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Research paper



Assessment of the Environmental Impact of Gharraf River in the Shat Shatra Area of Shatra District

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Abstract

Iraqi water resources are exposed to pollution due to the dumping of solid and liquid waste into the river without treatment. This is the objective of research to assess the environmental, social and economic impacts of the river. To achieve this goal, the method of direct assessment was adopted. In this way, the environmental impacts are determined, their nature and their interpretation in a quantitative or qualitative manner. Three study stations were selected for the period (four month September to December 2012). The models were withdrawn from the stations twice a month and their results were compared with Iraqi water standards and determinants. Most of the findings of the research are to comply with Iraqi water determinants and to have many environmental, economic and social impacts determined by the EIA method. The most important recommendations are the fencing of river banks in urban rivers and preventing the dumping of solid and liquid waste into the river without treatment.

Keywords: *environmental impact assessment, economic impact; social impact; Iraqi water standards.*

1. Introduction

The daily activity of man contributes to many problems faced by most rivers. These human-related problems lead to contamination of the river if left untreated.
The research tackled the types of environments affected by the projects, namely the natural environment, the built environment, the social environment, the economic environment and the aesthetic environment.
And the definition of environmental assessment and methods of environmental assessment is the method of direct assessment and matrices and composite maps.
And the study area in the district of Shatrah in the province of Dhi Qar, 2012 for the period from August to December..

2. Types of Environments Affected by Projects

2.1 Physical Environment

This refers to all that surrounds man, ranging from the living to the non-living phenomena. Mans' existence is virtually meaningless without the physical environment. These are represented in the environmental phenomena or data in (earth, terrain, climate, plant, water, soil [3].

2.2 Built Environment (Man-made Environment)

The constructed or artificial environment refers to all that man has added to the physical environment out of his workmanship, knowledge, and progress of the environmental elements. The artificial environment exists as a result of mans' interaction and exploitation of the resources of his natural environment [2].

2.3. Social Environment

This includes all the dominant systems and the different ethnic and social characteristics of the individual and the family [1].

2.4 Economic Environment

All economic factors such as levels of work and unemployment, income levels and sources, the economic basis of the region and its proximity provide the marginal factors of production and demand pattern, land value, taxes, economic management, and trade [8].

2.5 Aesthetic Environment

It is a secondary category and consists of many factors considered to be of great value, such as historical or archaeological areas or materials, landscapes, and recreation areas from which communities derive their happiness [9].

3. Environmental Impact Assessment (EIA)

This is an evaluation method for the detection of the negative and positive impacts of the concrete and comprehensive development plans on the environment (both immediate and remote, direct and indirect, global, local, and regional). These impacts are evaluated to address or prevent their harmful impacts on the environment and ascertain the beneficial impacts [5].

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3.1 Methods of EIA

3.1.1 Direct Method

Here, the environmental impacts are identified and interpreted either qualitatively or quantitatively, generally subject to personal intuition. The easiest methods of assessing the overall impacts of the project or intervention are to identify each environmental component that may be affected by the intervention, to identify the impacts of the intervention on those elements, and to describe the impact as follows: no impact, dubious impact (unclear), short-term impact, long-term impact, or rehabilitation status (irreversible impact (cannot be rehabilitated) or reversible impact (can be rehabilitated). This method will be used in this study for environmental assessment in the study area [6].

3.1.2 Checklist

This method employs series of transparent layers to identify, predict, and allocate near-impact hazards usually with a larger measure of reality where the baseline map is prepared for the public areas within the project site boundaries before preparing the transparent composite maps for the environmental elements that are likely to be affected by the project [7].

3.1.3 Composite Maps and Geographic Information Systems (GIS)

This method uses several transparent layers to identify, predict, and allocate near-impact hazards usually with a larger measure of reality where the baseline map is prepared for the public areas within the project site boundaries before preparing the transparent composite maps for the environmental elements likely to be affected by the project [10].

3.1.4 Matrix

Leopold Matrix is the leading method in the matrices for environmental impact assessment. This matrix is designed to be applied to several project alternatives or intervention in the environment so that the project with the least environmental impact is selected and implemented. The Sphere Matrix evaluates several topographical locations to determine the extent to which environmental elements are affected in each project or intervention and ultimately selects the best places to implement the project when it is clear that the environmental impact of the project on the elements of the environment is minimal. On the other hand, Interaction component Matrix is used to determine the reliability and interaction between environmental elements that characterize the different ecosystems [4].

4. Study Area (Gharraf River: Shatt al Shatrah)

The Dhi Qar province is located in southern Iraq, bordered by the Wasit province in the north, Basra province in the south, Maysan province in the east, and Muthanna province in the west. The province measures about 350 KM south of Baghdad, the Iraqi capital city. It has an area of about 12,900 KM^2 and a population of about 17.5 million people. Shatrah has a total area of about 206794 dunums, representing one of the largest areas in the governorate. The province is made up of 2 districts (Gharraf and Al-Dawa'iya) in addition to the city center. From the beginning of the Gharraf River in the Kut basin as a branch of the Tigris River to its entry into the Dhi Qar province, the river is exposed to many cases of abuse such as refuse and sewage disposal (Figure 1).
The beginning of Shatt al-Shatrah, especially in the center of Shatrah district, was chosen from Nazem Shatt al-Shatrah until it exited from the boundaries of the basic design of the city to represent the case study. Three stations were selected for study and observation, and water samples were drawn from these stations as shown in Figure 2.

4.1 Sampling and Methods

The water collected from the Shattra River was evaluated for both physical and chemical properties at the laboratory of the Directorate of Environment of Dhi Qar. The water sample was tested for pH level, phosphate, sodium, nitrate, dissolved oxygen, magnesium, calcium, sulfur, chlorides, potassium, total soluble salts, and sulfates. The water samples were collected from the River surface of the 3 stations at a depth of about 30 cm and at a distance of 1-3 m from the River edge. Clean 1.5-liter PET bottles were used to collect the water samples for the physical and chemical tests. The nozzles of the bottles were closed to prevent air entry. After collecting the water, few drops of chloroform (preservative) were added to the collected samples and homogenized. The necessary information was recorded on each vial. The results of the water quality tests were compared with the standards of the Iraqi environment in the river maintenance system for the year 1967 .



Fig. 1: Study Area

4.2 Assessment of the Environmental Impact of Waste on the Shattra

The environmental influence of dumping household and agricultural wastes into the Gharraf River was specifically evaluated using a direct method. The environment was evaluated for all the environmental elements of surface water quality, including natural plants/organisms, wildlife, groundwater, and archaeology. The health and socio-economic implications of land use were evaluated to check the extent of damage due to continuous and extensive refuge dumping in these water bodies. Table 1 shows the impact assessment using the direct method of assessment.
The most notable observations from the study are as follows:

- The water in the river is polluted but within the limits of the law of Iraq. This has led to the migration of species of birds and the extinction of fish species.
- There is visual contamination due to household waste dumping into the river.
- Pollution of surface water will lead to the contamination of groundwater.
- Migration of human stability.

- Deterioration of public health and the emergence of diseases such as typhoid and diarrhea.



Fig. 2. Three stations for study and observation

5. Conclusions

The following conclusions were drawn from the study:
1. The water quality in the studied stations was in accordance with the standards and determinants of the system for rivers and public water protection from pollution No. 25 of 1967 according to the criteria and determinants of physical and chemical properties developed in the system. This contradicts the hypothesis of the research which considered that the water in Shatt al-Shatra does not meet Iraqis' standards and limits.
2. Self-purification of the river reduces the impact of wastewater on the river Gharraf and Shat al-Shatrah.
3. There are impacts on the social, economic, and cultural environment.
4. Pollution of surface water will lead to contamination of groundwater.
5. Pollution will lead to migration of human settlement.
6. There will be a deterioration of public health and the emergence of diseases such as typhoid and diarrhea.

Table 1. Environmental Assessment Impact

Type of impact	Cumulative impact			Zone of impact	Duration of impact		Size of impact	Classification of impact		Nature of impact		Impact Estimation Indicators
	no	yes	Local	Regional	Short-term	(durable		Indirect impact	Direct impact	positive	negative	Environmental component
	1-Natural environment											
The deterioration of water quality leads to the death of several aquatic organisms, especially those that are sensitive to water quality changes.		√	√	√		√	Big		√		√	Aquatic
Water quality deterioration and low water levels affect aquatic lives.		√	√	√		√	Big		√		√	Fish
Low water level and water pollution and caused the migration/extinction of numerous birds and wildlife.		√	√	√		√	Middle		√		√	Wildlife

The deterioration of the quality of surface water due to dumping of household waste may cause the leakage of polluted surface water to into the groundwater.	√		√	√	√		Few		√		√	Under-ground water
Deterioration of Gharraf and Shatrah River water quality due to dumping of refuges have serious impact on the existence of both natural plants and plantations.		√	√	√		√	Big		√		√	Natural plant
	2-Man-made environment.											
Through several changes in the and use around the river banks for recreation and exploitation as service stations.	√		√		√		Middle		√		√	Land use
	3-Aesthetic environment.											
The aesthetic nature of the river may be affected by changes in the river color due to the dumping of solid wastes on both sides of the river.	√		√		√		Big		√		√	Recreation
	Socioeconomic environment 4-											
The deterioration Gharraf and Shatra River water quality have led to the deterioration of the quantity and quality of fish stocks.		√	√	√		√	Big	√			√	Fishing
The degradation of agricultural land has led to the migration of human settlements and changing livelihoods.		√	√	√		√	Big		√		√	Migration of human stabilizers
The deterioration of the quality of water leads to significant health impacts on citizens and the spread of diseases, especially diseases transmitted by water such as diarrhea, typhoid, and others.		√	√	√		√	Big		√		√	The health

Recommendation

To preserve the quality of water in the studied rivers, the following recommendations are necessary:
1. Blending the banks of the rivers in urban cities through which the rivers pass to protect them from abuses and maintain their quality..
2. Preventing citizens from discharging wastes directly into the rivers.

References

[1] Al-Baghdadi, Abdul-Saheb Naji, *An Analytical Study of Urban Environment Problems (Case Study: Al-Thawra Region in Hilla City)*, Kufa Journal of Literature, Volume 1, No. 10, Najaf (Iraq).

[2] Ossar Mnour, Ben Hadj Jilali, *Environmental Feasibility Study for Investment Projects*, Journal of North African Economics No. 7, Algeria, 2009, p. 335 .

[3] Abdel Maqsoud, Zinedine, *Environment and Man Study in Human Problems with his Environment*, Alexandria, 1997, p. 7.

[4] Gharaibeh, Sameh Gharaibeh, Yahya Farhan: *The Introduction to Environmental Sciences*, Fourth Edition, Amman, Dar Al-Shorouk, 2008, p. 434.

[5] Ghraibeh, Sameh Gharaibeh, Yahya Al-Farhan: *The Introduction to Environmental Sciences*, Fourth Edition, Amman, Dar Al-Shorouk, 2008, p. 430.

[6] Gharaibeh, Sameh Gharaibeh, Yahya Farhan: *The Introduction to Environmental Sciences*, Fourth Edition, Amman, Dar Al-Shorouk, 2008, p. 434.

[7] Abbasi S. A, Arya D.S., *Environmental Impact Assessment(Available Techniques, Emerging Trends*,1st edition, New Delhi (India), Discovery Publishing House,2004, p.7.

[8] Barthwal R.R, *Environmental Impact Assessment*, New Delhi (India), New Age International (P) Limited Publishers l, 2002, p.6.

[9] Barthwal R.R, *Environmental Impact Assessment*, New Delhi (India), New Age International (P) Limited Publishers l, 2002, p.7.

[10] Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt Richard A. Carpenter, *Environmental Impact Assessment for Developing Countries in Asia*, volume 1-, Manila(Philippine), 1997, p.3-25.