

# Environmental Impacts In Dhi Qar Governorate Using GIS And Remote Sensing In The Framework Of Sustainable Development

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## ABSTRACT

Geographic Information Systems (GIS) and remote sensing are essential tools in assessing and managing environmental impacts in Dhi Qar Governorate within the framework of sustainable development. These tools improve the understanding of environmental changes and provide accurate data to support decision-making. Environmental analysis using these techniques includes monitoring changes in land use, managing water resources, and monitoring environmental pollution. GIS and remote sensing enable improved urban planning, natural resource management, and natural hazard analysis, supporting sustainable development by improving management strategies and reducing negative environmental impacts.

## INTRODUCTION

Cities have developed significantly in recent years and the city is still the distinctive place for that development, as it has become known as a comprehensive and rapid growth, so the population and activities must be distributed according to the preparation and planning processes and the best models must be developed to organise cities and governorates and conceive the appropriate size and control the growth process and avoid the negative consequences that affect rapid growth and the trend towards urban planning within the administrative boundaries of cities and spatial planning at the governorate level. The study of the concept of sustainable development is done through the study of the systems that deal with it, in every city, village or governorate there are two basic systems interconnected with each other in which humans live, namely the social and economic environment system and the natural environment system, sustainable development means a balance between the social, economic and environmental aspects as well as between current and future interests. This research highlights the importance of using GIS and remote sensing to analyse and address environmental issues in Dhi Qar Governorate, and to promote sustainable development through strategic planning and effective resource management.

### Problem of the study

1.2 What are the pillars of sustainable development followed to preserve the environment using GIS and remote sensing?

2- What are the obstacles facing sustainable development in Dhi Qar Governorate?

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### Hypothesis of the study

1. The study area contains many natural and human components that have affected the environment.
2. Lack of a clear strategy for sustainable development
3. A development strategy can be developed based on the potential available in the governorate, which aims to sustain and preserve resources.

### Aims of the study:

1. Highlighting the potential that the governorate possesses, whether in the natural, human or economic aspect and its impact on the environment. And invest them in sustainable development processes in the governorate.
2. Selecting the best strategic plans and alternatives to achieve comprehensive sustainable development in the governorate.
3. Methodology of the study:

- Descriptive-analytical approach: To explain the theoretical aspects of the research and convey a realistic picture of the subject of the study

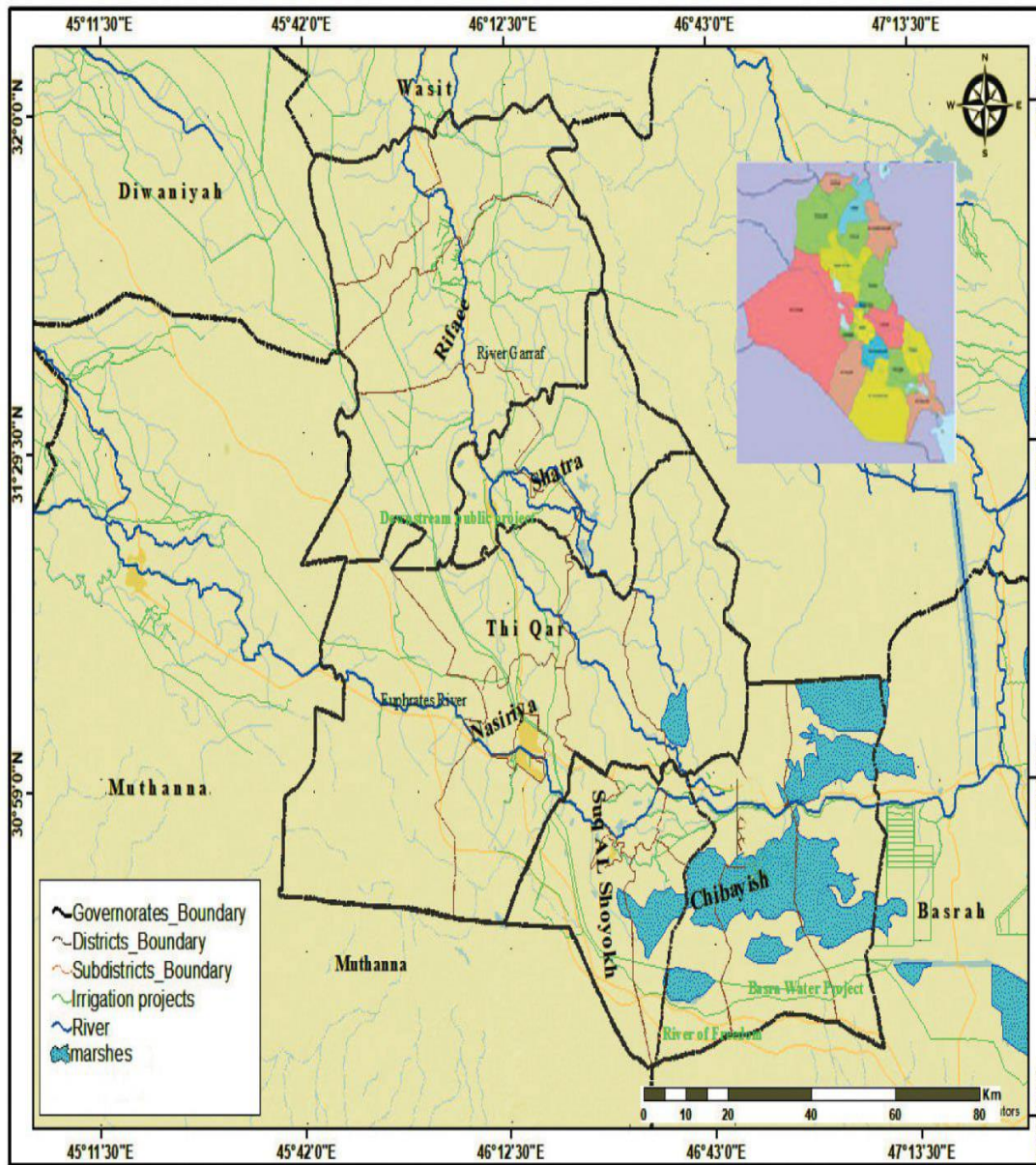
4- Study Boundaries: Dhi Qar governorate is geographically located in southern Iraq, bordered by Wasit governorate to the north, Qadisiyah governorate to the west, Muthanna governorate to the west and southwest, Basra governorate to the south and southeast, and Maysan governorate to the east. As for the astronomical location, it is located between the longitude

( $40^{\circ} 38' 45''$  -  $40^{\circ} 09' 47''$ )

north ( $20^{\circ} 33' 30''$  -  $02^{\circ} 32''$ ) it extends between latitudes

As shown in map (1)

### *Map (1) The Location of the Study Area*



**Source:** The General Authority for Survey, the administrative map of Iraq, Baghdad 2002, the scale of the drawing is 1:1000000 .

**Definition of sustainable development:**

Sustainable development is the process of developing land, cities, communities and businesses, provided they meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development is an overarching concept that relates to many economic, social and environmental aspects.

The concept of sustainable development: The concept of sustainable development includes several dimensions, including

1- The economic dimension:

- Achieving sustainable economic growth that meets the needs of society.

- Increasing job opportunities and achieving a fair income.
- Preserving natural resources and ensuring their sustainability.

2- The social dimension:

- Achieving social justice and providing equal opportunities for all.
- Improving the level of education, health and social services.
- Promoting gender equality and empowering women.

3- Environmental dimension:

- Preserving biodiversity and natural resources.
- Reducing pollution and maintaining the quality of air, water and soil.
- Adapting to climate change and minimising its negative effects

Sustainable development can be defined as that activity that leads to maximising social well-being while preserving available natural resources and minimising damage to the environment. It differs from traditional development in that it is more complex and intertwined with economic, social and environmental issues. The goal of sustainable development policy is to apply a method of production that is homogeneous over time and human-centred, the concept of sustainable development means an integrated strategic approach based on the concept of double solidarity.

-Solidarity in place: Solidarity between resource-rich and resource-poor regions.

- Solidarity in time: Solidarity between yesterday, today and tomorrow, i.e. economic and social decisions and plans are interconnected with each other.

The balance of the ecosystem must be based on the following pillars: -

1. Eco-efficiency, which is the automatic ability to produce without exceeding nature's carrying capacity, i.e. preserving natural resources and avoiding excessive depletion of renewable resources.
2. Social justice, i.e. justice in distribution, which means delivering social services to those in need and achieving gender equality for all segments of society.
3. Economic efficiency means producing goods and services continuously and preventing any social disruption resulting from economic policy.

Therefore, sustainable development is an interconnected strategic approach that harmonises the process of resource utilisation and seeks to serve all humanity throughout the distant future.

### **Advantages of sustainable development in the study area**

Advantages of sustainable development in the study area: Sustainable development is the ability to continue and communicate through its use of natural resources, which occurs through the existence of an integrated strategy that determines the process of exploiting natural resources, sustainable development represents the relationship between economic activity and its exploitation of natural and environmental resources in production processes and the reflection of this on the lifestyles of individuals and societies in order to achieve good outputs of economic activity, and sustainable development includes rationalising the use of natural and environmental resources to ensure their sustainability and safety without negatively affecting lifestyles and their development, that is, meeting the needs of current generations without

Sustainable development in Dhi Qar Governorate has several features that make it an effective strategy for balancing current and future needs, while preserving natural resources and the environment. Sustainable development in the study area is characterised by several features including:

**1. Balanced and inclusive development:**

- Meeting the needs of the poorest: Sustainable development focuses on improving the living conditions of vulnerable and marginalised groups in society by providing employment opportunities and basic services.

Balanced economic development: It aims to achieve sustainable economic growth that includes all economic sectors, with a focus on high-potential sectors such as agriculture and tourism.

**2- Thoughtful and long-term planning:**

-Organised urban planning: Sustainable development contributes to improving urban planning, which helps to develop infrastructure and public facilities in a coherent and sustainable manner.

-Strategic Vision: It relies on the development of long-term plans that aim to achieve sustainability of resources and improve the quality of life for the population in the long term.

**3-Conserving natural resources:**

-Management of water resources: The use of modern techniques in the management of water resources, such as advanced irrigation systems and water recycling, to ensure the sustainability of these resources.

-Preserving biodiversity: Protecting natural areas and biodiversity by establishing nature reserves and encouraging environmentally friendly agricultural practices.

**4- Promote environmental education and awareness:**

-Education programmes: Introducing educational and training programmes that focus on the importance of sustainable development and environmental conservation, thereby enhancing future generations' awareness of the importance of natural resources.

-Community Awareness: Awareness campaigns targeting all segments of society to raise awareness of the importance of preserving the environment and adopting environmentally friendly practices.

**5-Technology and innovation:**

-Using modern technology: Applying modern technologies such as geographic information systems (GIS) and remote sensing to analyse environmental data and plan development projects more effectively.

-Encourage innovation: Support innovative projects that contribute to achieving sustainable development, such as renewable energy and sustainable agriculture.

**6-Collaboration and Partnerships:**

- Local and international partnerships: Promote cooperation between the public and private sectors, as well as with international organisations, to achieve the SDGs through the exchange of expertise and resources.

-Community Participation : Involving the local community in the planning and implementation of development projects, thereby increasing the effectiveness and efficiency of these projects.

**7-Improving the quality of life:**

-Health services: Developing the health system and providing comprehensive health care for all, which contributes to improving the health and well-being of the population.

-Social services : Providing social services such as housing, education and transport in a sustainable manner, thereby raising the standard of living of the population.

**The importance of Geographic Information Systems (GIS) in sustainable development:**

Geographic Information Systems (GIS) play a vital role in achieving the SDGs by providing advanced tools and techniques for spatial data analysis and resource management. GIS directly contributes to sustainable development by improving planning, resource management, monitoring environmental changes, emergency response, and promoting economic and social development. GIS enables a comprehensive and accurate understanding of the environment and society, supporting the achievement of the SDGs in effective and thoughtful ways.

Dhi Qar governorate has many natural, human, and economic resources and is considered one of the regions rich in natural and human resources. These resources include:

1- Natural resources: -

- Oil: Dhi Qar governorate contains large oil reserves, as there are many oil fields such as Gharraf and Nasiriyah.
- Water: The governorate benefits from river water resources, including the Euphrates River, which contributes to agriculture and provides fresh water.
- Energy: In addition to oil, there is interest in developing renewable energy projects, such as solar energy.

2- Human Resources:

- Labour force: Dhi Qar has a large population, providing a broad base of labour in various sectors, from agriculture to industry and services.
- Cultural expertise The governorate is home to many cultural and artistic skills that date back to a long history of civilisation.

3- Economic Resources:

- Agriculture: Fertile land and suitable soil make agriculture a major activity, where various crops such as wheat, barley, and vegetables are grown.
- Trade: The geographical locations contribute to promoting trade through links with other regions in Iraq.
- Tourism: Dhi Qar contains important historical sites such as Ur, an archaeological city dating back to the Sumerian civilisation, which opens the way for the development of the tourism sector.

These resources make Dhi Qar Governorate strategically important in Iraq and provide it with great opportunities for growth and development in various fields. Proper planning and thoughtful development help improve the quality of life and ensure the sustainability of urban growth, leading to the creation of more efficient and attractive cities for citizens and investors.

**Environmental issues:**

In recent years, the natural environment has deteriorated significantly and this deterioration continues on a daily basis as air pollution increases with fumes, smoke and toxic gases, water pollution in seas and rivers, air temperatures rise, congestion and noise pollution increases, depletion of natural resources increases, rates of deforestation increase and thus the circle of desertification increases, the study area suffers from many environmental issues which in turn affect the sustainable development in the governorate that environmental degradation, desertification arises from the mutual interaction between natural and human factors that affect the formation of environmental conditions and desertification is the deterioration of the.

**There are several factors that lead to environmental pollution in general:**

## 1- Contamination of the soil with agricultural pesticides:

Agricultural pesticides that are used to control agricultural pests or control pests that transmit diseases affecting humans, plants and animals. The soil is also contaminated by chemical fertilisers that are used to increase the fertility of the soil, and the excessive use of chemical fertilisers leads to adverse results and consequently there are losses. The pollution of surface water sources in Dhi Qar Governorate leads to an increase in the phenomenon of accelerated plant growth and the occurrence of oxygen deficiency and rotting lakes, the availability of fertiliser in excess of the plant's need is absorbed by the plant and this affects the poor taste, increased soil acidity and adverse results that affect plant growth and give less yield.

2- Pollution from the air: The atmosphere of the study area is polluted by nitrogen oxide and hydrocarbons released from transport and power generators. The most important industrial facility is the Dhi Qar Steam Plant on the Euphrates River to generate electricity.

3- Pollution of the environment with solid waste: Burying solid waste in the ground has a negative impact on the environment, and solid waste is represented by (household waste and factory waste consisting of the remains of raw materials used in industry or from manufacturing waste such as wood, aluminium, paper and cardboard scraps. Water pollution, such as pollution that.

It is observed that the inhabitants of the area suffer from cancerous diseases and skin diseases due to the dumping of polluted water into the Euphrates River before the withdrawal of liquefaction water for the residential complex, the watercourse is polluted through pollutants that are thrown from the population living near the water body and these pollutants are human or animal waste that causes pollution of the watercourse. These environmental impacts negatively affect all components of the environment, including soil and human beings, and this leads to poor productivity of agricultural lands in the study area.

**Image (1) Sewerage pipe in the study area****CONCLUSIONS:**

- 1- Dhi Qar Governorate suffers from a weakness in the skills and expertise of the labour force to achieve development goals in all fields in various specialisations.
- 2- The main sectors in the governorate suffer from the policy of commodity dumping of imported goods

Taking advantage of the acute shortage of the local product and its low competitiveness.

The occurrence of these cases that work to destroy both industrial and agricultural production in the governorate

3- The means of transport in the province suffers from weakness and the current transport policies depend on private vehicles with fossil fuels that cause pollution in the environment, the lack of rapid transport means such as metro and express bus and the low efficiency of land transport roads, as the majority of roads are not paved and suffer from a large deficit, where we notice the high percentage of **unpaved roads with a very high deficit, which indicates weakness in the road network** and indicates a clear imbalance in transport, and therefore these indicators do not achieve the lowest level of sustainable development in the province.

4- Dhi Qar governorate is characterised by the presence of many tourist areas and archaeological sites

and heritage sites, religious shrines and natural potentials, but they are not optimally exploited to achieve the goals of sustainable development in the province.

### **Recommendations**

In order to achieve the goals of sustainable development in Dhi Qar Governorate, the study proposes a set of proposals that contribute to achieving the dimensions of economic, social, environmental and institutional sustainable development in the governorate, through the following: -

1- Working to invest the natural resources and potentials available in the governorate in a sustainable manner, relying on scientific methods in planning and developing balanced development policies that ensure the development of all sectors in the governorate to achieve sustainable development and welfare of the population.

2- Building a geographical database and a comprehensive strategy to build digital and cartographic models for sustainable human development in the governorate, and building a detailed geographical database at the level of the smallest administrative unit within the governorate based on the latest technologies and modern software, to provide information and facilitate the work of researchers and planners to draw development plans in order to advance the development reality and achieve comprehensive and sustainable development in the governorate.

3- Paying attention to trained cadres because of their impact on achieving sustainable development in the governorate

Disposal of solid waste by modern methods through the provision of sufficient and diverse mechanisms and manpower, setting timelines for the movement of vehicles, recycling and recycling scrap and garbage and exploiting them to provide income and create job opportunities instead of burning them and polluting the environment, with attention to planting plants.

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