall drains to dispose of their water into the sea or into depressions far away from cultivated lands. Although the implementation of such a plan will be very costly, it is considered to be economically feasible in the long run.

The industrial sector

The industrial sector has developed considerably throughout the country, particularly in big cities including Baghdad. The number of factories has reached 788 in Baghdad and is distributed as shown below:

Industry	N
Foodstuff	1
Chemical	1
Constructional	
Household (table and kitchen utensils)	
Textiles	2
Leather	
Carpentry and press	1
Electrical	
Total	7

Some of these factories are disposing of their treatment. Therefore, instructions have been issu installation of treatment plants in the factories s river.

Extension of housing schemes

Baghdad in recent years has seen distinguished d with intensive housing schemes is about 238 km creased by 84 per cent during the last twelve yea may be due to the following reasons:

(1) There are a great number of sewage pip discharging directly into the river water. These s constructed housing schemes, Government build

(2) There are more than 40 pumps installe posing sewage water directly into the river witho

(3) There are some old open drains (origin populated areas, discharging dirty water into the of drinking water pumping stations situated on t

(4) A great number of high buildings, hou river banks dispose of their sewage water directl

(5) There are a large number of private ag houses by using tankers. In most cases the tank

The permanent solution to such a problem is with a complete and effective sewage system su only treated water may be allowed to be dispose mation about the sewerage system in Baghdad.

Sewerage network system in Baghdad

The existing network of the sewerage system in about 20–25 per cent of the population. This i drains connected to the houses.

Studies and complete designs have been prep existing five-year plan which ends in 1980. In a the implementation of the sewerage system in B treatment plant will be installed complete with persons in Baghdad city. This new system will i side of the Tigris River (Karkh) area and 150 k area.

The first extension of the existing treatment at the moment. This extension will be complet

Industry	*Number of factories*
Foodstuff	120
Chemical	170
Constructional	58
Household (table and kitchen utensils)	25
Textiles	217
Leather	23
Carpentry and press	107
Electrical	68
Total	788

Some of these factories are disposing of their effluent directly into the river without any treatment. Therefore, instructions have been issued by the responsible authorities for the installation of treatment plants in the factories so that only treated water may reach the river.

Extension of housing schemes

Baghdad in recent years has seen distinguished development activities. The area covered with intensive housing schemes is about 238 km^2. The population of Baghdad city has increased by 84 per cent during the last twelve years. The pollution of the Tigris in Baghdad may be due to the following reasons:

(1) There are a great number of sewage pipes connected to storm sewer networks discharging directly into the river water. These sewage pipes mostly belong to the recently constructed housing schemes, Government buildings and some of the hospitals.

(2) There are more than 40 pumps installed along both sides of the Tigris River disposing sewage water directly into the river without any treatment.

(3) There are some old open drains (originally natural drains) crossing intensively populated areas, discharging dirty water into the river in positions very near to the intakes of drinking water pumping stations situated on the river.

(4) A great number of high buildings, houses, and casinos which are situated on the river banks dispose of their sewage water directly into the river.

(5) There are a large number of private agencies for removal of sewage water from houses by using tankers. In most cases the tankers unload directly into the river.

The permanent solution to such a problem is to cover the whole area of Baghdad city with a complete and effective sewage system supplied with proper treatment plants so that only treated water may be allowed to be disposed in the river. Below is some brief information about the sewerage system in Baghdad.

Sewerage network system in Baghdad

The existing network of the sewerage system in Baghdad city is about 1000 km and serves about 20–25 per cent of the population. This includes the main sewer, branch sewers and drains connected to the houses.

Studies and complete designs have been prepared by the appropriate authorities for the existing five-year plan which ends in 1980. In accordance with the new plan prepared for the implementation of the sewerage system in Baghdad during the years up to 1980, a new treatment plant will be installed complete with all the required sewers to serve 600 000 persons in Baghdad city. This new system will include 300 km of sewers on the western side of the Tigris River (Karkh) area and 150 km on the eastern side of the river (Rasafa) area.

The first extension of the existing treatment plant in Baghdad city is being undertaken at the moment. This extension will be completed during this year (1977) and will increase

the capacity from 300 000 to 750 000 persons.

It is also planned to commence the second extension of the existing treatment plant t serve 1 500 000 persons. It is expected to finish this extension before the end of 1980. is also expected to start the third extension in 1979 to increase the capacity to 2 250 00 persons.

The most important points taken into consideration in the preparation of the plan fo the sewerage network system were the following:

(1) For new building areas, complete sewage networks have to be installed before t roads and streets are paved, because it was found that the total cost of the job could be reduced by 30 per cent.

(2) In existing areas, priority is given to the areas where the population is most den the number of factories is greatest, and disposal by the sewerage system is most feasible.

(3) In all cases, the sewerage system should be accompanied by treatment plants.

RECOMMENDATIONS

(1) The whole area of Baghdad city should be covered with a complete sewage ne work and storm drainage system supplied with efficient treatment plants.

(2) Sewage pipes should be disconnected from storm drainage pipes.

(3) All natural drains which cross the populated areas have to be covered, in the meantime the flow from these drains should be treated before being discharged into the river.

(4) Drainage pumping stations installed on the river for the disposal of saline wate from cultivated areas in the vicinity of Baghdad should be removed and connections sho be made to the main outfall drain.

(5) Wastes from factories should be treated before being disposed of into the river.

(6) In areas which are not yet covered with sewerage networks where tankers are used for the removal of the effluent, these tankers should not be permitted to dispose of the material into the rivers directly, they have to be unloaded in selected areas away fro the town and populated areas.

It is suggested that the public sector should be prepared to replace the private agencie in the near future.

The means and problems of preventing poll waters from cities

O. T. Bolotina

Abstract. One of the tasks most urgent for the conserv water bodies by waste water discharged by the sewers of l wastes are prevalent in urban waste water, but a substanti fluents is expected. At the same time the volume of dom cause houses will be equipped with more modern amenitie evaluating future trends the joint treatment of domestic a

The processes responsible for the quality of the water but the decisive one is the discharge of urban waste water, at the sources of the pollutants and that the observance o collection and treatment of waste waters is strictly supervi

With respect to future techniques we think that the cla waste waters will be adequate to preserve the quality of w treatment by filtration through sand is perhaps necessary substances will be necessary for large flows of waste wate strict observation of established standards for the compos into the sewerage network is imperative. For the self puri necessary for the waste waters discharged to them to have

Les moyens de préserver les eaux de surface de la pollutio posés par cette protection

Résumé. Une des tâches les plus urgentes pour la con pollution des plans d'eau par les eaux usées déchargées pa Les déchets industriels prévalent souvent dans la composit peut espérer pour l'avenir une diminution substantielle de même temps, le volume des eaux usées domestiques va pr zones résidentielles seront mieux équipées, avec des matér situation présente et une évaluation pour le futur font pen des eaux usées domestiques et industrielles des villes.

Les processus responsables de la qualité de l'eau dans l nombreux facteurs, mais le facteur décisif est la décharge essentiel pour le contrôle de la pollution de partir des sou stricte le respect des normes établies aux différents stades usées. C'est le seul moyen d'assurer une protection effica proximité.

En ce qui concerne les futures techniques de traitemen complet classique des eaux usées urbaines sera suffisant p lacs et retenues. Un traitement supplémentaire par filtrati quelques cas. L'extraction des substances biologiques par d'eaux usées à forte concentration. Une stricte observatio des effluents industriels qui se déchargent dans les réseaux condition indispensable pour que les possibilités d'auto-ép pour venir à bout de la pollution résiduelle des eaux usées

Surface water bodies have been receptacles for wa paratively small volumes of waste waters polluted a water body hardly impared the quality as the or