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# Analysis of the environmental reality of the marshes and its sustainable development

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## Abstract

The study of the reality and concept of the environment of the marshes, both natural and human, and both sides complement each other in terms of the mutual influence between man and the environment, and that this influence refers to the process of adaptation practiced by man to the natural environment, which tries to harness for him to achieve goals, most of which are economic, which are not without harm to the environmental reality of the marshes. Such as overfishing and destruction operations such as the drying of large areas, and the reason lies in the lack of interest on the part of governments and ministries concerned with protecting the marshes from various environmental violations and their attempt to develop them. Its geographical location and its origin, as for the second topic, we touched on the most important environmental problems that the marshes suffer from in Iraq, and the methods of dealing with the deterioration occurring in the environment of the marshes were included in the third topic. In addition to the suggestions and conclusions and a list of sources and references.

**Keywords:** *Marshes, destruction, environmental pollution, Poaching, Scientific Planning.*

## 1. Introduction

The first text in which the marshes were mentioned in the Epic of Gilgamesh, written five thousand years ago in the Sumerian language. Gilgamesh is the king of Uruk of Warka. In the epic confirmed by biblical texts, we find Gilgamesh building a boat from papyrus reeds and coating it with tar. The marshes are inhabited by about one million Iraqi citizens belonging to the original Arab tribes. As for the inhabitants of the depths of the marshes, they are called the Madan, and their life is similar to the life of the nomads. The inhabitants of the marshes generally depend on fishing, rice cultivation and buffalo breeding[1].

The Iraqi marshes represent the largest wetland ecosystem of its kind in the Middle East and Western Asia. It consists of a group of connected lakes and swampy lands, in the lower part of the Euphrates and Tigris basin, which historically extended over an area of more than 20,000 km<sup>2</sup> from Iraq and Iran [1].

One of the most prominent challenges facing the marshes is due to water scarcity, drought and the absence of water-sharing agreements with neighbouring countries, the deteriorating water quality in the Tigris and Euphrates rivers as a result of sewage and industrial pollutants, saltwater intrusion from the Arabian Gulf, the lack of effective policies from the central and local governments, and the lack of coordination between them to perpetuate, preserve, develop and advance the marshes, and they lack sustainable development for all life facilities in them. note that it possesses the elements of development such as arable soil, water resources, population, and others

### 1.1 Research problem

The research problem includes:

1.1.1 Does the marshes have a role in the environmental reality and is it possible to develop their environment sustainably according to their natural.

1.1.2 The drying of marshes and their role in damaging the environment and depleting its wealth, as the water share that feeds the marshes is reduced and the concentration of salts and chemical elements increase.



### *1.2 Research Hypothesis:*

Human and environmental activities interact, and this, in turn, led to the study taking the environment a great deal. The marshes environment in southern Iraq is an integrated environment in terms of population, animal and plant resources and nature, creating an ecological balance in it. The marshes have a positive impact on the environment, as they are a good source of animal food and vegetarianism and has a role in its development.

### *1.3 Marsh definition:*

Marshes are freshwater bodies covering vast areas in Iraq that have known a distinct human civilization dating back about 6000 years, in which diverse living organisms live, such as birds, about 81 species, along with fish, wild animals and livestock. It has forests and aquatic plants due to the flow of the waters of the Tigris and Euphrates rivers to it. The lagoon is a shallow water body less deep than the lake. In terms of area, some marshes have a surface area that is either larger or smaller than the lakes. The lagoon is characterized by large seasonal changes in area and depth [2]. The marshes are a group of wetlands or picturesque bodies of water fed mainly by the Tigris and Euphrates and extend in southern Iraq in a triangular shape between the cities of Al-Amarah in Maysan Governorate, Nasiriyah in Thi-Qar Governorate and Basra in the same governorate.

They are a group of water bodies that cover the lowlands located in the south of the Iraqi alluvial plain, and it is in the form of a triangle. The major cities within the marshlands are; Al-Amarah, Nasiriyah, Basra, Thi-Qar and Maysan. The area of land covered with water expands at the time of the flood, in late winter and during the spring, and the days of the Chihod shrink. Its area ranges from 35-40 thousand square kilometres. The early Arabs called these areas "Al-Bataeh", the plural of Buta'ha because the water in it fell, that is, it flowed and expanded in the ground and reeds were growing there. On July 17, 2016, UNESCO agreed to add the marshes to the World Heritage List as an international nature reserve, in addition to the ancient archaeological cities located near them, such as Ur, Eridu and Warka [3].

### *1.4 Causes of the deterioration of the marshes:*

Despite all this environmental richness and ancient human history, the marshes - especially the central one - have been exposed for a long time, specifically since the mid-seventies, to various forms of neglect and dissipation, to the extent that these marshes are now threatened with demise or gradual disappearance. The reasons for this decline vary between historical reasons and external and internal reasons. The historical reasons are represented in the practices of the regimes that previously ruled Iraq, which is equal to what happened during the era of the previous regime when large parts were drained to stop the rebellion movement that spread in the region in the early nineties, with the ambitions and bourgeoisie of the American ruler of Iraq after the occupation, who harnessed all his efforts and interests To control Iraq's capabilities and facilitate the task of oil companies in obtaining concessions in the marshes and other Iraqi regions [4]. As for the external reasons, they are represented in the construction of several dams in Turkey and Syria. Consequently, the incoming water flows through the tributaries of rivers and waterways, which represent a lifeline for them, have stopped, as well as the lack of rainfall and water scarcity due to increased drought.

Its houses: They are built on the surface of the water completely from reeds, the area of which does not exceed the area of the house (the hut) that is built above it. Those islands are called (Ashman), which is a Sumerian word meaning hill. Some of them are made of mud-built on the edges of the marshes.

### *1.5 Disagreement over its origins and consensus on its importance:*

The subject of the marshes has gained great importance, especially after its nomination to join the World Heritage List, which is the Al-Hawizeh Marsh in Maysan Governorate, as well as the West Hammar Marsh in Thi-Qar Governorate.

Marsh is a local term used to refer to swamps and marshes scattered near the mouth of the Tigris and Euphrates in southern Iraq. Underground water, which is usually close to the surface of the earth, the groundwater seeps into it and in this case, it is called swamps (Marches), but if the level of the ground is slightly higher than the level of the groundwater without interrupting it, then Sobkhas appear, which are wetlands that are difficult to cross. The soil of the marshes is fertile consisting of silt, heavy clay of water and wet bodies. Examples of these ground features are the Hammar swamp, which is about 28 km long and about 5 km wide. It is located near the confluence of the Tigris and Euphrates rivers in the southernmost part of Iraq. It is a huge swamp that extends in an east-west direction [5].

### 1.6 How the marshes arose:

Archaeological investigations confirm when the marshes were present and healthy and after drying them by the previous regime, that large parts of the marshes of the governorates of Nasiriyah and Maysan were dry land exploited for agriculture, and there were some permanent swamps confined, especially in Maysan governorate, and the evidence for this is the spread of archaeological sites in them. In the Hammar Marsh, whose area is estimated at one million and forty-eight thousand acres, we were able to install 122 archaeological sites between small and large, and the history of some sites dates back to the era of the dawn of the Sumerian dynasties, i.e. around 2800 - 2350 BC., Al-Sidinawiya, Kerma Bani Said, and these sites were either submerged in a marsh surrounded by water, depending on their height. As for the governorate of Maysan, there are 48 exposed archaeological sites, most of which date back to the Parthian and Sassanid eras, and some of them are older, dating back to the first millennium BC. These sites are spread in the Al-Hawiza marsh, Al-Wadiyah, Al-Shaheen, Buraydah, etc., which are like its sisters in the marshes of Nasiriyah. Either it was immersed in the lagoon or surrounded by water. The views of the scientific community have varied, as one of them is likely to say that the sedimentary plain in southern and central Iraq was a sea in the Old Stone Age, i.e. about half a million years ago, and this sea began to retreat towards the south due to sediments and silt coming from the Tigris and Euphrates Rivers and their tributaries, and thus the plain appeared. The sedimentary in its current condition, and the owners of this opinion used to say that the marshes in southern Iraq are the remains of that sea [6].

That the areas of the marshes were dry land on which the Iraqis lived and practised their economic and social activities and built their future civilization as in the rest of Iraq, In the same way, the two rivers and their tributaries were engulfed by a massive and unprecedented tyranny, and the major dams and irrigation projects that were neglected due to the weakness of the Sasanian state in the late days of its rule were destroyed in Nahrwan and the old great dam as well as the old Diyala dam and other areas. To wide marshes extending like the sea, these marshes became known at that time as Bataeh. Arab historians and townspeople described them extensively and included them on their maps. The rate of advancement of the delta was at a rate of (1, 6) km every seventy km and every thirty years during ancient times [7].

### 1.7. Location and area of the search area:

The marshlands are located between latitudes  $50^{\circ} 30'$  and  $50^{\circ} 32'$  in the north, between the Iranian border in the east, and the edge of the plateau in the west. Among the most important marshes in Iraq:

The governorates of (Maysan - Basra - Dhi-Qar) occupy the area of these three governorates (48,042) km<sup>2</sup> and constitute (8,5%) of the area of the three governorates distributed as the basis of their small administrative units, amounting to 20 districts within the three governorates in which the marshes region is located, which are governorates (Maysan - Dhi Qar - Basra), which are considered the centres of spatial and population balance [8]. The surveyed Iraqi marshes include: first; Marsh Al-Dalamj, one of the marshes south of the Euphrates, second; The marshes of Maysan, third; The marshes in Al-Chbayish.

1.8 Marshes are divided into two groups: The first group:

*1.8.1 First:* The group of marshes located east of the Tigris River, the most important of which is Al-Hawizeh. Its area inside Iraq is about 2,863 km<sup>2</sup>.

*1.8.2 Second:* The marshes located to the west of the Tigris, the most important of which is the Hammar marsh, which has an area of about 2441 km<sup>2</sup>.

The Euphrates marshes extending from Al-Khidr to Al-Kifl between the two branches of the Euphrates (Al-Hilla and Al-Hindiya). It consists of several small marshes. The total area of the marshes, its estimates ranged between 9,000 and 20,000 km<sup>2</sup>, and the inhabitants of the marshes live on small natural or manufactured islands in the marshes, and they use a type of boat called Mashhouf for their movement and travel. The environment is considered a good source to provide a lot of food from fish, birds and agricultural materials that depend on the abundance and sustainability of water such as rice and sugar cane. Table (1).

Table (1) water areas of the southern Iraqi marshes for the year 2017

Marsh's Name	Area/ Km <sup>2</sup>
Middle Marsh	1800
Hammar Marsh	2433
Al-Sanaf Marsh	11
Al- Hawizeh Marsh	2608
Total	6852

Source: 1- Satellite visuals of the American satellite Landsat (1.2.5.7) for different years and with different sensors from the previous version. Landsat 8. The distance and mapping were calculated based on the GIS program.

2- Ministry of Water Resources, Marsh Recovery Center, Studies and Design Department, unpublished data for the year 2012.

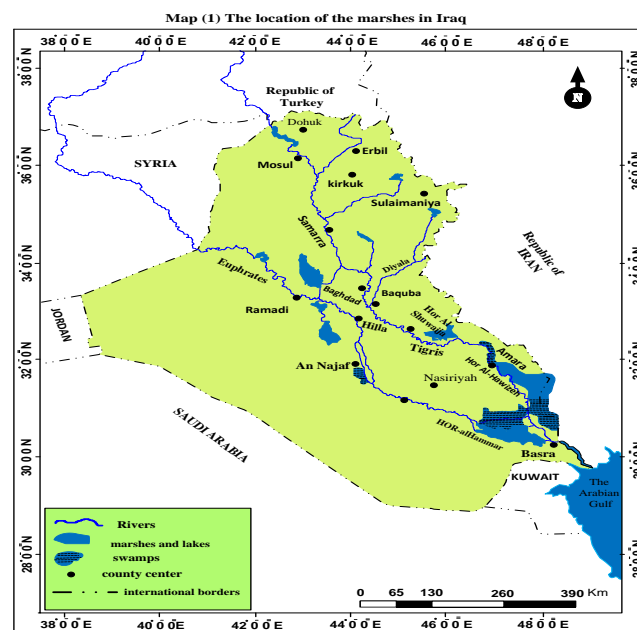
3-Hussein Alewi Naser Al Ziadi, The marshes of southern Iraq land and population, Alfaihaa for print and publishing, 2019.

### The idea of draining the marshes:

Draining the Hammar Marsh appeared in the report of William Wilcox in 1911 when he proposed to implement linking the end of the Euphrates River in the Al-Tar area with the exit of the Hammar Marsh in the city of Al-Jbayish and placing a plug for this stream on both sides to deprive the Hammar Marsh of its most important water sources. This proposal was implemented in the eighties of the last century in the name of the excavator The draining of the Hammar Marsh also appeared in the report of the Tebet and Partners Company in 1958 under the name of the irrigation and saltwater drainage project, and it was exposed to drying in the nineties of the last century, specifically after the 1991 uprising or what is known as the popular uprising, as punishment for the marsh residents who rose against the former regime. Map (1). Only 4% of its total area remained after draining 96% of it. However, the current government has started projects to develop the marshes, as the marshes are now considered one of the most beautiful tourist areas in Iraq [9].

### 1.9 The importance of the lands of the marshes and the elements of sustainable development in them:

Sustainable development: It is the process of developing the land, cities, communities and all human activities in order to meet the needs of the present without compromising the ability of future generations to meet their needs. Iraq faces the danger of environmental degradation, which must be overcome without abandoning the needs of economic development, as well as equality and social justice.



Source: 1- Republic of Iraq ,Ministry of Health and Environment (2011)  
2- Ministry of Irrigation ,General. Establishment for studies and design(G.E.S.D) ,Shatt Al - Arab project Feasibil Report Draft, studies of salinity problems, part A. Text olservices co . Basrah, Iraq, 1979,pp151-155.

**The importance of the marshes lies in Iraq, as it is a unique human community supported by natural resources for the unity of the ecosystem and possesses the elements of sustainable development.**

- 1- The traditional way of life continued by the Arabs of the Marsh or Madan has remained this way for thousands of years.
- 2- The recorded history of the same region, as well as the beginnings of world history, beginning with the history of Sumer, which documented the reed houses (the hostel) and the longboats (the Al-Mashhouf) and it has been immortalized for more than 5000 thousand years.
- 3- The marshes provide an environment for the traditional agricultural production of millet, rice, and vegetables and the appropriate and permanent benefits of environmental resources, hunting birds and grazing cows.
- 4- The development of unique knowledge, which is how to manage and benefit from the natural environment of the water areas.
- 5- Animals and the diversity of living things:

The habitat of the marshes is of importance to a large number of living organisms as it has a worthy contribution to biodiversity and also contributes to supporting the migration of continental birds to the region because it supports the rare living organisms that are endemic to it in the essence of the important fact on the production of rare organisms and when they are lost they will be lost forever. The Hammar and Al-Hawizeh marshes together are likely to provide the environment for two-thirds of the wintering wild birds such as geese and ducks in the Middle East. They are among the important areas for the gathering of migratory waterfowl between the breeding grounds of Western Siberia and Central Asia, as well as the winter quarter in Africa. The marshes are one of the eleven non-marine water areas in the international classification as an endemic bird area, as they provide the world sector for these creatures with two types of creatures, the Basrah Reed Warbler and the Iraqi Babbler. On this basis alone, the marshes are of global importance to birds in terms of biodiversity [10].

*1.9.1 The natural environment in the marshes and its role in sustainable development:*

The Tigris and Euphrates rivers are the main sources of water in the marshes, in addition to the flow of several main tributaries from Iran towards the Tigris and Hawiza. From the top of the upper Mesopotamian plain to the Gulf, the rivers turn slowly.

Biodiversity and the marshes that it possesses are essential for sustainable development:

*1.9.2 The environment of the marshes is home to many organisms* that can be adopted in the development of the marshes, as more than 95 species of fungi live in it, more than 260 species of phytoplankton, parasitic and algae, (51) types of aquatic plants, and about (89) species of zooplankton and (92) of the large invertebrates and more than (41) species of migratory river and marine fish, including more than (159) species of protected and migratory waterbirds and more than (18) species of protected plants [11].

*1.10 Obstacles to sustainable development in the marshes:*

Some areas of the marshes suffer from the presence of war remnants and unexploded bombs, especially the marshes east of Al-Hammar, adjacent to the city of Souq Al-Shuyoukh [12] The exposure of the marshlands to the phenomenon of desertification is a destruction of the Earth's atmospheric energy, and it can lead to the end of desertification being complete, and it is a manifestation of the widespread deterioration of environmental systems that leads to a diminishing of the Earth's vital energy represented in plant and animal production [13]

The marshes have a positive impact on the environment, as they mean a good source for providing food resources from fish, birds and agricultural materials that depend on the abundance and sustainability of water such as rice and sugar cane [13] and fish is one of the most important elements of livestock in the marshes area, and its abundance and types are livestock, as they are Provides income for many fishermen who inhabit the marshes [14].

Human and environmental activities interact, and this, in turn, led to the study of the environment taking a large space, as it has become a problem threatening the rivers as a result of an increase in life demands, which led to damage environment and the depletion of its resources. The marshlands environment in southern Iraq is an integrated environment in terms of population, animal and plant resources and nature, which creates a balance Environmental Now the issuance of projects to investigate the marshes and drought water level in terms of the lack of the water share that feeds the marshes and the increase in the concentration of salts and chemical elements [15].

*1.11 The natural components of the marshes of southern Iraq:*

*1.11.1 Climate influences:*

The marshes region is characterized by being a hot, dry region in the summer, which includes six months from May to October, and is characterized by a long hot dry summer and shorter rest of the other seasons, with less than 200 millimetres of

rain annually. The climate in the marshes is subtropical and dry. It has hot summers (average maximum temperature of about 43 degrees Celsius) and mild to cold winters (average minimum temperatures of 4 degrees Celsius). In summer, dust storms are common and heatwaves can raise temperatures to 48 degrees Celsius. During the winter, temperatures can drop to -8°C. Humidity is low while evaporation from water surfaces is high, which causes water loss because evaporation is ten times more than the contribution of precipitation in the region. It is noted that the highest temperatures were in July, followed by August, while June, in general, was the lowest of the three months in temperature [10].

#### *1.11.2 Terrain:*

Iraq consists chiefly of a flat, low-lying plain that rises slowly to the southwestern plateau, which is about 1,000 meters high, and the northeastern Zagros mountains, which reach a height of 3000 metres. Elevations on the nearly shapeless Mesopotamian plain are characteristic of most of the country and range from a few meters below sea level to about 400 meters above.

#### *1.11.3 Water Resources:*

The core of the marshes is centred around the confluence of the Tigris and Euphrates rivers. It is usually divided into the three main areas: the Hammar marshes, south of the Euphrates River; the central marshes (Qurna) between the Tigris and Euphrates rivers; And Hawizeh marshes to the east of the Tigris River. The marshes formed a series of nearly interconnected marsh catchments and lakes, which flowed into each other. During periods of high floods, large areas of the desert were submerged underwater. As a result, some of the previously separate marsh units have fused, forming a larger wetland catchment. The wetland watershed itself was made up of a mosaic of permanent and seasonal marshes, shallow and deep lakes, and mudflats that were regularly flooded during periods of high-water levels [16]. Also downstream, the Tigris and Euphrates rivers meet to form the Shatt al-Arab River, which flows into the Persian Gulf and is thus affected by tides. Before the 1970s, there was a complex system of natural channels where the Tigris and Euphrates formed the inner delta at the source of the marshes, and the marshes formed a system so closely connected that the rivers merged and disappeared. This system changed in the last century with the construction of agricultural canals, drainage systems and hydraulic structures, which greatly affected the hydrotherapy of the entire system. Water from the Tigris feeds the Hawizeh and Central Marshes due to the insufficient carrying capacity of its channel. The main Tigris canal also reduces its cross-section as it approaches the marshes; Where the flow of the river drops significantly. The Euphrates is restricted by higher dams from Nasiriyah to Qurna. However, there are secondary tributaries that connect the Central Marsh with the Euphrates via several canyons along the northern dam of the Euphrates. The Euphrates River divides into several arms downstream to Nasiriyah, and flows into the Hammar Marsh along several secondary channels; The main tributary of the Euphrates flows towards the confluence of the Tigris with the Qurna, but it is currently closed by a barrier that facilitates its flooding through the wetlands. Water flows from the Hammar Marshes to the Shatt al-Arab and the Shatt al-Arab and Shatt al-Basra rivers through Qarmat Ali, while the central marshes flow up the Euphrates and then, in Qurna, to the Shatt al-Arab. The water flows from the Hawizeh Marsh to the Tigris and Shatt al-Arab [9].

#### *1.12. Iraqi river*

##### *1.12.1 Euphrates River:*

It is the largest river in Mesopotamia, with a length of about 2,800 km, and it begins with a thousand km in Turkey, where it originates in the mountainous region and descends to cross the Syrian Republic and continues to the southeast inside Iraqi territory. Its length in Syria is about 675 km, and in Iraq, it is 1,200 km. The rain and snow falling on the upper edges of the river basin are the main sources of its water[10]

##### *1.12.2 Tigris River:*

It originates from the Anatolian plateau in southeastern Turkey, to the eastern Taurus Mountains and the Zagros Mountains in Iran, and ends in Iraq after passing a short distance in Syria. There are several dams on the Tigris River, larger than the Euphrates River.

##### *1.12.3 Shatt Al Arab:*

As for the Shatt al-Arab, it is a waterway that extends about 120 km, starting from Qurna and pouring its fresh water into the northern Gulf. Qurna is the area where the Tigris and Euphrates rivers meet, which stem from the mountains of Turkey and cross in parallel the Turkish and Iraqi lands. At the confluence of the two rivers, the marshes were found. It is the result of

natural processes over millions of years due to the exposure of certain areas in the triangle of Nasiriyah, Basra, Al-Amarah, to the flooding of the two rivers, and this water combines, creating a distinctive environment [9]. It is the main nutrient for the waters of the northern Arabian Gulf, and its waters are characterized by low salinity and an abundance of dissolved nutrients such as nitrates and phosphates [6].

### *1.13. Third river:*

Iraq completed the Third River Project in early 1993, diverting the course of the Euphrates River to prevent it from feeding the Hammar Marsh with fresh water. Its length is about 565 km and its width is 90 m. The third river carries the wastes of agricultural areas in central Iraq and the floodwaters to the northern Arabian Gulf region through Khor Al Zubair and then Khor Al Sabiya. If the legends that the long-lived residents of the marshes are still circulating, which go by saying that some Sassanid kings during the fifth century AD wanted to drain the marshes to be vast fields for the cultivation of grains, and they could not achieve that dream.. the former Iraqi regime did not dream of drying the marshes Except to eliminate the focus of the Iraqi resistance there. The marshes of southern Iraq almost disappeared from the map of the country, due to the crime committed by the architects of the former Iraqi regime against the oldest environmental systems in the world. This crime, which was carried out with great coldness and indifference, was taking place continuously despite the air embargo imposed by the coalition forces to protect the southern region located on line 32.

### *1.14 Human Ingredients (Population):*

The inhabitants of the marshes are among the first in Iraq, and the rate of decline began to increase due to migration to neighbouring cities, especially to the centers of the southern governorates such as Basra and Nasiriyah. They have names such as (the inhabitants of the marshes - the Arabs of the marshes - the Madan), and most of the inhabitants live in floating banks that are separated from others by a waterway where they communicate with each other by means of (the Mashahif), which is similar to a boat used for transportation and work.

This style of living is unique and similar to the settlement pattern of some villages in Southeast Asia on the banks of rivers and coasts. This style can be developed with the available ingredients to be able to promote it and overcome the living difficulties experienced by the population. The United Nations report described the Marsh Arabs as a distinguished and ancient people and that their lifestyle, which dates back to five thousand years, has become threatened with sudden extinction, this lifestyle that is the legitimate heir of the Sumerian and Babylonian civilizations. "The destruction of the marshes has devastating effects on wildlife, and this would have negative impacts on animal diversity at the local and regional levels.

### *1.15 The economic and environmental importance of the Iraqi Marshlands:*

The marshes are of great importance from the traditional agricultural point of view for the people of the region as they are used for fishing, hunting birds and grazing livestock. It is considered a nursery and hatching area for some creatures and birds that are of commercial and environmental importance. The environment of the region filters natural and inorganic pollutants from the water, and accordingly, the water that flows into the northern region of the Arabian Gulf becomes purer than its counterparts in that environment.

The preliminary economic estimation of the value of sedge and traditional agricultural activities alone in the marshes is estimated at more than 300 million US dollars. The annual rate of fishing from the marshes is about 1700 tons of small fish. Shrimp and agricultural nurseries in the marshes may constitute more than 40% of the total area of Kuwait. The universality of animals and the diversity of different neighbourhoods are of fundamental importance to the preservation and preservation of unique cultural heritage, of importance to the preservation of the quality of the environment.

### *15.1 Fishing places:*

The marshes are an important habitat for diversity and diverse species in two respects, economic and scientific interest. Some species migrate for economic importance outside the borders of Iraq, especially the small fish called in Latin *Metapennaues affinis*, which is of great economic importance to professional fishermen on the northern Gulf coast. A large number of marsh organisms of the cyprid family are of great importance to the study of evolutionary theory. The marshes in southern Iraq have a long history that extends back to more than 5,000 years, and they are of great environmental importance, as they possess many of the elements of :-

- 1- They represent areas for tourism and it is possible to invest all the ingredients in them.
- 2- It forms a way for migratory birds to cross between the continents.



- 3- Sand warehouse for the continuity of the freshwater fish fishing areas, as they constitute ideal hatcheries and nurseries for fresh and even marine fish species such as pilgrims and shrimp.
- 4- It supports the marine ecosystem and marine life in the Arabian Gulf.
- 5- It protects endangered animal species by providing them with nutrition, shelter and reproduction.
- 6- The marshlands are natural sources of water across the border.
- 7- It constitutes an unparalleled human heritage and has been home to the indigenous people for 5000 years (Sumerians. Ur. Eridu. Lagash.)
- 8- Marshes contribute to the disposal of water pollutants through their deposition and representation of the natural life cycles of nutrients, plant and animal organisms in the food web.
- 9- The presence of its oil reserves and military conflicts have led it to face major challenges in maintaining its ecosystem and exploiting its resources for growth and development. [17]

#### 1.16 The marshes of southern Iraq and their importance:

Marsh al-Hawizeh, which overlaps with the Iranian border, the Hammar marshes, which is in the middle of the region, and the Euphrates marshes, which extend and expand towards the north and west of Basra and the south of the al-Amarah region, reaching close to the mouth of the Tigris and Euphrates to mix and form the Shatt al-Arab. The area occupied by the marshes of southern Iraq can be estimated between 15,000 square kilometres. - 50,000 square kilometres because the water area of these marshes is not fixed and unstable. It expands and contracts according to the rhythms of the seasons. In the autumn, when the water levels of the Tigris and Euphrates are at their lowest, we find that the area of the marshes shrinks significantly, to return and expand in the spring with the season of melting snow in Both Turkey and Iran. The importance of the marshes includes rare animals and birds that cannot be found in any other part of the world, in addition to its wealth of fish, oil and other virgin minerals that have not been exploited yet. It also constitutes a kind of ideal nature reserves that receives huge numbers of migratory birds due to the abundance of the necessary food sources. for such birds.

The geographic and natural characteristics of the permanent marshes, represented by the geographical location, area, extension, climatic characteristics, the vital environment, and the diverse and diverse plant groups it contains, as well as the diverse animal groups in them.

The efforts made to include the marshes of southern Iraq on the World Heritage List opened new and promising horizons to restore life to these beautiful marshes in all fields. This requires drawing up a comprehensive policy for developing the area and completing the infrastructure to benefit from this decision in restoring and developing the marshes and ensuring their proper sustainability.

The Iraqi Marshes represent the largest wetland ecosystem of its kind in the Middle East and Western Asia. It consists of a group of connected lakes and swampy lands, in the lower part of the Euphrates and Tigris basin, which historically extended over an area of more than 20,000 km<sup>2</sup> from Iraq and Iran. [18] included many types of plants Table (2)

Table (2) Names of plants in the marshes of southern Iraq

The scientific name	Potamogeton pectunatus
Phragmites australis	Vallisneria spiralis
Typha australis	Potamogeton lusens
Schoeno plectus	Potamogeton perfoliatus
Najas sp	Ceratophyllum demersum
Myriophyllum verticillatum	Hydrela
Salvinia natans	Lemna gibba

Source; The Republic of Iraq, Ministry of Health and Environment, Dhi Qar Environment Directorate, Environmental Reality 2015. Hussein Alewi Naser Al Ziadi, The marshes of southern Iraq land and population, Alfaihaa for print and publishing, 2019.

##### 1.16.1 The most important components of the marshes:

1. The environmental characteristics of the southern marshes indicate that it is a natural reserve due to the weak human influence therein.
2. The water landscape, plant and animal life, and unique human life make the marshes a tourist attraction[19]. The environment of the marshes has contributed, since the early days of human life, to the making of the elements and components of civilization through which humanity moved to historical times, as confirmed by archaeological evidence. In the marshes, the first walled cities were built, such as Uruk, Eridu, Ur, and Lagash. In the marshes, writing was invented for the first time in the history of the world, marking the start of the written history of the world. From there, the systems of government, laws,

laws, arts, industry, irrigation, agriculture, religious beliefs, literature and music began. Through which he emphasized that the environment of the marshes represents a lifestyle that has its own characteristics that distinguish it from other forms of living and coexistence in Iraq ((eco-viability)) with its manifestations (distinctive, luxurious and transformed). A special style of life and culture in it, and according to the consensus of specialists, this environment, in the opinion of the researcher, combined heritage, thought and civilization, which eventually reached high peaks.

The marshes, in their cultural and historical form, constitute the appropriate incubator for the reconstruction of the Iraqi personality, and that the provinces and universities in which the marshes are located have the responsibility to preserve them as a natural reserve whose water produced man and his civilization. Map (2)

Thus, it may turn into a global tourist resort frequented by the people of the world, in which the twenty-first-century person will ease his concerns and return to living with nature, in nature, and nature [1].

#### 1.16.2 Obstacles to sustainable development in the marshes:

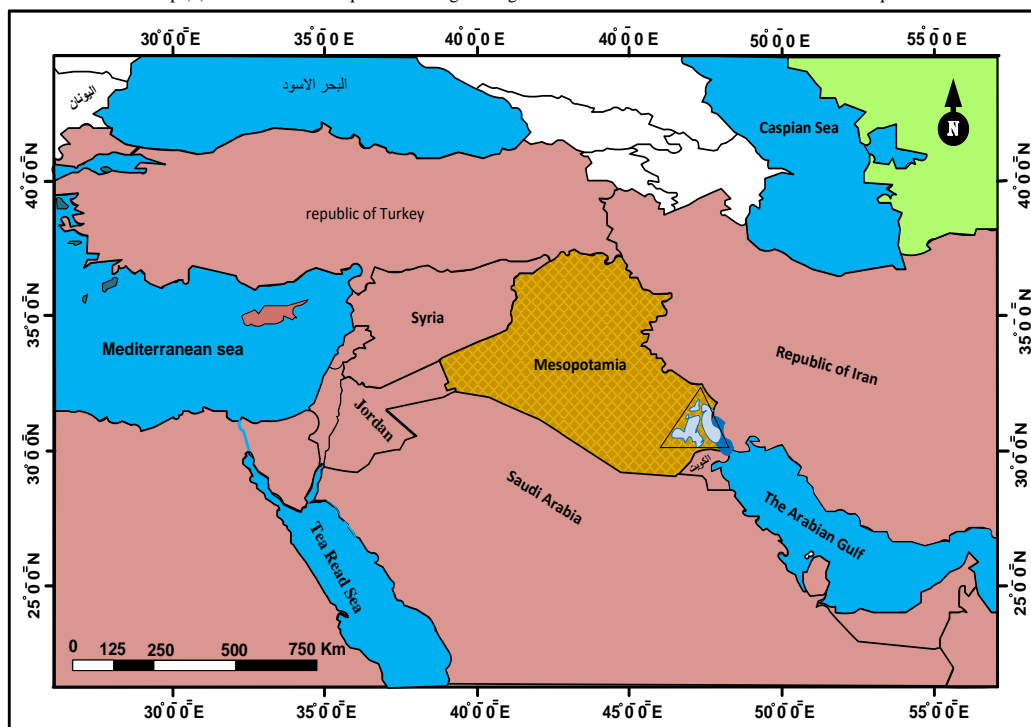
1- Lack of interest in the governmental situation at present and the present, and its shortening of the environment of the marshes with its natural sides, plans, plans, plans and governmental plans inside Iraq from the singularity of interest in the marshes

2- Construction of dams, and conditions for obtaining oil prices that are protected for the Marshes.

3- The effects of the Iraqi-Iranian war and the resulting displacement and displacement of hundreds of families. This war created a huge displacement crisis in which the social structure of the marsh dwellers was often cracked and collapsed.

4- The environment of the marshes is polluted with thousands of tons of mines, rockets and unexploded bombs, many of which have remained until today a source of death or disability for the residents or their attachments of unconventional weapons.

Map (2) the location of Iraq between neighboring countries and the location of the marshes in Iraq



Source: <https://www.aljazeera.net/wp-content/uploads/2015/09/9ddead94-6815-4acb-b192-a21389ef9818.jpeg>

#### 1.17 Factors that contributed to the increase in the problems of the environment of the marshes at present:

1. Classifying the marshes as mere (water and plants), based on which the task of developing the marshes was entrusted to the Ministry of Water Resources first and the Ministries of Environment, Works and Municipalities in the second degree.

2. The absence of central planning and the lack of coordination between the central government and local governments concerning the file of marsh management and development.
3. Weak state control and monitoring over the global grants that were distributed to official and non-official bodies, and which were often exhausted in marginal and meaningless programs and plans for the development of the marshes [20]
- 4- The social values of the marsh dwellers after the opposite migration that occurred after 2003, after which the most important variables in the process of developing and organizing the environment of the marshes and that these social values of the children differ significantly from the values of the parents as a result of several factors, including the factor of education and social interaction with communities and other groups outside the marsh areas, which Contributed to the acquisition of new trades and professions that were not known in the environment of the marshes previously.
- 5- The interaction of young people and their ideas with human values as a result of the communications revolution and the multiplicity of social media, which allowed individuals to communicate with different cultures in society[21].

#### *1.17.1 Marsh Community Development:*

The marsh community is a unique community with many characteristics that are not available in the corresponding areas supported by natural resources, which is the traditional way of life that has preserved its nature for thousands of years, starting from reed houses to wooden boats (Al-Mashhouf) and other methods of transportation, to ways of preparing food and ending with relationships The family and the nature of the local dialect, and this reality requires specialists, planners and decision-makers to advance the reality of these areas economically and socially and to draw a clear strategy and objectives that include giving guarantee and confidence to the population and social leaders in them not to prejudice the local character and social values to ensure the success of the plans developed through the participation of the population in preparing and implementing them and planning for it [22].

The development of the tourism sector and its development is very important to change the economic and social reality of the residents of the marshes for the better. The development of the tourism sector requires development programs, foremost of which are the education of the people of those areas on tourism behavior and the construction of infrastructure such as hotels, restaurants and cafes with building materials from the products of the marshes and the development of programs for hunting and fishing festivals Rural singing, plastic art and folklore, reducing negative influences, enhancing economic benefits, and developing tourism activity in the southern marshes, which is part of the regional map of economic and social development for the marsh dwellers in particular, and for Iraq in general.

This activity will contribute to providing wide job opportunities for the people of the Marshlands. In addition to the need to provide full support to the private sector to contribute effectively and to overcome legal and administrative obstacles in front of it, and on the prerequisite that there should be standards for work and an investment map with clear lines and open objectives. [23]Tens of thousands of people who used to live in the marshes area in southern Iraq live in poverty. Since the nineties, after the former Iraqi regime drained the water that was the mainstay of life in the region, whose civilizational history dates back to five thousand years[24].The marshes, which are the largest water bodies in the Middle East, were destroyed. The marshes, the largest of the water bodies in the Middle East, were destroyed, and the marshes slowly turned into a drought-stricken wasteland, and the marsh Arabs still remember the sight of their animals dying and their children sick with the disappearance of the water around them. But now the world's worst environmental crisis has begun to unravel as people, birds and livestock are starting to return.

#### *1.17.2 The dangers of environmental disasters in Iraq:*

Reports indicate that the water level of the Tigris and Euphrates rivers has declined to 43% compared to normal rates, a level that has been less than that since the beginning of the general water level recording. watering first, Secondly, the high level of salinity of river water, and the increase in the pollution levels of groundwater and running water due to its exposure to the flow of sewage and wastewater, and the high levels of pollution of river water that make access to clean water for human consumption difficult, especially with the decline of health services in general and the state of drought and the decline The rains led to the deterioration of the agricultural seasons. Iraqi agriculture, which already suffers from a deficit in meeting the needs of local demand, including grain crops.The deterioration of the condition of the natural pastures and the exposing of livestock and herders to more suffering due to the difficulty of providing fodder and the weak contribution of the concerned authorities to assisting those affected, which puts about 400,000 herders at a new risk, creating a new type of competition for natural resources and eliminating the new generation of livestock.

The marshes is the result of wars and as a result of the policies of the state's management of water in Iraq through the construction of dams and reservoirs at the meeting point of the Tigris and Euphrates, as well as the wrong practices carried out by many of the inhabitants of the marshes and adjacent area, including overfishing of fish and birds through the use of poisons Electrocutation and these crude operations have led to damage to the vital system of the marshes.

### 1.17.3 Sewage disposal:

Pollution of the marshes is represented by the discharge of sewage water into the rivers that it irrigates up to the marshes. The marshes in southern Iraq have been exposed to various types of environmental climatic conditions that affected the ecosystem, especially after drying, where the environmental balance was disturbed and the character of the region changed, as well as changes in climatic and local conditions. More than (9555) km<sup>2</sup> of marshes and lakes quickly and with a direct impact on the local climate, and the area has become a dry environment and its exposure to the phenomenon of desertification, which is a process of demolition and destruction of the vital energy of the earth and can lead to a wide deterioration of the environmental systems that lead to the erosion of the earth's air represented by plant and animal production [25].

### 1.17.4 Overfishing:

Hunting in a healthy environment, such as fishing with electric current, burning areas of reed and papyrus lands, and using grains in them, to catch the largest number of animals is the black water platform, pink flamingos, hamlets, and others.

### 1.17.5 Vegetation:

The aquatic plants within the marshes are a major part of the food chain of other living organisms, and the vegetation cover death to more than 75% of the vegetation cover. [26] The dried lands turn into a desert of hardened mud that no longer accepts animals or natural plants, and it is one of the worst environmental disasters in the world now, and that the effects of this will include the Gulf region because the marshes incubate several types of birds and some fish hatch in them, which will have far-reaching damages. On the ecosystem of the marshes, it was completely destroyed and the balance between water, crops, and animals was disturbed. Picture (1), which found thousands of years ago that the process of rehabilitating this area is very difficult, as the marshes that desertify no longer accept life.



**Picture 1:** Al-Mashhoof permeates the waters of the marshes as a means of transportation surrounded by plants  
Source; [https://usercontent.one/wp/hdf-iq.org/wp-content/uploads/2017/09/Marsh\\_Arabs\\_in\\_a\\_mashoof-400x242.jpg](https://usercontent.one/wp/hdf-iq.org/wp-content/uploads/2017/09/Marsh_Arabs_in_a_mashoof-400x242.jpg)

### 1.18 Drying the marshes:

The Iraqi plan, which began in late 1991, is summarized in the revival of the Third River Project, whose idea dates back to the mid-fifties of the last century by digging the old course of the Euphrates River and diverting the waters of some of the tributaries that feed the marshes with freshwater to this artificial river and proceeded to drill it at great depths To ensure its withdrawal of groundwater sources due to its location lower than the depth of the marsh to withdraw the water of the marsh by osmosis and to ensure the drying of these fresh lakes, which extend over a wide range of water, so that this river undertakes to draw the water of the marshes from its sources as well as diverting the streams of many of the tributaries that fed them to dry it

and eliminate the thick reed and sedge forests, which became an ideal shelter for those outside its control and opponents of it. The project reached its climax at the end of 1992 of the project, and after about 90 per cent of the areas of those virgin areas dried up, and since the implementation of the most important part of these projects began after the uprising in the south in March 1991, the volume of water bodies and vegetation cover decreased to less than 20 percent. Sources estimate that the population of the region has decreased from 750,000 to less than 50,000, confirming that the number is constantly declining and the population has moved to live in poverty belts surrounding the cities of Basra and Baghdad after their natural sources of livelihood dried up and their livestock died. Experts in the affairs of the marshes called for an international campaign to declare the marshes area a natural environmental reserve before it was destroyed by Iraqi procedures [27].

### 1.18.1 Turkish dams:

Until the 1970s, the freshwater marshes covered up to 20 square kilometres, and in addition to providing the Marsh Arabs with a suitable environment for agriculture and fishing, they fed up to 40% of Kuwaiti shrimp fisheries. Its chicks head downstream into the bay, but then dam and drain projects cut off the water supply.

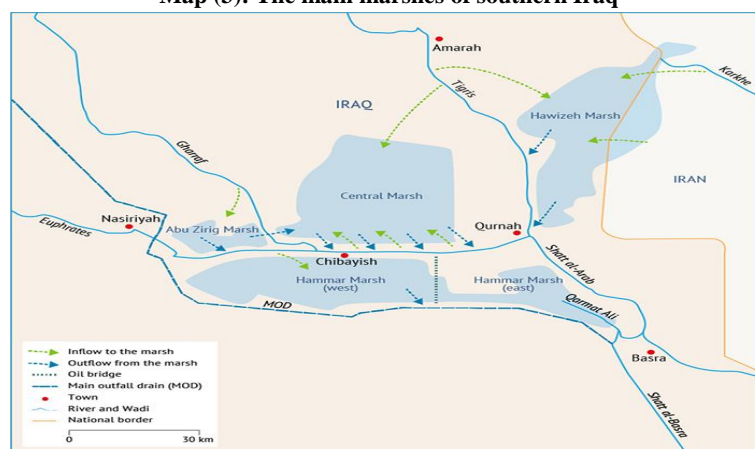
His studies and calculations showed that the Turkish dams built in the late eighties and early nineties reduced the level of the Euphrates River by more than 20% and could eventually reduce it by 50%. That the water storage capacity of all dams on the Euphrates is six times greater than the annual flow of the river, and the dams that Turkish plans to build on the Tigris, including the controversial Ilisu Dam, which is behind British companies, will further reduce the flow of water into the marshes.

### 1.18.2 Environmental Effects of Drying the Iraqi Marshes:

Many harmful environmental effects result from draining the marshes, the most important of which are the following:

- 1- The decline in groundwater levels and the reduction of water bodies means the transformation of areas of wet cohesive lands into dry, loose land that can be eroded by wind, which means creating conditions for the spread of sand and dust storms and the movement of sand due to the prevailing northwest winds and not to mention the salts and vapours carried by the wind, which move with sand and dust.
- 2- Depletion of soil fertility due to the volatilization of fine grains of green and clay, as well as the organic matter originally present in the soil.
- 3- The death and destruction of plant clans and the birds and animals that live on them.
- 4- The disappearance of marine creatures and plankton.
- 5- An imbalance in the water balance.

**Map (3): The main marshes of southern Iraq**



Source; [https://water.fanack.com/wp-content/uploads/2017/05/Fanack\\_Irak\\_Map-02\\_705px.jpg](https://water.fanack.com/wp-content/uploads/2017/05/Fanack_Irak_Map-02_705px.jpg)

There is live evidence of the environmental destruction that the drying of wet areas brings, as the drying up of the areas surrounding the Aral Sea in Kazakhstan in the western part of the former Soviet Union exposed an area of 4800 square km to the winds, which turned the area into a huge theater for active wind operations where continuous dust storms and the transfer of salts to areas. And that was during the period from 1961 to 1964. As for southern Iraq, the Iraqi regime claims that the draining of the marshes is due to the construction of dams in Syria and Turkey in the upper reaches of the Tigris and Euphrates rivers. Wet areas, consisting of swamps, marshes, and other ecosystems, are considered the most sensitive and the most vulnerable. They are, on the whole, a delicate system in which complex hydrological, biological, climatic, dynamic and environmental factors overlap. This prompted the US Environmental Agency to establish specialized departments responsible for supervising the management, control and regulation of the exploitation of these ecosystems.

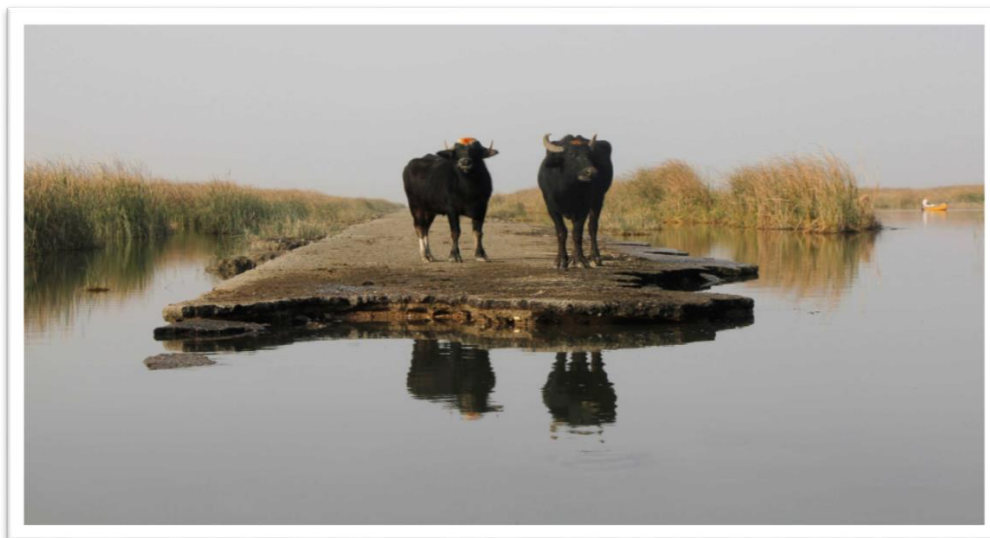
That the mammals and fish that live in the area are now considered extinct, and the quantities of fish in the northern Gulf, which depend on the marshes for fish reproduction, have decreased sharply. There is also a type of large rat, known as the pig rat, which is unique to the region has become extinct. A unique way of life is on the way to extinction, but the United Nations has not completely given up on the situation, as confirmed. The situation in the Iraqi marshes seems bleak, but there are examples of similar areas in the world recovering after their disappearance. That this happened in Cameroon and the United States, and that there is an urgent need to preserve what remains of the marshlands on the Iraqi-Iranian border, and to reconsider the dams that were built to prevent floods in the fifties. These dams have become useless and if they are removed, they will make way for the marshes to be revived again. However, demolition is always easier than building, and marshes represent thousands of years of natural development. The regional effects of draining these swamps were devastating to the environment in the northern Arabian Gulf region, as it included an increase in pollution with hydrocarbon compounds, trace minerals and pesticides, and an increase in sedimentation in its marine environment, which resulted in direct negative effects on fisheries, coral reefs and human health. And adverse effects on regional wildlife, which resulted in a significant decrease in the numbers and species of endemic birds accompanied by a significant increase in the blooming of harmful algae and fish deaths in the region, in addition to the occurrence of regional climatic changes accompanied by an increase in temperature and rates of dust storms, which contributed to the rise in temperatures Earth and global warming [27].

#### *1.19 The effect of draining the marshes on animal husbandry, the most important of which is the buffalo:*

The buffalo is one of the most important animals in the marsh environment. Its upbringing occupies the main craft practiced by the ancient population. It is raised by a population called (the metal), and it depends on buffalo milk by making milk products and making use of its meat and offal as fuel. The Iraqi buffalo is distinguished by its adaptation to the environment in which it lives in the marshes. The Iraqi buffalo is one of the distinctive species in the world. The number of buffaloes in the world is 3 million, 90% of which are concentrated in Iraq. It is compatible with the environment of the marshes, and that the buffalo animal is threatened with extinction in Iraq in the absence of attention to the marshes and continue drying them Picture (2)

##### *1.19.1 Marine environment (fish):*

The marshes provide a suitable environment for the presence of water, sunlight and food resources on which plant organisms such as algae, crustaceans and insects feed, due to the absence of sea currents. For food the population and their commercial activity. The marine environment is affected by any changes that occur in the northern region of the Arabian Gulf, and the discharge of pollutants into the marine environment reduces the chances of development for different marine organisms and causes changes among its various elements that may cause damage to the human morsel through the food chain, and the matter gets worse the more it increases Focus on the long term. Therefore, we see that the drainage of the Shatt al-Arab waters constitutes a major and important source of nutrients, which include nitrates, nitrites, phosphorous compounds and silicon, and that any increase or decrease in the amount of nutrients affects the balance of the biochemical cycle of nitrogen and phosphorous in the marine environment, as nutrients are an important food source for algae and plant vermin in the marine environment. photosynthesis processes. The effect of drying the marshes in southern Iraq has a negative impact on the marine environment and its lack of development, as the results of studies indicated an increase in the concentration of petroleum pollutants associated with suspended and sedimentary particles and an increase in the rates of pollutant deposition in the marine environment.



**Picture 2:** The Iraqi buffalo animal in the middle of a carrot in the marshes of southern Iraq

Source; [https://media.voltron.alhurra.com/Drupal/01live-106/styles/1984x1200/s3/2021-05/2015-02-12T000000Z\\_943294106\\_GM1EB2C16R901\\_RTRMADP\\_3\\_IRAQ-DAILYLIFE.JPG?itok=w\\_-RLEaL](https://media.voltron.alhurra.com/Drupal/01live-106/styles/1984x1200/s3/2021-05/2015-02-12T000000Z_943294106_GM1EB2C16R901_RTRMADP_3_IRAQ-DAILYLIFE.JPG?itok=w_-RLEaL)

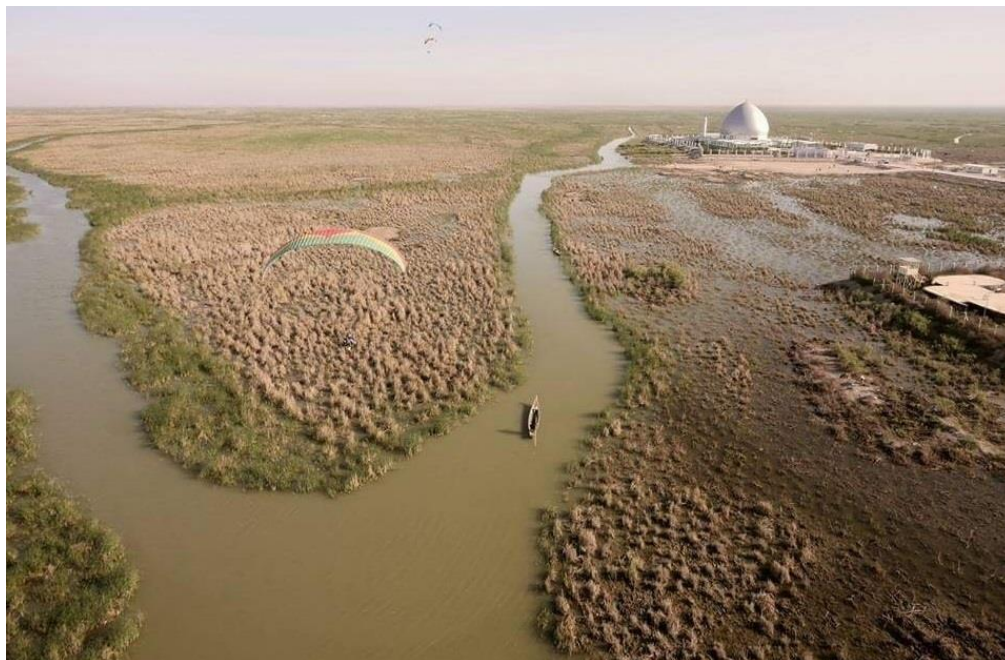
Birds: The marshes constitute a suitable environment for the presence of birds, where the conditions of the climate are suitable, water and food. - and geese) and these types of birds can be made as a reserve, developed and preserved in the environment suitable for their living.

#### **Effects of the spread of desertification in the marshes:**

The phenomenon of desertification has spread to reduce the areas of the marshes and expose large parts of them to salinization and the drying of water on their lands This resulted from the problem of salinity in the soil, which is a manifestation of desertification and because of the high level of saline groundwater and its proximity to the soil surface And then the accumulation of salts on its surface after its evaporation, leaving salt deposits with an area of about (100), (168) and (376) km<sup>2</sup> of the three marshes, respectively, which led to the salinization of the soil and its drying and holding of its particles, which is a manifestation of desertification.

#### *1.19.2 Environmental Effects on Agriculture in the Marshes of Iraq:*

The areas planted with crops have been reduced for extensive measures from the marsh to salinization and to change the water quality, as the areas planted with rice have been occupied due to the decline of the marsh's water from areas and its cultivation and the high salinity of the soil and its replacement by the cultivation of wheat and barley crops that can tolerate salinity, in addition to palm and vegetables and it has shrunk to (13%) due to the low hydrological characteristics and the difference in the sources of nourishing water. The salinity rate of the marshes is (14, 15) dc/m, which limited the possibility of using water for different purposes and the effect of saline sewage drained from the public estuary. Which led to the pollution of the waters of the marshes and its low efficiency in agricultural investment [28].



**Picture 3:** The manifestations of desertification in the marshes environment in southern Iraq

Source: <https://upload.wikimedia.org/wikipedia>

### 1.19.3 Hard facts:

The environment of the marshes has facts, namely that environmental problems know no borders, and their impact does not appear in the short term, and any defect in the physical, chemical and biological properties of the ecosystem affects the systems related to it, such as the northern marine environment of the State of Kuwait and the nutritional relationships it contains between organisms represented by the food web of the region. As a whole, scientific studies conducted on sabour, zubaiddi and shrimp fish in Kuwait proved that they depend on the environment of the marshes and the areas near the Shatt al-Arab. Most of these fish migrate from the maritime borders of Iraq to the northern waters of the Gulf. Therefore, the fish stock of Kuwait was affected by the drying of the marshes, and there are significant changes that occurred in the water, a sharp drop in salinity in Khor Al-Subiya and North Failaka from 36 parts per thousand in 1982 to one part per thousand in 1996 and 1998, and the concentration of the northern suspended sediments more than doubled, as it was observed that species near the mouth of the third river affect the marine food chain in the region, disturbing the ecosystem in addition to the newly formed environmental sediments. Consequently, the water affected the Kuwaiti fish wealth, the most important of which are:

First: Establishing a new course for the Euphrates River and diverting it from the Hammar Marsh. This river carries the remnants of agricultural areas, such as fertilizers and pesticides, from the central Iraq region as well as the flood area to the northern Arabian Gulf region through Khor Al-Zubair and then Khor Al-Subiya.

Second: The construction of 22 dams at the Tigris and Euphrates rivers, called the Turkish Anatolia Project, with the aim of generating electric power and providing irrigation water to Turkey. In 2010, the rate of fresh water that flows into the Arabian Gulf will decrease. Followers of this issue believe that the situation in the Marshes of Iraq will have many side effects on the Iraqi and Kuwaiti environments, but rather on the environment of the region as a whole. Therefore, observers see the need for the experts of the two countries to work in coordination with international organizations to develop studies to evaluate the situation, conclude agreements that prevent construction works harmful to the environment, coordinate at the international level, pump water into the Iraqi marshes, and abide by international environmental laws and legislation [29].





**Picture 4:** Types of marsh plants and their growth methods

Source: Hussein Aliwi Nasser Al-Ziyadi, Some Development Indicators in the Marshes of Southern Iraq, College of Education, Wasit University, Special Issue for Research of the Fourth Scientific Conference 2011, p. 949.

1.20 **Restoration actions:** several restoration actions have been implemented by both governmental and non-governmental institutions which include:

- 1- Marshlands restoration activities included surveys, site visits, modelling, water characteristics study, and infrastructure needs assessment.
- 2- Providing a technical evaluation in June 2004 in cooperation with the Ministry of Water Resources and the relevant university.
- 3- Implementation of a strategy for the restoration of the marshes that includes monitoring the ecosystem, the reconstruction of water bodies, the making of models to study the water and hydraulic characteristics, agricultural work on a large scale, fishing and aquaculture. Under suitable conditions, livestock breeding, dairy production and primary health care.
- 4- Developing capabilities through laboratory development, study tours, training, and forming a strategy for international aid to donor countries and participation.

#### **Suggestions and recommendations:**

- 1- Commitment not to build and construct inside the marshes any buildings with materials of bricks, plaster, cement, iron and wood, and to build the necessary buildings near the marshes of reeds, papyrus and Golan only to continue to preserve them as a nature reserve.
- 2- habits in society by enacting an appropriate law for that.

- 3- Protecting the environment of the marshes from pollution and the use of overfishing methods using poisons and electric shocks to birds and fish.
- 4- Protecting the tourists as well as working as a tourist guide at the same time.
- 5- The Iraqi universities concerned with the environment of the marshes, especially Basra, Maysan and Dhi Qar, should establish a special department for the environment of the marshes, aimed at establishing knowledge, skills and information that preserve and maintain this environment.
- 6- Encouraging governmental institutions and bodies and civil society organizations in the sectors of education, health, environment and human rights to hold courses and field workshops to rehabilitate the population in these areas and to achieve environmental sanitation represented by preventing the danger of pollution and organizing cultural awareness campaigns among the people of the marshes whose mission is to establish friendship with the environment The marshes and emphasis on the correct behaviour of fishermen and birds, as well as the correct methods of grazing buffalo, cows and other animals
- 7- Encouraging the scientific research process in the marshes, especially the social, anthropological, demographic and economic studies, which the marshlands environment in Iraq lacks.
- 8- Removing the marshes administration file from all forms of partisan and clan quotas and adopting the criterion of efficiency and integrity as a basis for its management.
- 9- Benefiting from the decision of UNESCO and the Ramsar Treaty to put pressure on Turkey, Syria and Iran to conclude a water-sharing agreement and with it the marshes' share.
- 10- Encouraging tourism investment near archaeological sites near the marshes, and enacting a law that facilitates investment and overcomes the current obstacles, provided that it takes into account the standards of world heritage and the establishment of tourism infrastructure (such as artificial islands within the marshes with tourist cities that include hotels, restaurants, casinos and game cities that can be used in winter). With the recommendation to establish tourist cities on the edges of the marshes, including the same components and infrastructure for water travel within the marshes, including (boats of different sizes + tour guides + maps of the owner's water within the marshes.
- 11- Recommending attention to the issue of periodic cleaning of the marshes and making the most of every water point in it and not wasting it and all other resources, by relying on modern technologies and working with specialized and efficient international companies.

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