The Iraqi Marshes

Regional Analysis Through Interdisciplinary Lenses

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مركز الرافدين للحوار
al-Rafidain Center for Dialogue
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by:
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Prof. Dr. As'ad Kāẓim Shabīb
CEO, Al-Rafidain Center for Dialogue RCD

The Marshes in southern Iraq (al-Ahwār) are one of the most prominent unique ecosystems in Iraq and the world, representing one of the oldest natural habitats that has preserved its environmental and cultural character over thousands of years. They were not merely water bodies; rather, they were and still are a home to ancient civilizations, a source of rich cultural and environmental inspiration, and a natural system teeming with biological and morphological diversity, making them an authentic part of the history of Mesopotamia.

This rich environment contributed to the emergence of exceptional civilizations and ways of life that have left their clear marks on human history. Despite the natural changes and human challenges it has endured, such as draining, burning, and deliberate desiccation by despotic regimes, especially the defunct Ba'ath Party regime, the Marshes still preserve many of their environmental and living characteristics. These characteristics deserve documentation, study, and analysis from multiple scientific perspectives, particularly in light of the increasing environmental threats they face.

From this standpoint, and based on its mission to support scientific research and stimulate intellectual dialogue on important national issues, al-Rafidain Center for Dialogue (RCD) initiated an integrated research project to document and analyze the reality of the Marshes in southern Iraq. RCD assigned this task to an elite group of specialized researchers in the fields of environment, wildlife, and tourism to produce a comprehensive scientific book that highlights the various dimensions related to the Marshes.

This book addresses through study and analysis the natural aspects of the Marshes in terms of their area, geographical distribution, and geological formation. It also reviews the historical theories that have explained their origin and development through the ages. The book is also concerned with analyzing the aspects of biodiversity within them, including vegetation cover, animal life, and endemic and endangered species, in the context of changing environmental conditions. It also addresses the environmental and human challenges that threaten this sensitive ecosystem, whether due to climate change, regional dams, or internal water policies.

The book did not overlook the economic, social, and tourism aspects of the Marshes. It highlights their value as an attractive area for ecological and cultural tourism, as well as their development potential if properly utilized within a comprehensive vision for sustainable development. The book underscores the importance of preserving this unique region, not only as a global environmental heritage inscribed on the World Heritage List but also as a national resource that can contribute to achieving environmental, social, and economic balance for Iraq.

This book represents a qualitative contribution from the al-Rafidain Center for Dialogue (RCD) in supporting national and academic efforts aimed at protecting the Marshes and reviving their role in Iraqi life. It also seeks to enhance public awareness and formulate a solid scientific discourse that reflects the importance of this region in the consciousness of Iraqis and in the record of human civilization.

In this regard, the Arabic version of this book, like other works published by RCD, has received great attention from many institutions, including the Iraqi Parliament, institutions concerned with the study of the Marshes, and the state's executive institutions, due to the highly important studies it contains in light of its diagnostic and analytical dimensions. We hope that the translation into the English will receive the satisfaction and acceptance of readers and relevant institutions.

1. Environment

Prof. Dr. Ḥusayn ʻAulaywī al-Zayyādī

Head of the Department of Geography, Faculty of Arts, University of Dhī-Qār; formerly Director of the Geographic Information Systems and Remote Sensing Unit, Faculty of Arts.

I. Areas of the Marshes in Southern Iraq

The importance of the marshes is not limited to their being one of the world's significant ecosystems, due to their unique biodiversity. This important area carries a great human heritage and is a testament to the manifestations of human civilization. The land of the marshes contains approximately (250) archaeological mounds dating back to various ancient periods, including Tall al-Rabāb, Abū-Shuʻayb, Jirbāsī, al-Jalʻah, al-Ḥamar, Mijbil, Abū-Ḥadīdah, al-Ḥadd, al-ʻAyn, Ḥallāb, al-Hawī, Ḥammūd, al-Shuwayʻirīyah, and Umm-al-Wadaʻ.(1) The subject of the marshes has gained great importance, especially after their nomination for inclusion on the World Heritage List.(2)

The research topic addresses the marshes of southern Iraq geographically and historically – land, population, and potentials – according to a scientific, analytical vision.

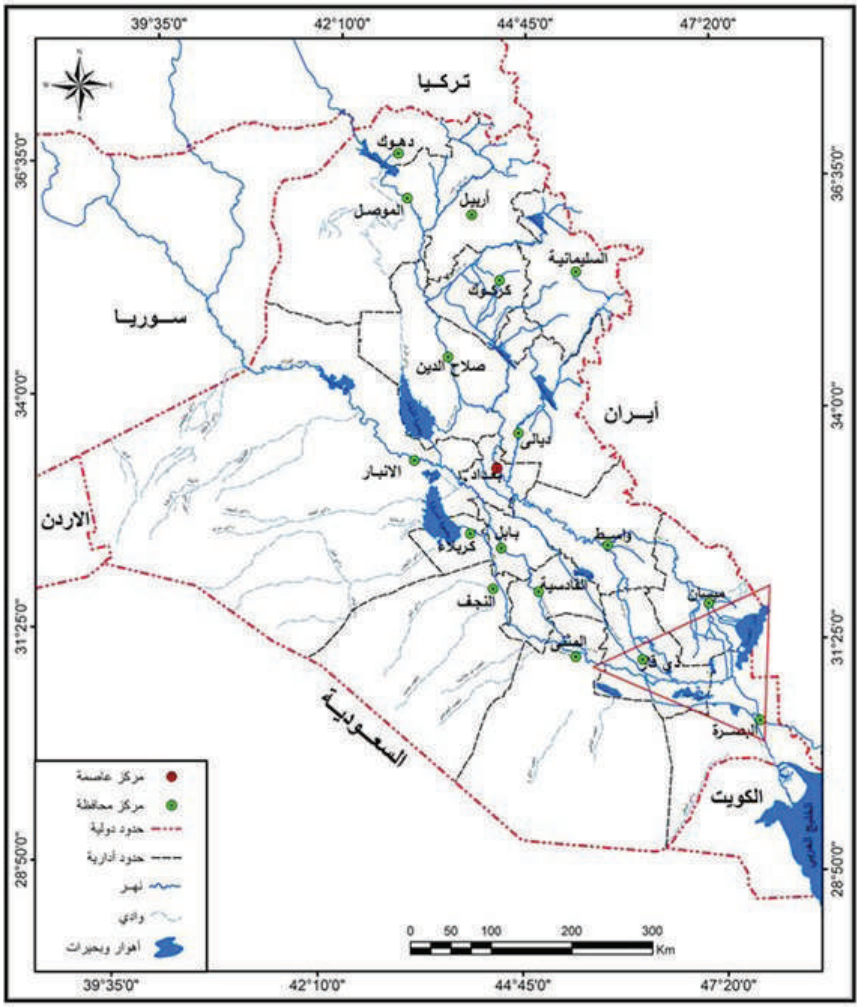
The research hypothesizes that the marsh areas in southern Iraq have experienced a reduction in their surface area due to the decreased water inflows from the Tigris and Euphrates rivers, which are the two main sources feeding the marshes. This has contributed to the migration of large numbers of the population due to the loss of their livelihoods, represented by fishing and buffalo breeding, and this decrease has led to an increase in the severity of environmental pollution.

The research has shown that there are changes in the area of the marshes, as evidenced by satellite imagery from the Landsat satellite. The reason for the decrease in the marsh areas is attributed to the reduced water inflows from the Tigris and Euphrates rivers, as well as the reduced inflows from border rivers originating in Iran. The research was preceded by a historical

(1) Based on archaeological surveys conducted by a team from the Directorate of Antiquities of Dhī-Qār Governorate (see al-Ḥamdānī, 2014, p. 64).

(2) The marshes included in the World Heritage List are Hawr al-Ḥuwayzah in Maysān Governorate and the Central Marshes, shared between Dhī-Qār and Maysān Governorates, in addition to the West al-Ḥammār Marsh in Dhī-Qār Governorate.

Map 1-1: The Geographical Location of the Marshes of Southern Iraq

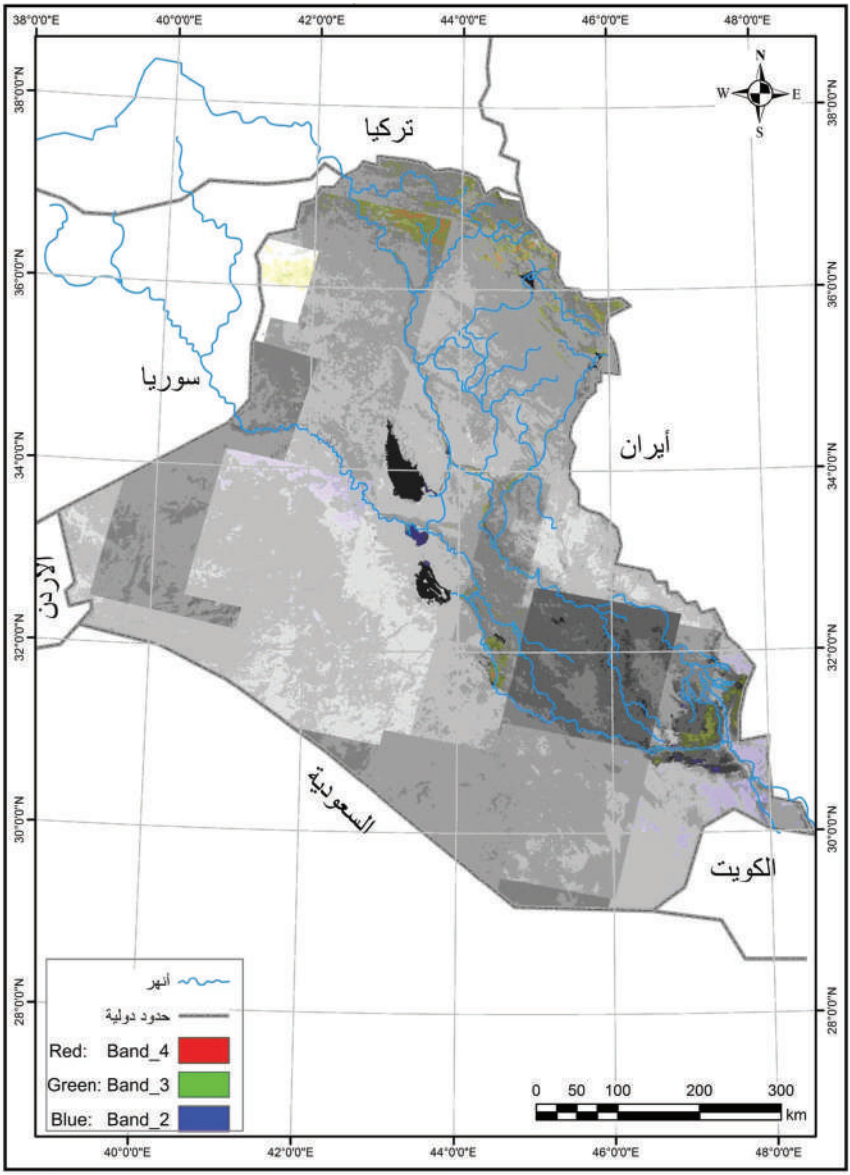


Source: Ministry of Water Resources, 2015.

introduction to the marshes of southern Iraq and concluded with a list of credited sources and references.

This study benefits from modern technologies represented by remote sensing systems and satellite imagery. The area captured by a satellite image can exceed 180 km^2, and the data is either digital on magnetic disks or in the form of films and photographs. Satellite imagery is characterized by its Spatial Resolution, Spectral Resolution (the range of wavelengths within which the sensor bands operate and record different values of spectral reflectance or emittance), Radiometric Resolution (the sensor's ability to accurately

Map 1-2: Satellite Image of Iraq (1973)



Source: Landsat-1 satellite image.

record changes in radiant energy over a range representing gray levels), and Temporal Resolution.

II. Theories on the Formation of the Marshes in Southern Iraq

The issue of the formation of the marshes has captured the interest of researchers, geologists, and specialists. Various theories have emerged to explain their origin, among these theories:

First Theory

This theory indicates that the formation of the marshes was due to the subsidence experienced by the alluvial plain as a result of tectonic folding movements. This led to the uplift of some parts and the sinking of others, which were then flooded by the waters of the Arabian Gulf for a distance of (90) km north of the capital, Bāghdad. It suggests that the coastline in the Paleolithic era ran along the imaginary line between Hīt and Sāmarrā' on the Tigris River, the city of Ur on the Euphrates, and the city of al-'Amārah on the Tigris in the fourth millennium BC (Shukrī, 2008, p. 3). Euphrates and Tigris used to flow into separate channels, then the Gulf began to recede due to the enormous quantities of silt being deposited. The retreat of the Gulf was at a rate approaching (115) feet per year, which is equivalent to one and a half miles per century.

The deposition processes from the Tigris and Euphrates rivers were continuous, flooding the subsided areas. Then, the waters of the Arabian Gulf receded, and the rivers deposited their sediments, forming the surface of the marshes. In the Sumerian era, the delta reached the outskirts of the historical city of Ur in a southeastern direction. Some suggest that the rate of delta advancement was (1.6) km every seventy years in modern times, whereas the rate of delta advancement did not exceed (1.6) km every thirty years during ancient times ('Abd-al-Laṭīf, 2005, p. 4).

Until recently, this theory, proposed by the French researcher De Morgan in the late 19th century, was popular among archaeologists, especially the archaeological expert Seton Lloyd, author of the book Mesopotamia. However, this theory faced several objections, the most prominent being: that the Gulf did not experience regression or retreat during the 19th and 20th centuries, with no fundamental change occurring in the general system of the two rivers' courses. The other objection is that geologists have not found any evidence of marine organism remains in the marsh region. Consequently, this hypothesis did not withstand the sharp criticism directed at it (al-Zayyādī, 2017, p. 45).

Second Theory

Proposed by the British researchers Lees and Falcon in 1952 and called the Tectonic Construction Theory. It involves two processes: subsidence and replacement or construction. The Tigris and Euphrates rivers flood every year, carrying hundreds of thousands of tons of silt that end up in the low-lying area.

The land then subsides by an amount equivalent to the height of this silt, thus the area remains at its elevation. What supports the validity of this theory is that if things had not happened in the manner indicated by its proponents, the current marshes would have been buried, and the Tigris and Euphrates rivers would have changed their courses every year. The most prominent objection recorded against this theory is the existence of remains of prosperous cities in the marshes, which the local population calls "al-Ashan" (plural of "Īshān"). After the drainage, a number of archaeological sites emerged, indicating that they are the remains of cities, which proves that this area was once a dry land. Archaeologists found remains of reeds and papyrus that grow in the marshes, dating back more than 4,000 years.

Third Theory

This view is held by a number of historians who explain the formation of the marshes by the overflowing waters of Tigris and Euphrates and their tributaries. This led to the collapse of dams and reservoirs, the diversion of rivers from their old courses, and the filling of adjacent depressions with water, forming vast swamps and marshes known as al-Baṭā'iḥ (Lloyd, 1943, p. 6).

Fourth Theory

This theory asserts the occurrence of numerous and successive earthquakes in the Arabian Gulf region in ancient times. These earthquakes affected the coastal lands surrounding the Gulf, leading to the rise and fall of coastal landforms. The region of southern Iraq was one of the areas affected by this movement, where depressions were formed. Due to the floods of the Tigris and Euphrates rivers and the upwelling of water, these depressions filled with water, forming what is known as the marshes. This theory has not found compelling scientific evidence, as the marsh depressions are confined to specific areas and do not cover the entire region. The question that is difficult to answer is: what is the reason for the subsidence being limited to the areas of southern Iraq and not extending to the neighboring regions in Iran or the Arabian Gulf countries? (al-Rubay'ī, n.d., p. 7).

Fifth Theory

Some contemporary scholars believe that multiple factors contributed to the formation of the marshes. These include the shifting of river courses and their diversion to new channels from a known point, thus leading to the formation of oxbow lakes as a result of river meandering or its development. An example of such course changes is the shift in the course of the Tigris River during the Abbasid era, under the rule of al-Mustanṣir, where the original course changed in the period 1171 - 1231 CE.[1]

(1) See 'Abd-Thāmir (2000) For more on the changes in river courses.

III. Reduction of the Marsh Areas

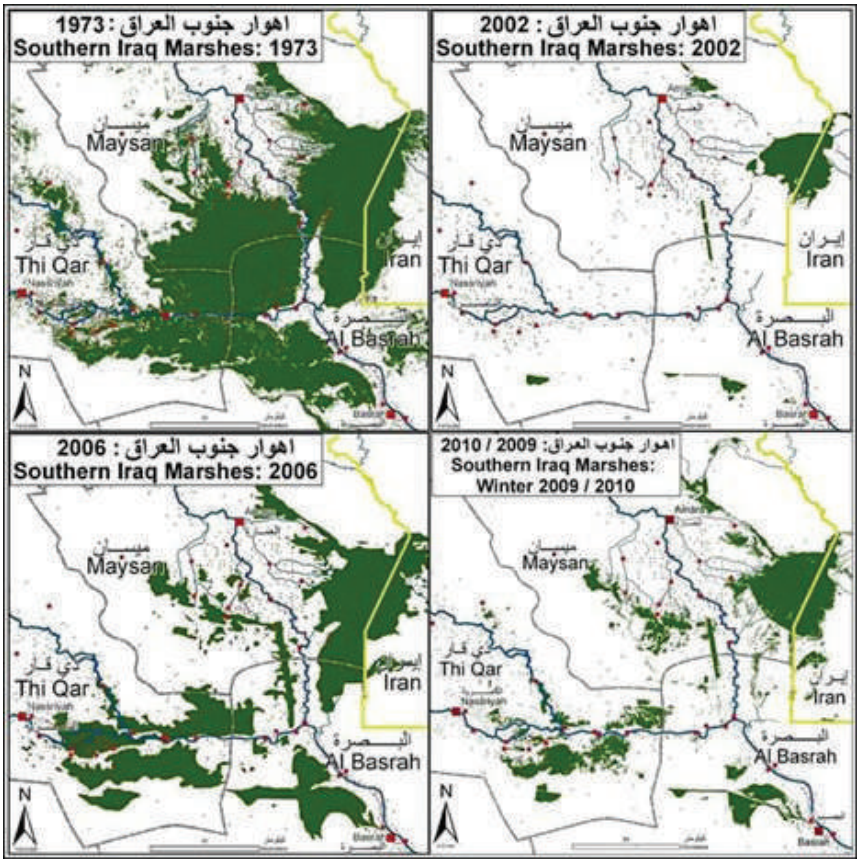
Southern Iraqi marshes have witnessed significant fluctuation in their water surface area for reasons related to the decrease in water inflows from the Tigris and Euphrates rivers. Following the decrease in water inflows, as shown in Table 1-1, the per capita water share also decreased, reaching 1287 m^3 in 2015, whereas it was 4990 m^3 in 1993 and 4316 m^3 in 1994. In general, the figures provided cannot be compared with the per capita share of previous decades; the per capita share exceeded 7000 m^3 during the 1970s and 6000 m^3 during the 1980s, which is attributable to higher water inflows and a smaller population size.

Table 1-1: Inflows of the Tigris and Euphrates Rivers (1990-2015)

Year	Euphrates	Tigris	Total	Population	Per Capita Share m^3
1990	12.4	30.87	43.27	18363904	2356.3
1991	12.15	62.72	74.87	18931860	3954.7
1992	12.37	66.63	78.73	19517381	4033.8
1993	15.33	44.58	60.18	20121012	2990.9
1994	23.9	65.63	89.53	20743311	4316.1
1995	30	38.85	68.85	21384857	3219.6
1996	27.64	42.66	70.3	22046244	3188.8
1997	28.91	49.9	78.81	22046244	3574.8
1998	18.61	18.8	37.41	22702211	1647.9
1999	17.23	18.85	36.08	23382068	1543.1
2000	9.56	21.13	30.69	24085748	1274.2
2001	10.95	43	53.59	24813365	2174.2
2002	27.4	49.48	76.88	25564835	3007.3
2003	20.54	45.51	66.05	26340227	2507.6
2004	17.57	38.1	55.67	271340585	2051.2
2005	20.6	44.6	65.2	27962968	2331.7
2006	19.33	39.86	56.19	28810441	2054.5
2007	14.7	20.37	35.07	29222081	1200.1
2008	19.32	47.69	67.01	30577798	2191.5
2009	22.81	9.3	32.11	31496406	1019.5
2010	19.8	32.3	52.1	32437946	1606.1
2011	19.9	31.5	51.4	33402567	1538.8
2012	20	30.7	50.7	34392179	1474.2
2013	20	29.8	49.8	35423944	1405.8
2014	20.1	29	49.1	36486663	1345.7
2015	20.4	28.2	48.4	37581264	1287.9

Source: Central Statistical Organization, Water Statistics 1990-2015.

Map 1-3: Reduction of Marsh Areas for Different Years

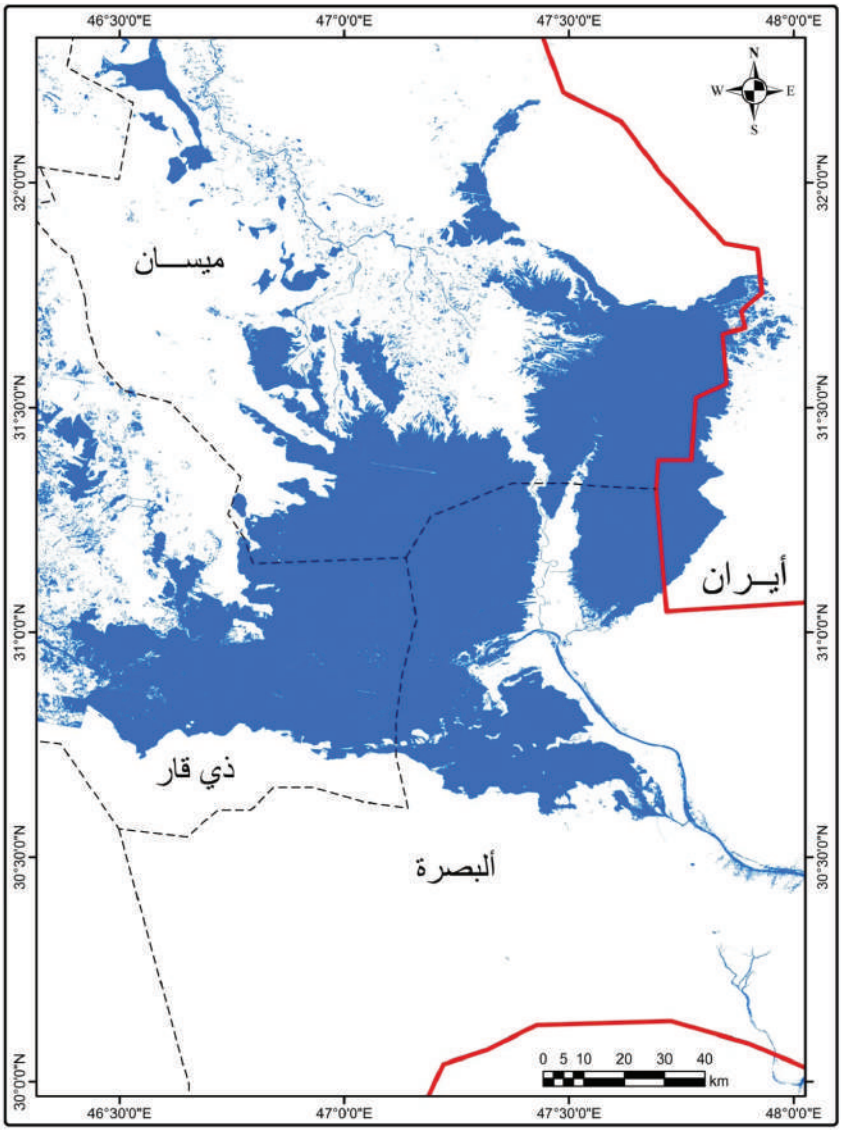


Source: Ministry of Health and Environment, 2011.

As for discharge rates, they cannot be compared with their previous counterparts during the 1960s and subsequent periods, given that those rates exceeded 445 m^3/s in 1966 and 827 m^3/s in 1969 (Ministry of Water Resources, 2008). Based on the foregoing, the governorates of southern Iraq used to experience floods resulting from the river overflowing onto adjacent lands, the last of which was in 1988.

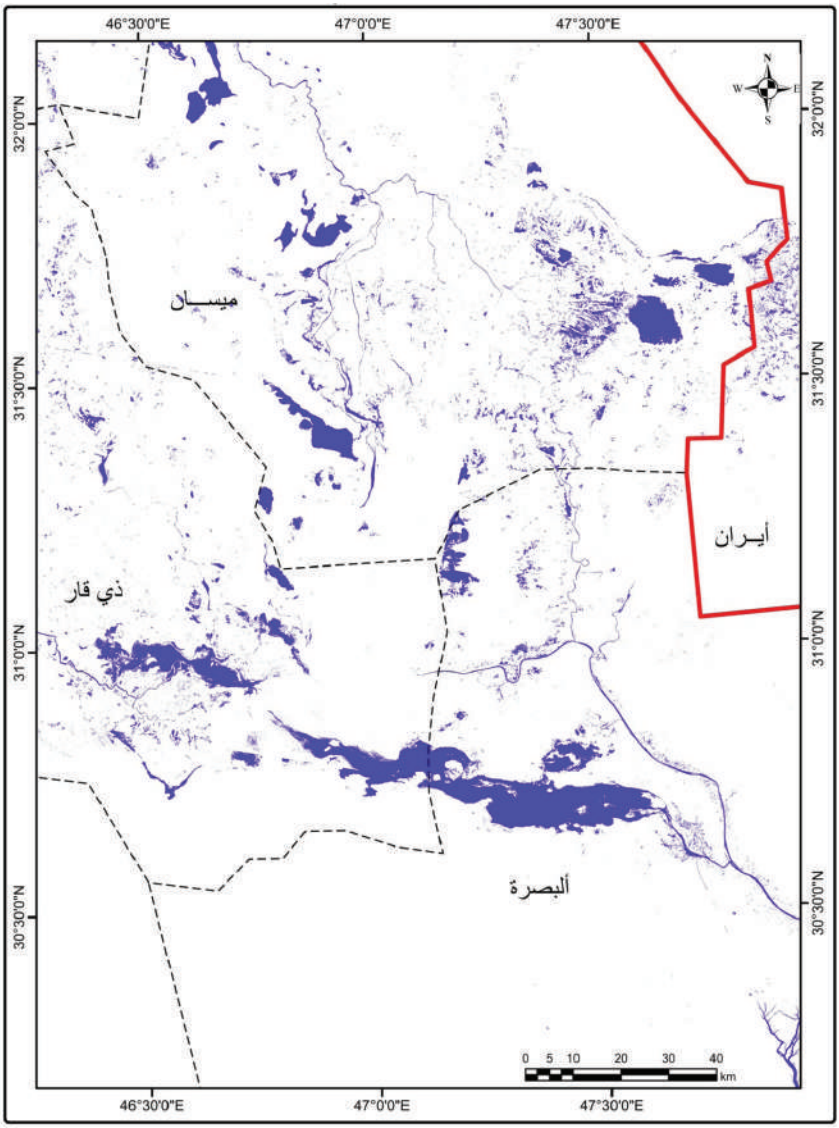
Satellite images of Iraq taken over distant time intervals show the reduction of the marsh areas. The largest of Iraq's marshes, Hawr al-Ḥammār, located between Dhī-Qār and al-Baṣrah governorates with an area of about 114,480 dunams (Hadrūs, 2006, p. 9), has seen its area decrease significantly according to the satellite image captured on 15/4/2016. A clear difference in the change of the marsh area is noticeable among five satellite images taken for the years (1973, 1991, 2000, 2010, and 2016) by the Landsat satellite with different sensors.

Map 1-4: Marshes of Southern Iraq (1973)



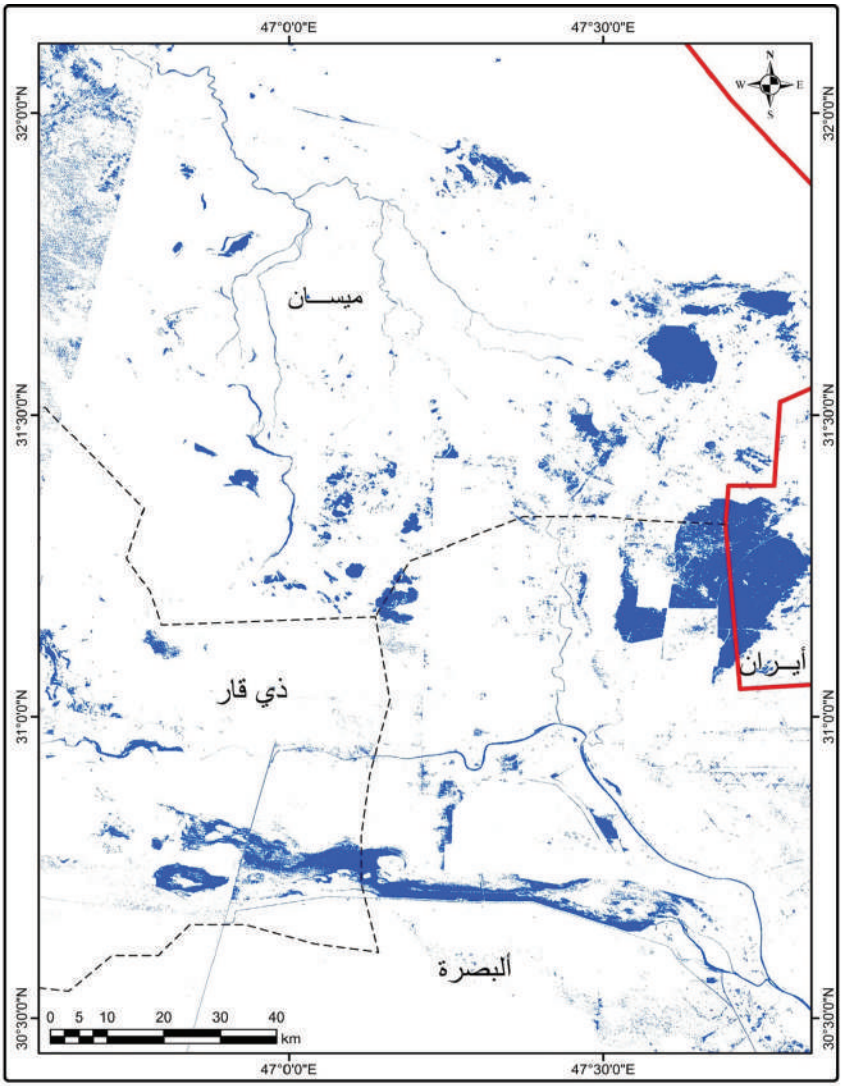
Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with different sensors. The area was calculated and maps were drawn based on the GIS program.

Map 1-5: Marshes of Southern Iraq (1991)



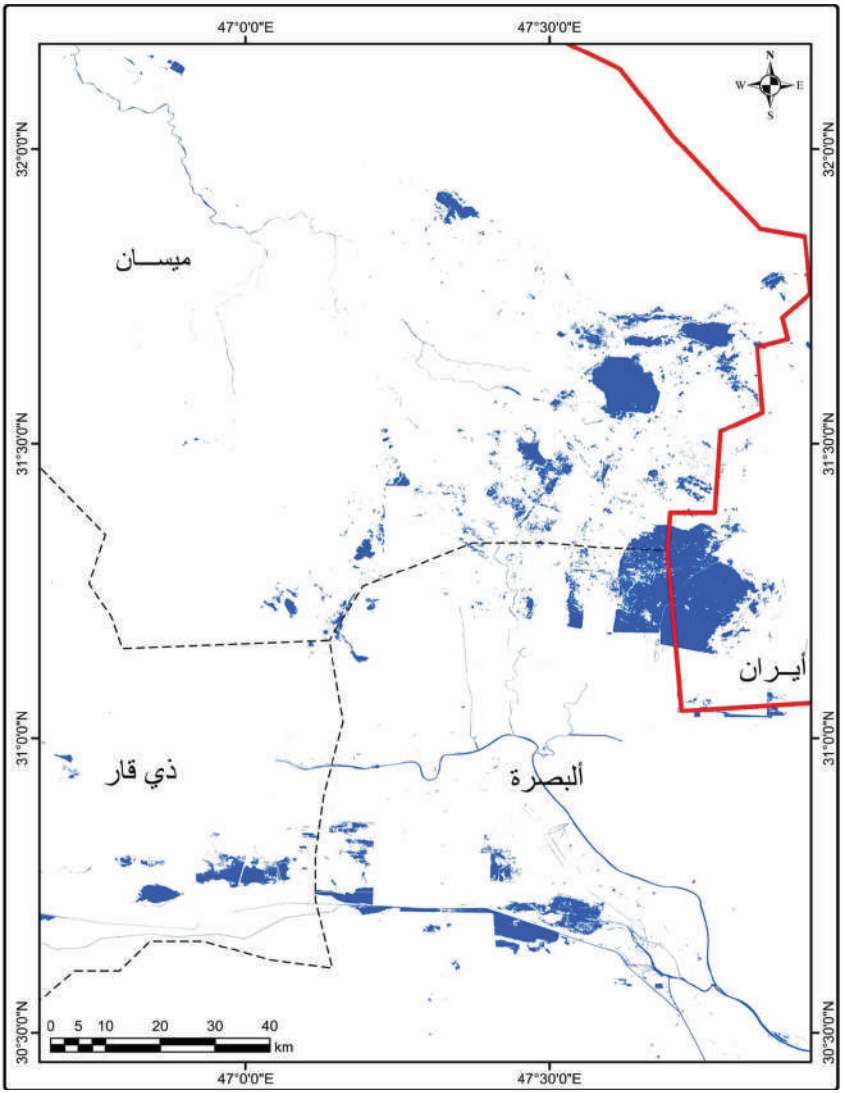
Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with different sensors. The area was calculated and maps were drawn based on the GIS program.

Map 1-6: Marshes of Southern Iraq (2003)



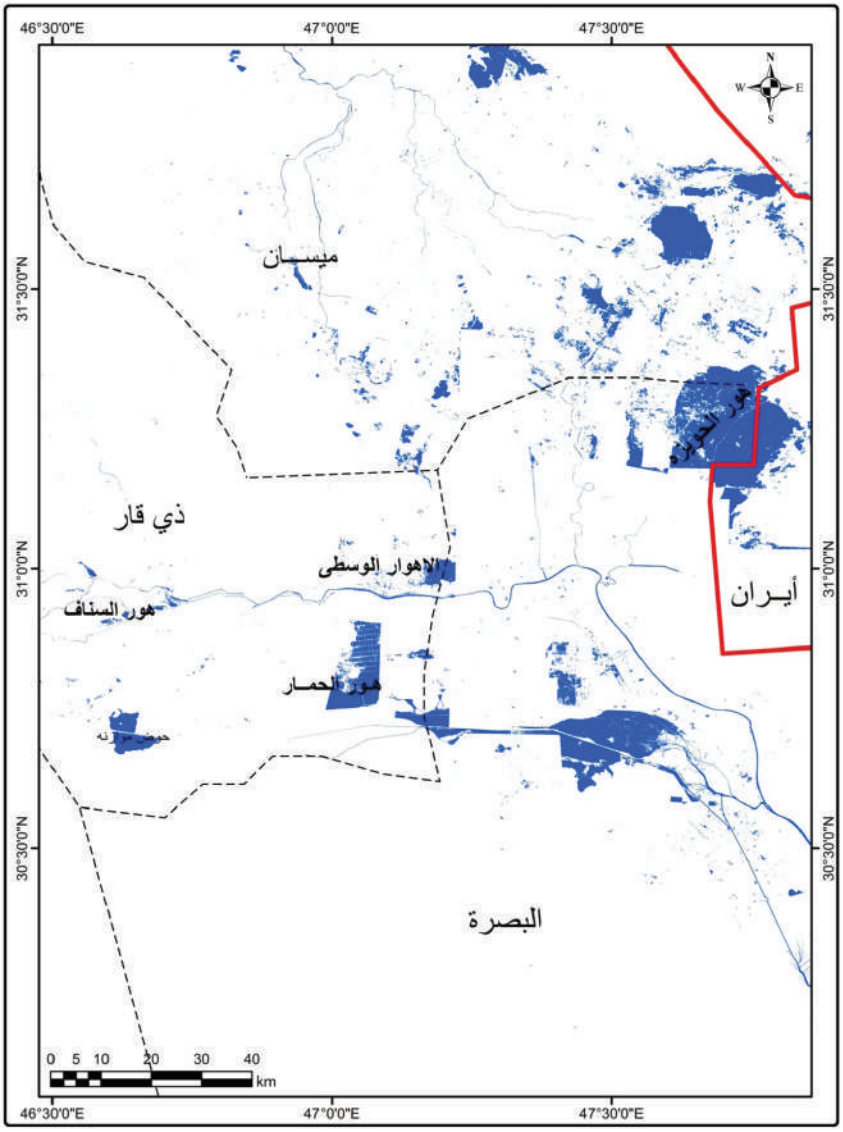
Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with different sensors. The area was calculated and maps were drawn based on the GIS program.

Map 1-7: Marshes of Southern Iraq (2015)



Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with different sensors. The area was calculated and maps were drawn based on the GIS program.

Map 1-8: Marshes of Southern Iraq (2016)



Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with different sensors. The area was calculated and maps were drawn based on the GIS program.

Marsh Areas for Multiple Time Periods

- In 1973, the area of the marshes was 19,788 km².
- In 1991, it was 10,453 km².
- In 2003, it was 11,455 km², as shown in Table 1-2.
- In 2016, it was 6,852 km², as shown in Table 1-2.
- The loss for the period 1973-1991 = 9,335 km²
- The loss for the period 1973-2016 = 12,936 km²

In other words, the marshes lost about two-thirds of their area during the period 1973-2016.

Table 1-2: Marsh Areas for the Years 2003, 2016

Marsh Name	2003	2016
Central Marshes	1,434 km²	1,800 km²
Hawr al-Ḥammār	5,657 km²	2,433 km²
Hawr al-Sannāf	8 km²	11 km²
Hawr al-Ḥuwayzah	4,356 km²	2,608 km²
Total	**11,455 km²**	**6,852 km²**

Source: The researcher, through satellite images from the American Landsat satellite (1, 3, 5, 7) for different years and with sensors different from the previous version, and Landsat 8. The area was calculated and maps were drawn based on the GIS program.

II. Biodiversity in the Marshes

The marsh environment is a habitat for many living organisms. It is home to more than 90 species of fungi, more than 260 species of phytoplankton, parasites, and algae, 51 species of aquatic plants, about 89 species of zooplankton, 92 species of large invertebrates, more than 41 species of riverine and migratory marine fish, more than 159 species of resident and migratory (winter and summer) water birds, and more than 18 species of resident and visiting mammals.(1)

1. Vegetation Cover

Aquatic plants in the marshes are a major part of the food chain for other living organisms in the marshes. The rate of drying and death of vegetation cover in the marshes reached more than 75% during previous years.

Table 1-3: Most Important Plant Species in the Marshes.

No.	Arabic Name	English Name	Scientific Name
1	Qaṣab	Reeds	Phragmites australis
2	Bardī	Papyrus	Typha australis
3	Jawlān	Club-rush	Schoenoplectus
4	Shuwayjah	Waternymph	Najas sp
5	Dhayl al-'Utwī	Whorl-leaf watermilfoil	Myriophyllum verticillatum

(1) For more, see ('Abbūd, 1994).

Table 1-3 (continued)

No.	Arabic Name	English Name	Scientific Name
6	Ghazīzah	Floating fern	Salvinia natans
7	Shatītīnah	Sago pondweed	Potamogeton pectinatus
8	Khuwayṣah	Eelgrass	Vallisneria spiralis
9	ʻArmaṭ 1 (Long-leaved)	Shining pondweed	Potamogeton lucens
10	ʻArmaṭ 2 (Oval-leaved)	Perfoliate pondweed	Potamogeton perfoliatus
11	Shambulān	Hornwort	Ceratophyllum demersum
12	Kurayshah	Waterthyme	Hydrilla
13	Kuʻībah	Water lily	Nymphaeaceae
14	ʻAdas al-Māʼ	Gibbous duckweed	Lemna gibba

Source: Ministry of Health and Environment, 2015

2. Birds

The drying of the marsh waters, the desiccation of the vegetation cover, as well as the death of fish in the marshes—all these factors have affected the presence of bird species in the marshes and have led to the disappearance of birds to a very large extent. Birds were not observed during the field visits after drought.

Table 1-4: Most Important Bird Species in the Marshes.

No.	Arabic Name	English Name	Scientific Name	Status
1	al-Ghaṭṭās al-Ṣaghīr	Little Grebe	Tachybaptus ruficollis	Migrant
2	Ghurāb al-Baḥr	Cormorant	Phalacrocorax carbo	Migrant
3	Ghurāb al-Baḥr al-Qazam	Pygmy cormorant	Phalacrocorax pygmeus	
4	al-Wāq al-Ṣaghīr	Little Bittern	Ixobrychus minutus	Migrant
5	al-Wāq al-Abyaḍ al-Ṣaghīr	Squacco Heron	Ardeola ralloides	Migrant
6	al-Balūshūn al-Aurjuwānī	Purple Heron	Ardea purpurea	Resident
7	al-Balūshūn al-Ramādī	Grey Heron	Ardea cinerea	Migrant
8	al-Iwazz al-Arbad	Graylag Goose	Anser anser	Migrant
9	al-Ḥadhf al-Shatwī	Teal	Anas crecca	Migrant
10	Baṭṭ Samārī	Gadwall	Anas strepera	Migrant
11	al-Khuḍayrī	Mallard	Anas platyrhynchos	Migrant
12	al-Sharshīr al-Mukhallaṭ	Marbled Teal	Marmaronetta angustirostris	Migrant
13	Ḥamrāwī Abyaḍ al-ʿAyn	Ferruginous Duck	Aythya nyroca	Migrant
14	Marzat al-Baṭāʾiḥ	Marsh Harrier	Circus aeruginosus	Migrant
15	Darrāj Aswad	Black Francolin	Francolinus francolinus	Resident
16	Dajāj al-Māʾ	Moorhen	Gallinula chloropus	Migrant

Table 1-4 (continued)

No.	Arabic Name	English Name	Scientific Name	Status
17	al-Ghurrah	Coot	Fulica atra	Migrant
18	al-Burhān	Purple Gallinule	Porphyrio porphyrio	Migrant
19	Abū-Mughayzil	Black-winged stilt	Himantopus himantopus	Resident
20	Qaṭqāṭ Aḥmar al-Lughd	Red-wattled plover	Hoplopterus indicus	Resident
21	Qaṭqāṭ Abyaḍ al-Dhayl	White-tailed Plover	Chettusia leucura	Resident
22	al-Jahlūl	Common Snipe	Gallinago gallinago	Resident
23	Ṭīṭūy Aḥmar al-Sāq	Redshank	Tringa totanus	Migrant
24	Nawras Mustadiqq al-Minqār	Slender-billed Gull	Larus genei	Resident
25	Nawras Aswad al-Raʾs	Black-headed Gull	Larus ridibundus	Resident
26	Khuṭṭāf Mustanqaʿāt Multaḥī	Whiskered Tern	Chlidonias hybrida	
27	Ṣayyād al-Samak al-Abqaʿ	Pied Kingfisher	Ceryle rudis	Resident
28	Ṣayyād al-Samak al-Rafrāf	Common Kingfisher	Alcedo atthis	Resident
29	Ṣayyād al-Samak Abyaḍ al-Ṣadr	White-breasted kingfisher	Halcyon smyrnensis	Resident
30	Qumburah Mutawwajah	Crested Lark	Galerida cristata	Resident
31	Jashnat al-Māʾ	Water Pipit	Anthus spinoletta	Migrant
32	Dhaʿrah Bayḍāʾ	White Wagtail	Motacilla alba	Migratory
33	Bulbul Abyaḍ al-Khadd	White-cheeked Bulbul	Pycnonotus leucogenys	Resident
34	Naqshārah	Chiffchaff	Phylloscopus collybita	
35	Tharthārat al-ʿIrāq	Babbler	Turdoides altirostris	Resident
36	Ghurāb Abqaʿ	Hooded Crow	Corvus corone cornix	
37	ʿUṣfūr al-Baḥr al-Mayyit	Sparrow	Passer moabiticus	Migrant
38	al-Wāq (al-Rukhāmah)	Bittern	Botaurus stellaris	Migrant

Source: Ministry of Health and Environment, 2015

3. Threats to Biodiversity in the Marshes

a. Drought

The water crisis in the marshes began in 1991, i.e., after the Sha'ban Uprising, when the former regime committed the largest environmental crime that threatened biodiversity by damming the rivers and preventing them from supplying the marshes with water. The drought continued through

the 1990s, then water returned to the marshes again after 2003. Since the end of 2008, the drought has returned again, as follows:

1. Hawr al-Ḥammār dried up completely and has been fed by water from the Main Outfall Drain since the end of 2009, a process that contains multiple risks due to the salinity of the Main Outfall Drain's water.
2. The Central Marshes (al-Chibāyish Marshes) dried up completely. As for Abū-Zaraq Marsh, its water decreased by 50%. A weir was constructed on the Euphrates River, which increased the level of inundation in the Central Marshes.
3. Abū-Zaraq Marsh dried up completely due to the lack of water inflows in the Gharāf River, from which it is fed.

b. Pollution in the Marsh Waters

This is represented by the discharge of sewage waste into the rivers, which in turn reach the marshes. The marshes in southern Iraq have been exposed to types of environmental changes that have affected the ecosystem, especially after the draining, where the ecological balance was disturbed and the nature of the area changed. This is in addition to changes in local climatic conditions, because the rapid draining of an area of more than 9,000 km^2 of marshes and lakes is accompanied by a direct impact on the local climate, and the area became a dry environment, subsequently exposed to desertification. Desertification is a process of demolition or destruction of the Earth's biological potential, which can ultimately lead to complete desertification. It is a manifestation of the widespread degradation of ecosystems that leads to a reduction in the Earth's biological potential, represented by plant and animal production (Abū-Jirrī, 2007). Some areas of the marshes suffer from the presence of war remnants and unexploded ordnance, especially the eastern al-Ḥammār marshes adjacent to the city of Sūq al-Shuyūkh, thus creating the possibility of radioactive contamination.(1)

c. Deterioration of the Social Situation

Most villages are located deep in the marshes, and most of their inhabitants depend for their livelihood on:

1. Buffalo breeding.
2. Cutting and selling reeds.
3. Fishing and bird hunting.
4. Some crafts (making boats, fishing nets, reed mats).

d. Problems Related to Human Development

1. Scarcity of potable water.
2. Illiteracy and lack of education.
3. Low health level of the population.

(1) According to researcher's field study, July 2015.

4. Impact on some crafts (making boats, fishing nets, reed mats).(1)

e. Overfishing and Overhunting

This includes fishing with electric current and the illegal hunting of migratory birds, using all forms of illicit hunting methods. Some hunters burn reeds and papyrus to drive out birds and hunt them in open areas. These include the Common Coot, Greater Flamingo, Mallard, Common Teal, and other migratory birds. Flocks of birds arriving in the marshes are subjected to hunting by prohibited methods through the use of wheat treated with poisons, which is then marketed in the cities, especially ducks that prefer to stay and breed in narrow and specific places in the middle of the marsh, which makes the task of hunting them easier.

III. Conclusions

1. Marshes in southern Iraq are part of the alluvial plain, and satellite imagery has shown their areas have shrunk in recent decades. Their area, according to the satellite image taken in 1973, was 8,926 km^2, and the marshes form a triangle whose vertices are the governorates of Maysān, al-Baṣrah, and Dhī-Qār.
2. The reason for the shrinking water area is the decrease in the inflows of the Tigris and Euphrates rivers, as well as the rivers coming from Iran, such as al-Karkheh, al-Ṭīb, and Duwayrij.
3. Quality of water in the marshes has differed from its previous state as a result of different hydrological conditions, an increase in the level of salt concentration, and an increase in the concentrations of physical and chemical properties.
4. Tests have recorded a clear increase in the numbers of fecal coliform bacteria, which have significant health effects. In the summer, it was 3919.4 cells/100ml; in the winter, it reached 2839.1 cells/100ml; and in the spring, it recorded 2241.3 cells/100ml.
5. The study recommends relying on geographic information systems and remote sensing techniques to build a digital hydrological model to be an effective and useful tool for monitoring the marsh ecosystem.
6. The study recommends periodically measuring water characteristics to determine its suitability for human or animal consumption, or for irrigation, and expanding the establishment of an integrated network of drains, especially field drains, in order to reclaim all lands, increase their productivity, and reorganize the drainage networks and secondary branch channels in the marshes, as they are random and primitive.

(1) For more, see (al-Zayyādī, 2011, p. 949).

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2. Mesopotamian Buffalo: Identity and Economy

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I. A Brief Overview of the Buffalo

The buffalo is one of the oldest domesticated livestock species, associated with humans since prehistoric times not only as a draft animal but also as a primary source of milk, meat, hides, and horns. The buffalo is a primitive animal suitable for breeding in extensive areas and can be kept year-round in wet fields. It is characterized by its high immunity to diseases and its ability to consume large quantities of cheap fodder, utilizing feed components with high efficiency (Sivakumar et al., 2006).

The domestication of the buffalo and its native habitat extends from the eastern Indus Valley to the Mesopotamian Valley. Its numbers then multiplied, and it spread from there to the rest of the world due to the presence of dense forests, rivers, marshes, and streams, which were considered natural and agricultural reserves for buffalo breeding (Dhanda, 2006). It is believed that the buffalo settled in Mesopotamia since prehistoric times, most likely in the third millennium BC (al-Sā'idī, 2010). This belief was confirmed by archaeologists in Iraq and around the world through archaeological excavations in the Royal Cemetery at Ur in southern Iraq, as Sūsah (1983) indicated the presence of buffalo in the marsh regions of Iraq long before the Sumerians depicted them on their seals and tablets. This statement contradicted the opinion that the Iraqi buffalo was imported from India during the Umayyad Caliphate. Sūsah's excavations in the Royal Cemetery at Ur in southern Iraq revealed cylinder seals and ivory seals that confirm the presence of buffalo in Iraq since ancient times (Picture 2-1). The presence of the buffalo in these Sumerian symbols and inscriptions prompted Iraqi researchers, through the International Buffalo Federation, to name it the Mesopotamian Buffalo.

Webster and Wilson (1980) noted that the buffalo is distinguished from other animals by being a semi-aquatic animal. It enjoys swimming, especially in hot months, due to having few sweat glands, meaning its sweating process is less efficient. It spends the hottest part of the day (10-16 hours) partially

Picture 2-1: The Mesopotamian Buffalo and its connection to the Sumerian era.

submerged in natural swamp waters. The buffalo surpasses cattle in its resistance and adaptation to harsh environments.

Most buffalo in the world descend from the genus (Bubalus) of the family (Bovidae). The predominant species is (Bubalus bubalis), or what is known as the Water Buffalo. In general, there are two types of water buffalo in Asia (Wilson and Cole, 2000):

1. **Wild Buffalo**: Globally, the wild buffalo population is approximately 4,000 animals, which are protected in special areas in Bhutan, India, Nepal, and Thailand. Unfortunately, however, the number of wild buffalo is continuously decreasing significantly, due to excessive hunting and also to crossbreeding with domesticated buffalo.
2. **Domesticated Buffalo**: The buffalo in Iraq is of the domesticated type. This type of buffalo is also divided into two kinds:
    - **Swamp Buffalo**: Also known as (Bubalus carabanesis), it is found in the eastern half of Asia. It is inclined to swim in stagnant lakes and swamps and is primarily used for labor in the rice fields of China and Southeast Asia. It is characterized by its low milk production and small size, mainly due to nutritional factors.
    - **River Buffalo**: Also known as (Bubalus bubalis), it is found in the western half of Asia, Egypt, and Europe. It tends to swim in deep waters and flowing rivers and is characterized by its large size and is often used for producing high-fat milk.

The domesticated buffalo plays an important role in the economies of developing countries in hot and semi-hot regions whose economic resources depend on agricultural activity. In Southeast Asia, the buffalo is the main source of milk production, alongside meat, and the primary source of agricultural labor, especially in rice cultivation areas. The river buffalo has also proven to be of great merit in the Nile Valley and the Middle East region. Farmers have come to appreciate it for its docility and its resistance to many

diseases that cattle cannot tolerate, as well as its high ability to utilize coarse fodder of low nutritional value.

II. Buffalo Milk

The buffalo contributes significantly to global milk production, producing about 69 million tons annually, which is equivalent to 11% of the total milk production in the world. This percentage varies from one country to another. In Pakistan, buffalo produce 75% of the total milk production, while this figure is 55% in both Egypt and India. As for Iraq, it ranked second after Egypt, with its production reaching 28,000 tons. However, buffalo milk production still represents a small percentage of total milk production in Europe (less than 0.01%) (FAO, 2002).

Buffalo milk is a source of livelihood for a wide segment of the rural population in Iraq, especially the inhabitants of the marshes. It is the primary provider for many poor families who depend on it completely for their nutrition, as it is a milk with special and distinct qualities that make it suitable for direct consumption or for use in extracting breakfast cream (qaymar), as well as in making braided cheese, a specialty of the villages of southern Iraq (Idrīs et al., 2009).

According to research findings, the buffalo reaches peak milk production 6-8 weeks after calving. Milk production gradually increases from birth until the peak, then gradually decreases until the animal dries up. The rate of milk let-down is higher in the morning than in the evening due to the different quantities of milk in the udder; for the same reason, the rate of milk let-down is higher at the beginning of the season than at the end. It is known that buffalo are milked twice daily, and milk production increases with the number of milkings, but with a lesser response than in cattle. The average seasonal milk production for buffalo ranges between 700-800 kg, while in well-cared-for herds, production can reach 1200-2100 kg. Clear differences exist among individual buffalo from one region to another and from one country to another due to genetic and environmental variations in milk production (Dash et al., 1976). Milk production is affected by many environmental factors, including the calving season; females that calve in the autumn and winter yield more milk over a longer lactation period, with production rising during the winter to 4.1 kg per day, while it decreases in the summer to 2.5 kg per day. This difference is due to the availability of Alfalfa and moderate temperatures during the winter, in contrast to the summer season when temperatures are high and food is scarce (ʻAbd al-Raḥīm, 2007).

Fresh buffalo milk is characterized by its brilliant white color due to the absence of carotene, the precursor to vitamin A, and its thicker consistency compared to cow's and goat's milk. This is due to its higher content of fat and

other milk solids, which gives it a better taste and makes it more palatable and highly preferred by consumers (Ghada and Soliman, 2005).

'Abd-al-Raḥīm (2007) mentioned that buffalo milk has the lowest cholesterol content compared to other types of milk. The cholesterol content in buffalo milk is 8 mg/100 g, while cow's milk is considered the highest in cholesterol at 14 mg/100 g. The low cholesterol concentration in buffalo milk is attributed to its low level in the blood, and consequently, a lower rate of passage from the blood to the udder in buffalo compared to cows. This makes buffalo milk and its products much better than cow's milk and its products for the nutrition of patients with high blood pressure and arteriosclerosis. This is contrary to the prevailing belief that buffalo milk is more harmful than cow's milk for patients with heart and cardiovascular diseases due to its high fat content.

Buffalo milk is distinguished by its high levels of natural antioxidants such as tocopherol (Bilal et al., 2006). It is also rich in lactoferrin, which is a glycoprotein containing iron that has antibacterial effects, regulates iron absorption, stimulates the formation of white blood cells (lymphocytes), and is anti-inflammatory (Vorland, 1999; Valenti, 1998; Steijns and van Hooijdonk, 2000).

Buffalo milk differs from the milk of other ruminants in that it is highest in calcium and phosphorus and lowest in sodium, chlorine, and potassium. The high concentration of calcium causes it to curdle quickly even after being diluted to twice its volume. Given the nutritional importance of these mineral elements, this increases the nutritional value of buffalo milk and maximizes its benefits, especially for sensitive groups such as children, pregnant women, and the elderly (Ghada and Soliman, 2005).

Braun and Stefanie (2008) stated that the pH value of fresh buffalo milk ranged between (6.53-7.00), while the acidity of buffalo milk was between (0.17-0.26%) (Rehman and Salaria, 2005). This is higher than the acidity of goat's milk, which ranges from (0.14-0.19%). It was found that when milk is stored for some time, bacteria multiply, and lactose is used and converted into lactic acid, which leads to an increase in acidity and lowers the pH value of the milk (Sawaya et al., 1984). The specific weight of buffalo milk ranges from (1.030-1.035), while its viscosity is 2.04, which is higher than the viscosity of other types of milk due to the high content of fat and milk solids in buffalo milk (de Franciscis et al., 1988).

III. The Iraqi Buffalo

Iraq is one of the countries where buffalo are raised, given the suitable environment for their existence, especially the marsh region in southern Iraq. It is believed to have originated from India, but archaeological evidence indi-

cates that it was present in Mesopotamia before its presence in India, based on drawings found dating back 4,600 years.

An ivory animal head, believed to be that of a buffalo, was found in the Nimrud region of northern Iraq, dating back to the reign of Ashurbanipal in 265 BC. Meanwhile, other sources indicate that the buffalo was introduced to Iraq during the governorship of al-Ḥajjāj ibn Yūsuf al-Thaqafī under the Umayyad rule, when breeders brought them and settled in the marsh region in the south. It was later sent to Antioch in Syria, then to Turkey. The number at that time was estimated at 8,000 buffaloes. It then spread to Bulgaria, Yugoslavia, and Italy, and it is believed that the buffalo was transported from Iraq to Egypt, thus forming the nucleus for Egyptian buffalo breeding.

The buffalo is widespread in most of the country's governorates, especially around cities, but it is concentrated in the marshes of southern Iraq. The buffalo has coexisted with the environmental conditions and was and still is the main source of livelihood for the inhabitants of the marshes. Its population in 2008 was 437,285 head, distributed across different regions in Iraq, including 283,049 head in Dhī-Qār Governorate (National Livestock Survey, 2008). Its diet consists of concentrated and green fodder, depending on availability. It feeds on reeds, papyrus, and coarse grasses containing low-value nutritional materials and converts them into high-value nutritional substances, which is attributed to the physiological development of the buffalo's digestive system (al-Ḥamdānī, 2004). Despite the distinguished role of the buffalo as a producer of milk and meat and as a source of energy for agricultural work, this animal has remained neglected from a research perspective in terms of the number of studies concerned with improving and developing its production. The proper breeding and care of buffalo and the improvement of this resource's current state will have a positive impact on the development of the national economy.

The Iraqi buffalo faced several challenges, as detailed in the following:

1. The First Migration (1981-2003)

Before the eight-year Iraq-Iran War, the geography of the buffalo in Iraq was closer to reality, especially if we study the history of this animal in the region and the nature of the environment in which it thrives, where water is an important element. Therefore, we see that the highest densities were in the marshes and cities of the three southern governorates of Iraq, reaching 60% of the total buffalo population in Iraq, followed by the central region with about 37%, and the lowest numerical density in the northern regions, reaching 3% (Ministry of Planning, 1981).

When the Iraq-Iran War ended, the geography of the buffalo did not change much. The buffalo villages in the marshes were relatively removed from the war, except for the villages located in the eastern marshes adjacent to Iran, which were subjected to shelling and military operations, including

the marshes of al-Musharraḥ, al-Kaḥlā', and al-'Uzayr. Buffalo breeders there were forced to move to the safer Central Marshes in the marshes of al-Salām, al-Haddām, and their surroundings. However, the serious event that occurred and led to a significant decline in buffalo numbers in the mid-1980s was the large-scale death of livestock, especially buffalo, due to rinderpest imported through the introduction of infected Indian buffalo without medical examination across the land border with Kuwait. The fatalities at that time were estimated at 17,000 head (FAO, 1986), and the buffalo of the marshes bore the largest share of this due to the difficulty of carrying out preventive vaccinations at the time, resulting from the ferocity of the Iraqi buffalo and its sensitivity to strangers, in addition to the surrounding war conditions.

The problem of the draining of the marshes in the early 1990s brought about the greatest change in the geography of the buffalo in Iraq. This resulted from the burning and draining of thousands of hectares of reed and papyrus swamps that constituted the largest balanced natural ecosystem for buffalo breeding and contained the largest proportion of buffalo numbers in Iraq (Picture 2-2). The policy of draining the marshes and burning the reeds led to a mass exodus of the marsh dwellers and their buffalo to Iran via the eastern marshes or to Iraqi cities around the capital Bāghdad and other governorates in the central and northern regions. This was confirmed by human rights organization reports at the time, which also indicated that those who remained in the marshes were forced to farm on the drained lands after dams were built to divert water so that it would not flow into the marshes. These people were forced to sell some of their buffalo to pay for

Picture 2-2: Draining of the marshes and the state of buffalo life.

the expensive fodder after the disappearance of the reeds and papyrus that had been the primary feed for this animal. In the face of the deteriorating situation and the high cost of fodder, some switched from breeding buffalo to raising sheep, as they are less troublesome and costly to raise and are suitable for the conditions of the marshes after draining. This was in addition to migration to other areas, which caused a decrease in the number of buffalo in the southern governorates of Iraq as follows:

- Dhī-Qār Governorate (from 21.2 to 5.5%).
- Maysān Governorate (from 15.4% to 9.3%).
- al-Baṣrah Governorate (from 19.1% to 12%).

The years of economic sanctions in the 1990s led to economic turmoil in the country, resulting in a significant increase in fodder prices in general and an unprecedented rise in meat prices. This forced breeders to sell some of their buffalo to butchers to pay the exorbitant fodder prices or to provide feed with poor nutritional elements, which led to a clear decline in buffalo growth rates and a decrease in their reproductive and productive capabilities.

2. The Reverse Migration (2003-2006)

This is divided into two periods:

- The first period is called the voluntary reverse migration (Ministry of Water Resources, 2005).
- The second period is called the forced reverse migration, which occurred as a result of the security conditions that Iraq experienced after 2003.

Therefore, a forced reverse migration of thousands of buffalo-breeding families took place from these areas back to their original villages in the southern governorates, from which they had migrated after the draining and burning of reeds in the marshes. Therefore, we find a clear increase in the proportions of buffalo densities in the governorates of Dhī-Qār and Maysān, with the exception of al-Baṣrah Governorate, where the proportions remained static.

Table 2-1 shows the variation in the numbers of Mesopotamian buffalo for the period (1981-2008). It is clear from the table that there was a large number of buffalo in 1981, which reached 309,000, while a decrease in the number was recorded in 2001, reaching 120,000, which is low compared to the number in 1981. This supports what was mentioned about the conditions that this sector faced. The year 2006 recorded an increase in the number of buffalo, reaching 146,000, which is consistent with the return of life to the marshes and its effect on the growth of this sector, reaching 285,537 in 2008 according to the Ministry of Agriculture's statistics in this regard.

Table 2-1: Variation in Buffalo Numbers (1981-2008).

Governorates	1981	2001	2006	2008
Bāghdad	24,500	29,100	19,800	16,700
Dhī-Qār	12,200	5,500	12,300	17,300
al-Baṣrah	19,100	12,000	11,900	20,200
Maysān	15,100	9,300	14,200	8,500
al-Qādisīyah	6,700	8,800	5,800	4,400
Wāsiṭ	5,000	6,020	2,100	3,800
al-Najaf	4,800	5,000	5,100	7,500
Babylon	4,100	4,270	6,300	4,000
Nīnawá	3,500	5,600	5,500	4,900
Diyālá	3,400	5,500	6,200	2,700
Karbalā’	1,800	3,800	2,500	4,400
al-Muthanná	1,500	1,600	3,400	2,400
Kirkūk	1,100	1,100	2,500	1,500
Ṣalāḥ-al-Dīn	1,000	1,400	900	1,900
al-Anbār	700	700	800	200
Total	**309,000**	**120,000**	**146,000**	**285,537**

Source: Ministries of Agriculture and Planning.

Table 2-2 shows the number of buffalo in 2008 according to Ministry of Agriculture statistics by governorate and other criteria such as sex and sexual maturity. It is clear from the table that the governorates of southern Iraq accounted for approximately 50% of the total number of buffalo, which supports the idea of the return of life to the marshes and its effect on the

Table 2-1: Distribution of Buffalo in Iraqi Governorates (1981-2008).

Governorate	Male (Immature)	Female (Immature)	Total (Immature)	Male (Adult)	Female (Adult)	Total (Adult)	Grand Total	Percentage
Southern Iraq								
al-Baṣrah	8,297	11,546	19,843	2,590	35,271	37,861	57,704	20.2
Dhī-Qār	6,836	10,498	17,334	2,679	29,270	31,949	49,283	17.3
Maysān	3,371	5,023	8,394	1,228	14,723	15,951	24,345	8.5
Bāghdad & Vicinity								
Bāghdad	6,434	10,243	16,677	1,812	29,320	31,132	47,809	16.7
Wāsiṭ	1,351	2,086	3,437	527	6,785	7,312	10,749	3.8
Middle Euphrates								
al-Najaf	3,022	5,029	8,051	1,203	12,049	13,252	21,303	7.5
al-Qādisīyah	889	2,136	3,025	415	9,049	9,464	12,489	4.4
Karbalā’	1,724	3,180	4,904	741	7,018	7,759	12,663	4.4
Babylon	1,543	2,345	3,888	535	6,973	7,508	11,396	4.0
al-Muthanná	828	1,289	2,116	346	4,501	4,847	6,963	2.4
Northern Region								
Diyālá	1,006	1,628	2,634	277	4,948	5,225	7,859	2.7

Table 2-2 (continued).

Governorate	Male (Immature)	Female (Immature)	Total (Immature)	Male (Adult)	Female (Adult)	Total (Adult)	Grand Total	Percentage
Nīnawá	2,028	2,832	4,860	300	8,801	9,101	13,961	4.9
Kirkūk	489	1,009	1,498	231	2,466	2,697	4,195	1.5
Ṣalāḥ-al-Dīn	279	592	871	181	1,626	1,807	2,678	0.9
al-Anbār	58	134	192	29	321	350	542	0.2
Kurdistan								
al-Sulaymānīyah	256	430	686	41	871	912	1,598	0.6
Arbīl	-	-	-	-	-	-	-	-
Duhok	-	-	-	-	-	-	-	-
Iraq	**38,410**	**60,000**	**98,410**	**13,135**	**173,992**	**187,127**	**285,537**	**100**

Source: (Ministry of Agriculture, 2008).

development of this sector. The governorates of the Middle Euphrates region ranked second in the buffalo census, followed by Bāghdad and Wāsiṭ, then the northern governorates.

IV. Iraq's Membership in the International Buffalo Federation

The International Buffalo Federation is an independent scientific body with legal personality at the international level that observes complete equality and mutual respect among members, taking into account non-discrimination based on color, race, religion, or political creed. It is one of the bodies of the Food and Agriculture Organization of the United Nations (FAO). It is a result of the first scientific conference on buffalo, organized by the Egyptian Veterinary Medical Society for Buffalo Development in cooperation with the University of Florida in the United States, from December 27-31, 1985, under the auspices of the Academy of Scientific Research and Technology and the National Research Center. The International Buffalo Federation was formed based on the collective desire of scientists from the 31 countries participating in the conference. Egypt was chosen at that time as the headquarters of the International Buffalo Federation.

Objectives of the Federation

1. To develop buffalo productivity at the international level by standardizing the basic criteria upon which national, regional, and international bodies concerned with the breeding and care of buffalo as an economic investment are based.
2. To organize conferences, seminars, and meetings at the national, regional, and international levels in all scientific, applied, and economic fields that serve the development and productivity of buffalo.

3. To organize training courses in advanced scientific and technological fields for different levels, in line with the interaction of the scientific and technological revolution in national environments.
4. To follow global scientific progress and conduct research in various fields that lead to the development of buffalo productivity at the international level.
5. To organize scientific publishing and contribute to spreading scientific awareness and culture with the aim of deepening scientific thought and methods among those working in buffalo breeding.
6. To establish a center for the preservation of reproductive cells in preparation for studying various methods of their application in the field of genetic bioengineering, with the aim of developing and enhancing buffalo productivity at the national, regional, and global levels.
7. To establish a central body to coordinate and organize the exchange of scientific information and documents in all fields that serve the development and improvement of buffalo productivity between international, national, and regional bodies, and to develop and strengthen scientific, social, and economic ties among members and international scientific bodies.

Communication with Professor Antonio Borghese, the Secretary-General of the Federation, for several years, and through joint efforts with Dr. Jabbār al-Sā'idī of the General Company for Veterinary Services (Ministry of Agriculture), resulted in the accession of the Directorate of Animal Resources in the Ministry of Agriculture to the aforementioned Federation in 2008. Approval for Iraq's accession to the International Buffalo Federation was obtained from the General Secretariat of the Council of Ministers on 11/3/2009.

V. Reality of Buffalo Breeding in Iraq: Problems and Solutions

Many countries around the world have given great importance to this resource with its extensive economic returns, and many scientific programs have been planned to develop, improve, and enhance it. There are many experiences in Egypt, Italy, Romania, India, Pakistan, Brazil, and the United States. This was achieved through communication and correspondence with many researchers and relevant parties in the aforementioned countries and others, and our efforts in this direction have resulted in the General Company for Animal Resource Services joining the International Buffalo Federation.

The current situation of animal resources, animal production, and buffalo breeding in the marsh areas of Iraq needs rehabilitation, just like the overall life in the marsh areas. The obstacles and problems facing this resource call on all of us to work together to find appropriate solutions to advance this

sector. It is necessary to first identify these problems and obstacles and then to outline the necessary proposals and solutions for its advancement.

Problems and Obstacles

1. The decrease in water levels in the marsh areas, which negatively affects the distribution and life of buffalo in the marsh areas.
2. Proper management of breeding and production.
3. Scarcity of scientific studies and research related to buffalo.
4. Lack of an integrated and accurate database that gives a clear picture of the distribution and reality of this resource.
5. Lack of concentrated feed production plants.
6. Veterinary services and the provision of necessary vaccines and treatments, and working to support and assist this sector.
7. Lack of milk collection plants.
8. Health education and awareness.

Proposals and Solutions

Advancing the development and improvement of buffalo in Iraq requires the consolidation of all sincere efforts and the necessity of financial support to establish sound scientific programs, adopt the experiences of developed countries in this field, especially regarding proper management, artificial insemination programs, genetic improvement, and the preparation of competent scientific cadres in this field. We believe that achieving this requires the following:

1. Encouraging and supporting specialized scientific studies and postgraduate research.
2. Proper management of breeding and production.
3. Working to implement a program of breeding, genetic improvement, and artificial insemination through the establishment of specialized research centers and stations.
4. Working to support breeders and encourage their animal husbandry, and creating a spirit of competition among them.
5. Emphasizing the activation of the animal resources law to govern the relationship between breeders on one hand and agricultural and veterinary departments on the other.
6. Implementing awareness programs in the field of health education.
7. Preparing awareness and educational programs for men and women in the marsh areas in the field of animal husbandry and proper management.
8. Providing concentrated feed.

Picture 2-3: Buffalo in the village of Umm al-Wada', Sūq al-Shuyūkh, Dhī-Qār Governorate.

9. Establishing milk collection plants.
10. Establishing additional veterinary centers and units and implementing continuous vaccination programs.

Economic Feasibility

Feasibility of implementing a project for the development and improvement of buffalo lies in the following points:

1. Developing the national economy.
2. Employing a larger number of laborers.
3. Providing suitable means of livelihood for buffalo breeders.
4. Preserving this resource and increasing its products.
5. Encouraging the development and raising of the scientific level of specialists within Iraqi universities and coordinating with research centers and universities in other countries.

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3.
Aquatic Tourism

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This study addresses the components of aquatic tourism in al-Ahwār, those marshes that have interconnected to form vast water bodies in the southern triangle of Iraq's land, known as the permanent marshes, as they are not seasonal marshes that appear during flood seasons, which typically occurred in the spring.(1) Their area is 9,177 km^2, and with this size, they appear as a distinct physiographic region with a natural environment that has reflected its effects on its inhabitants economically and socially.

Although this region was characterized by being closed and semi-closed until the end of the first half of the last century, its unique natural and human characteristics encouraged some of the travelers who visited Iraq to visit it and enter it from some of its peripheries to get to know it. It also prompted some researchers interested in geology, archaeology, ancient history, anthropology, and geography to study the history of human settlement, the origins of human groups, population numbers, customs, and their socio-economic activities within it.

Among the studies that have addressed the history of human settlement in these marshes and the origins of the human groups that inhabit them are the following studies:

- **Field, H. (1916). The Marsh Arabs of Iraq. Asia Journal, (18), London**. The researcher believed that the inhabitants of the marshes are remnants of the Sumerians who lived in southern Iraq 5,000 years ago and, for their own protection, moved to live inside these marshes.
- **Sitron, L. (1934). Iraq. Oxford Journal of Indian Affairs, (No. 13)**. Sitron put forward the opinion that the origins of the inhabitants of these marshes date back, at the very least, to before the Arab era and the major Arab migrations. In a book his (Foundations in the Dust), published in Oxford in 1947, he says: The guest houses (maḍāyif) of

(1) The annual discharge of the Tigris and Euphrates rivers was 43,500,000,000 cubic meters per year in the 1950s and before, which gradually decreased until it is now less than 22,000,000,000 cubic meters due to storage projects implemented in Turkey and Syria without regard for international law.

the sheikhs of these marshes are similar in style to the structure of Sumerian temples from the fourth millennium BC.

- **Frankfort, H. (1954) The Birth of Civilization in the Near East, Oxford, London**. Frankfort also believes that these marshes have been inhabited by humans since the fifth and fourth millennia BC.

The following studies also addressed a range of economic and social characteristics of the marsh inhabitants and their methods of interaction with the environment:

- al-ʻAqīlī, N. (1971). Tourism Geography of al-Ṣuḥayn Region [الجغرافيـة السـياحية لمنطقـة الصحيـن]. Journal of the Iraqi Geographical Society , 7.
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Recently, detailed studies, research, and reports have been published concerning the topic of the marshes and programs for their development and enhancement. Center for Restoration of the Iraqi Marshlands (CRIM) was established, affiliated with the Ministry of Water Resources, has prepared numerous research papers, studies, and reports. Marshes Research Center at the University of Dhī-Qār was also established, and some postgraduate students have addressed the topic in their theses and dissertations.

We have referred to the primary sources upon which we relied for the preparation of this study. We hope that we have succeeded in filling some of the gaps in the scientific literature dealing with the Marshes of Iraq, particularly the marshes of southern Iraq. Our interest was clear in presenting the tourism components in the hope of developing and enhancing them, and in seeing these marshes gain a place on the list of nature reserves and the World Heritage List, similar to nature reserves in the Arab world, such as the al-Shūf Cedar Nature Reserve in Lebanon, the Arabian Oryx Sanctuary, the al-Salīl National Park, Ras al-Jinz Turtle Reserve in Oman, Bahariya Oasis in Egypt, Ain al-Ghazālah in Libya, Ṣabāḥ al-Aḥmad Natural Reserve in Kuwait, and the group of reserves in Sudan and Somalia.

I. The Fundamental Natural Characteristics of the Geography of the Permanent Marshes

1. Geographical Location

Looking at the map of Iraq, we notice that the triangle of the permanent marshes extends between latitudes 30°30′ and 32°30′ North of the equator and longitudes 46°30′ and 48°0′ East of the Greenwich line.

2. Area

With this vast extent, the permanent marshes cover an area of 9,177 km^2, which constitutes 19.1% of the area of the southern triangle governorates (Dhī-Qār, Maysān, al-Baṣrah), whose total area is (48,042) km^2. They also cover 8.55% of the area of the administrative units (sub-districts and district centers) in which they are located, as shown in Table 3-1. It must be noted here that the area of the aforementioned governorates constitutes slightly more than 50% of the total area of the alluvial plain, which is 132,500 km^2. This, in turn, constitutes 25% of Iraq's total area of 435,052 km^2, including the territorial waters area of 924 km^2.

It should be noted that the area of the marshes has not been determined with a single figure by researchers due to differences in the criteria they rely on. Here, we refer to the estimate of Wilfred Thesiger for its area in his book

Table 3-1: Administrative Units in the Marsh Region and the Area of Permanent Marshes within them

Administrative Unit	Area km²	Permanent Marshes as % of Area	Permanent Marsh Area km² (*)
Dhī-Qār Governorate	**12,900**	**22.1%**	**2,849.9**
al-Chibāyish District Center	1,062	90%	955.8
al-Ḥammār Sub-district	681	90%	612.9
al-Fuhūd Sub-district	590	90%	531.0
Garmat Banī Sa'īd Sub-district	474	80%	379.2
al-Faḍlīyah Sub-district	615	60%	369.0
Maysān Governorate	**16,072**	**23.1%**	**3,720.9**
Qal'at Ṣāliḥ District Center	250	70.0%	175.0
al-'Uzayr Sub-district	1,161	50%	580.5
al-Majar al-Kabīr District Center	506	30.0%	151.8
al-'Adl Sub-district	539	30.0%	161.7
al-Kaḥlā' District Center	800	50.0%	400.0
al-Maymūnah District Center	550	30.0%	165.0
al-Salām Sub-district	1,302	50.0%	651.0
al-Rifā'ī Sub-district	913	50.0%	456.5
Al-Kumayt Sub-district	1,695	31.7%	537.3
al-Musharraḥ Sub-district	1,917	30.0%	575.1
al-Baṣrah Governorate	**19,070**	**13.6%**	**2,606.5**
al-Madīnah District Center	269	90%	242.1
'Izz al-Dīn Salīm Sub-district	503	95%	477.8
Ṭalḥah (al-Ṣādiq) Sub-district	217	90%	195.3
al-Qurnah District Center	1,248	50%	624.0
al-Dayr Sub-district	825	80%	660.0
al-Nashwah Sub-district	539	70%	377.3
Total	**16,452**	**55.8%**	**9,177.3**

Source: Areas of administrative units are from the Ministry of Planning, Central Statistical Organization, Annual Statistical Abstract 2012-2013, Part One - Natural Conditions - Table 1-5.

(*) The permanent marsh area was calculated based on the percentage of the administrative unit's area it constitutes (90, 75, 50, 30, less than 30), as calculated by the researcher using a planimeter at the Survey Department, Real Estate Registration Directorate, al-Najaf al-Ashraf Governorate.

"The Marsh Arabs," which he wrote at the beginning of the fifth decade of the last century. He estimated it at 6,000 square miles, which is approximately 15,520 km². We have mentioned this estimate as it is one of the early estimates made before the marsh area shrank due to the storage projects built by Iraq, Syria, and Turkey, and finally, due to the drainage project with its security and political objectives.

Map 3-1: Administrative Units in the Permanent Marshes Region of Southern Iraq.

3. Geological Structure

The geological structure of the marshes is linked to the geological structure of Iraq and the surrounding region; thus, their history is the geological history of Iraq. Geological studies indicate that the land of Iraq has undergone a long history extending through ancient eras and periods up to modern times. In general, the geological structure of Iraq was influenced by two main factors:

1. The presence of the solid landmass to the west and southwest of Iraq, which is the mass forming the Arabian Peninsula. Geologists believe it is part of the ancient, solid continent of Gondwana,[1] which is highly resistant to the earth movements that formed mountains in its neighboring areas.
2. The presence of the Tethys Sea,[2] which was a great sea adjacent to this solid mass. Geological studies indicate that in the Permian period (late Paleozoic Era), this sea covered most of the land of Iraq. The rocks forming its floor were less solid than the rocks of the Gondwanaland continent, and thus they were affected by earth movements.

From these two factors, the topographic map of Iraq was formed. The parts of Iraq covered by this sea and close to the Arabian Peninsula landmass were not significantly affected by the folding movements that occurred in the region because the rocks of the Arabian Peninsula plateau extended beneath

(1) Geologists believe that this ancient continent extended over a vast area of the globe, from South America (the Brazilian Highlands) to Africa (the Sahara Desert), to the Arabian Peninsula, and to the Deccan Plateau (the Indian subcontinent), and to Australia (the central Australian desert).

(2) The vast Tethys Sea extended from the eastern Mediterranean, including Syria, Lebanon, most of Iraq, and Iran, and continued eastward to northern India.

them. Thus, they largely maintained their flatness, such as the alluvial plain, the western desert plateau, and the areas near them. The farther we move from these western regions towards the east and north, the more the land was affected by folding movements due to a lack of thickness in the underlying base of hard, resistant rocks. Thus, we observe that the topographic map of Iraq depicts mountains in its north and east, and these mountains increase in height and complexity the farther we move from western Iraq, that is, the farther we move from the base of resistant hard rocks.

During the Mesozoic Era and the early Cenozoic Era, the area covered by the Tethys Sea was subjected to folding movements that formed mountains, causing the sea to become shallower. As a result, the mountains of Turkey, Iran, and the coast of Oman were formed, and sedimentation in the sea bed increased until it turned into two shallow basins in the Oligocene epoch (the second epoch of the Cenozoic Era). After that, intense folding occurred, forming the Taurus Mountains in the Miocene epoch (the third epoch of the Cenozoic Era).

At the end of this epoch, the land of Iraq emerged almost completely, and vast alluvial fans began to form on it. In the Pliocene epoch (the last epoch of the Cenozoic Era), the folding movements intensified, forming the Zagros Mountains, including the mountains of Iraq, as they are an extension of them. In the Pleistocene epoch (early Quaternary Period), the folding movements that completed the formation of the mountains of Iraq continued (Admiralty Naval Staff, 1918, pp. 59-60).

Due to the orogenic folding movements, the southern parts of Iraq, which is the alluvial plain region, subsided and were submerged by the sea (the Gulf). As a result of this subsidence, erosion in this region increased, and river sediments accumulated on top of it, forming the great plain of Iraq, the alluvial plain, which dates back to the most recent geological periods, as has been indicated. This plain is still in the process of formation.

Perhaps this very brief introduction to the geological history of Iraq provides us with an explanation for Iraq's topographic map and helps us understand the gradual subsidence of the plain's land from north to south and how the marshes were formed.

The southern parts of the alluvial plain are still in the formation phase. The Tigris and Euphrates rivers carry sediments to the head of the Gulf, which extends its reach by an annual average of 72 feet, or one and a half miles per century. Thus, new lands are added to the alluvial plain, the area of which is not known (al-Khalaf, 1961, p. 26).

Wilson believes that the delta was formed from the sediments of the Kārūn River and the Karkheh River to the east, and from the sediments of Wādī al-Bāṭin to the west. These sediments formed a relatively elevated basin at its edges, while the interior of the basin was gradually filled by the sediments of

the Tigris and Euphrates and their tributaries. Some parts of this basin are still covered by marshes because they have not yet been filled (Wilson, 1928, p. 3).

Lloyd believed that the Gulf extended north of Bāghdad around 4000 BC (Lloyd, 1943, p. 19) and that during the Sumerian era, it extended to the location of the city of al-'Amārah on the Tigris and the city of al-Nāṣirīyah on the Euphrates. The historic city of Ur was located on the coast of the Gulf at that time, which means the Gulf had receded about 368 km between 4000 BC and the Sumerian period (Lloyd, 1947, p. 51).

The researchers Lees and Falcon presented their opinion in a scientific article titled "The Geographical History of the Mesopotamian Plains," published in The Geographical Journal, Vol. 118, Part 1, in March 1952. Their view was that the Tigris-Euphrates delta would not advance towards the Gulf at the described speed, nor was its progress steady. The shores of the Gulf were not close to the location of al-'Amārah and al-Nāṣirīyah as is commonly believed; rather, these shores were farther to the southeast than they are now. They believe that the Gulf advanced, covered the alluvial plain, and then retreated significantly. Evidence for this includes signs of settlement submerged under the marsh waters or the Gulf waters, or those visible in the southern parts near the current Gulf coast. They also infer this from the drainage direction of some Gulf islands, such as Būbyān Island, whose drainage is directed northward instead of southward.

The researchers concluded that the marsh region is still receiving sediments that average 0.22 inches per year, an amount sufficient to fill them in a few hundred years. Hawr al-Ḥammār, which was formed in 600 BC (Lees and Falcon, 1952, p. 27) and has existed for more than 2,600 years, has not yet been filled. It is clear from the foregoing that they believe the marsh region is still undergoing slow and gradual subsidence because it is in the formation phase (Lees and Falcon, 1952, p. 394).

4. Surface

Topographic maps indicate that the land of Iraq is divided into the following surfaceforms:(1)

a. The Western Plateau

It is located in western Iraq and occupies less than half of its total area (168,552) km^2. Its elevation ranges between (100-1,000 m) and includes al-Jazīrah region between the Tigris and Euphrates. It has a desert nature due to aridity and the absence of surface water.

(1) Geologists, and subsequently geographers, have divided the surface of Iraq into several main and other secondary sections, as indicated by their studies, which began with the initial interests of oil companies, particularly after World War II. Among these studies are Henson (1947-1951), Husted (1948), Dunnington (1953, 1955, 1958), al-Atrūshī (1954), al-Ṭā'ī (1954), Sharīf (1954), Mtchel (1955), Poltton (1958), Holl (1958), Stevenson (1958), al-Khalaf (1958), the agriculturalist specializing in soil science Buringh (1960), Reggii (1964), al-Sayyāb (1968), and Buday (1978).

b. The Mountainous Region

It is located in the northern and northeastern part of Iraq and extends to its borders with its neighbors, Syria, Turkey, and Iran. It occupies a quarter of its area, amounting to 92,000 km^2.

c. The Sub-Mountainous or Undulating Region

To the traveler, it appears as a transitional zone between the low plain in the south and the high mountainous region. It occupies about half the area of the mountainous region, around 67,000 km^2, of which 42,000 km^2 is outside the mountainous region with an elevation ranging between (100-200 m), and 25,000 km^2 is within the mountainous region with an elevation ranging between (200-450 m).

d. The Alluvial Plain

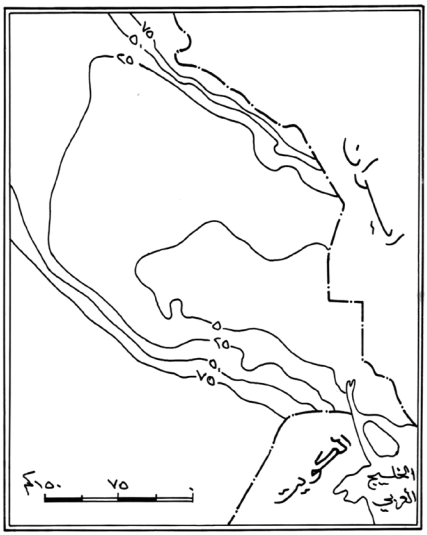
Also called the floodplain, it occupies central and southern Iraq with a length of up to 650 km and a width of up to 250 km, from the city of Balad on the Tigris River and the city of al-Ramādī in the Tall Aswad area on the Euphrates River. These are its northern boundaries, while its southern boundaries stop at the end of the Iraqi landmass at the mouth of Shaṭṭ al-'Arab in the Gulf. This plain occupies an area of up to a quarter of Iraq's area, equal to 132,500 km^2. It is bordered to the east by some Iranian highlands at its upper edges, and to the west by the edge of the Western Plateau. On this plain are spread areas of marshes, swamps, and lakes, the most extensive of which is the southern marshes triangle.

The phenomenon of the spread of marshes, swamps, and lakes in southern Iraq is not limited to it; it also appears in some Arab regions such as the chotts region in Algeria, al-Jarīd chott in Tunisia, al-Ḥūlah region in Jordan, and al-Ghāb plain in Syria.

Geological and geomorphological factors have played their role in the concentration of these marshes in the lower part of the alluvial plain (the delta plain), which is considered the lowest surface in Iraq. It is therefore called the Lower Mesopotamian Basin or the Lower Valley, as is clear from Map 3-2, from which it appears that the 5 m contour line above sea level delineates a basin into which the land slopes from all directions. This basin opens with a very gentle slope towards the southeast, where Shaṭṭ al-'Arab flows into the Gulf. This gentle slope does not have an effect on the process of pushing and draining the marsh waters, nor does it obstruct the inflow of water caused by the tidal movement at the head of the Gulf.

The surface gradient in this triangle is about (1/74,000), as the length of the straight line between the head of the Gulf and al-Iṣlāḥ sub-district (al-Nāṣirīyah district), being the farthest point located on the 5 m contour line, is about 375 km. It is only about (35%) closer to the gradient of the alluvial plain, which is described as having a low gradient and being extremely flat and level, with its general gradient estimated at (1/17,500) (al-Ṭā'ī, 1969, p. 20). The city of Balad

Map 3-2: Contour Lines in Southern Iraq.



is located at an altitude of 45 m above sea level, and al-Baṣrah is at an altitude of 5 m above sea level.

Were it not for the formation of this subsided basin and the abundance of water in it, the marshes would not have appeared as a distinct environment with their water, plants, animals, and human groups amidst a vast geographical surrounding characterized by aridity in southern and central Iraq. The region at the head of the Gulf, located at an elevation of (zero) or fractions of a meter below sea level, allows its subsidence for tidal movement and the entry of Gulf water into Shaṭṭ al-'Arab and surrounding land areas, providing an enchanting view for every tourist and visitor to this region. The river mouths are also considered beautiful natural landscapes that encourage people to reach them and enjoy their features.

A study of the natural reality of these marshes reveals that their main problem is the scarcity of dry land, which pushes marsh dwellers to create (jibāshāt), meaning artificial islands, in order to settle and live on them, building their dwellings and small villages, usually in shallow water areas.

The scarcity of dry islands and their distance from each other contributed to the difficulty of penetrating deep into the marshes, thus causing the communities to remain small and isolated from one another. They thus form a social "image" from the past, which makes them and their biotic environment (plants and animals) a preserve that must be conserved and developed in a way that maintains the unique characteristics of human, plant, and animal groups.

5. Climate

a. General Characteristics of the Climate

The permanent marsh region is part of the arid desert climate zone that covers central and southern Iraq; in this zone, the summer season is long and the winter season is short, while the spring and autumn seasons are short and transitional. It is clear Table 3-3 that the annual average temperature is 23.8°C; it rises in the summer to 33.5°C and falls in the winter to 12.6°C.

As for the monthly average, it is 34.0°C in August and drops to 11.9°C in January. The average maximum temperature rises to 42.6°C in August and drops to 18.1°C in January. As for the average minimum temperature, it is 26.2°C in June and July and drops to 6.3°C in January. The annual average relative humidity is 51%; it rises to 75% in December and January and drops to 35% in September. As for rainfall, it appears from the table in two peaks: a winter peak in November, December, and January, and a spring peak in March and April.

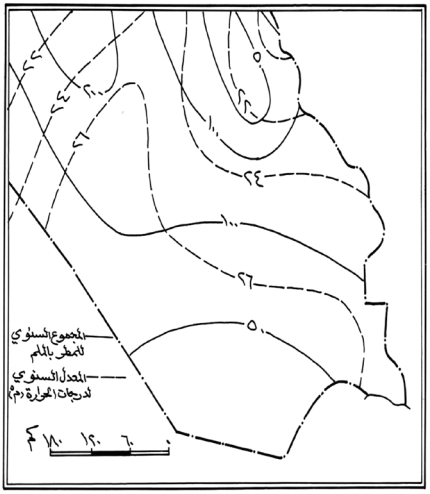
We notice from the table and Map 3-3 that this region has little rainfall. Rain falls on it seasonally in the winter and spring, in accordance with the rainfall pattern of the Mediterranean basin and its margins. The rainy period extends from October, and the amount of rainfall increases to reach its peak in December, then begins to decrease until it has a secondary peak in March. Thus, this region has a rainy season with two peaks, a winter and a spring one. The first is related to the prevailing cyclonic activity over the Mediterranean region and the activity of warm fronts coming from the Gulf when

Table 3-2: Main Climatic Characteristics of the Permanent Marsh Region.

Month	Average Temp (°C)	Max Temp (°C)	Min Temp (°C)	Humidity (%)	Rainfall (mm)
January	11.9	18.1	3.6	75	21
February	13.7	20.0	8.0	65	16
March	17.5	24.0	11.5	57	22
April	23.5	30.0	17.1	49	21
May	29.4	36.0	24.9	45	6
June	32.6	38.0	26.2	41	-
July	33.9	41.5	26.2	40	-
August	34.0	42.6	25.8	36	-
September	31.0	40.0	22.0	35	-
October	25.8	35.9	16.9	43	15
November	19.0	26.6	12.3	61	24
December	12.9	19.0	7.7	75	31
Year	**23.8**	**31.0**	**16.9**	**51**	**156**

Source: General Authority for Meteorology and Seismic Monitoring (unpublished data for the years 2000-2011).

Map 3-3: Temperature and Rainfall Distribution in Southern Iraq.



the southeastern winds blow. The second is related to the prevailing cyclonic activity over the Mediterranean region.

In addition to this cyclonic rain, convectional rain falls on this region, caused by the gradual rise in temperature at the end of the spring season (Shalash, 1960, p. 11).

The data from Table 3-2, and based on the principles adopted by the climatologist Köppen in classifying climate types, indicate that the prevailing climate type in the permanent marsh region is of the arid type (BW), where the amount of rainfall is less than half the annual average temperature. The climatic symbol (h) is added to this, given that the annual average temperature is (23.8)°C, thus exceeding the average of (18)°C, making it a hot climate. The complete climatic symbol for it is therefore (DWh).

If we use De Martonne's equation to measure the aridity index, which is:

$$\text{Index} = \frac{P}{T + 10}$$

where P is the total annual precipitation in mm and T is the mean annual temperature in °C. If the result is below (5), which is the aridity limit coefficient, the region is considered arid. When applying this equation using the data from the previous table, we get:

$$\frac{156}{23.8 + 10} = \frac{156}{33.8} = 4.6$$

This result means that the region is below the limit (5), and is therefore considered an arid region.

b. The Comfortable Climate

It is the state of the climate or weather in which a person feels comfortable, which is physiological comfort or what is called thermal comfort. It usually occurs in a state where the body's thermoregulatory systems are at their lowest level of activity. This is the state that usually occurs when the body is able to lose an amount of heat and emit it to the external environment in an amount equal to the amount generated internally from the effect of vital activities, thus achieving a state of maintaining a constant body temperature (Griffiths, 1976, p. 76).

One of the important facts that must be mentioned is that scientists have not yet been able to arrive at a comprehensive mathematical formula that includes all the elements of the climatic complex in order to calculate human comfort. Some have managed to calculate the effect of temperature and humidity level in an index called the temperature-humidity index. The scientist Thom is considered one of the pioneers who presented their studies in this field. In this study, we have relied on the following equation:

$$I = T - (0.55 - 0.55 \times \text{r.h.})(T - 58)$$

Where:

- I: Index
- T: Temperature (°F)
- r.h.: Relative humidity
- 0.55: Constant
- 58: Constant (al-Shalash, 1980, p. 16)

Based on these results, we can divide the year into three climatic comfort states:

3. Uncomfortable months for humans, tending towards high temperatures, where the index rises above (70). These months are: May, June, July, August, September, and October.
4. Uncomfortable months where the index drops below (60) and the temperature tends to fall, causing a feeling of cold. These months are: January, February, and December.
5. Comfortable months with moderate weather, where the index ranges between (60)-(70). These months are: March, April, and November.

Thus, it seems to us that the best months for feeling comfortable in this region are March, April, and November. This requires tourism management to encourage tourism to the marshes during these months, and it is assumed that they should provide cooling services during the months when the index tends to be high due to high temperatures, and heating services during the months when the index tends to drop due to low temperatures, in tourist facilities such as hotels, cafes, restaurants, and others.

6. The Biotic Environment

The climatic conditions, whose most important characteristics and effects we have pointed out, are reflected in the biotic environment of each region. We have tried to use Emberger's equation to determine the nature of the biotic environment, including plants and animals, in the permanent marsh region.

According to this equation, which is:

$$Q = \frac{1000 \times P}{\frac{(M+m)(M-m)}{2}}$$

Where:

- Q: Pluviothermic quotient. The lower the value of this quotient, the more arid the condition.
- P: Precipitation in mm (annual average).
- M: Average maximum temperature of the hottest month of the year (°C).
- m: Average minimum temperature of the coldest month of the year (°C).
- (M+m): Approximation of the average annual temperature.
- (M-m): Average range of temperature variation in the year.

Based on the data from the main climatic characteristics table for this region, this equation means: Q = 0.15.

The result of the equation indicates that the permanent marsh region is on the border of the arid zone with a cold winter, according to the table described by Emberger. We have described it as "on the border of the arid zone" because the arid zone according to Emberger is where the result of the equation ranges between (12-15) (Emberger, UNESCO-FAO Map of the Mediterranean Zone).

While it is true that the geographical surroundings of the region are generally characterized by aridity, the presence of water has relatively influenced the average temperatures and precipitation. It has also negated the plant poverty that the result of this equation would reflect (12-15). A tourist and visitor to this region will observe a landscape rich in plants and animals.

a. Plant Communities

A visit to the permanent marshes reveals the observation of (Plant Succession), where some plant species can be seen reaching Climax Vegetation, meaning the presence of dominant or controlling plants in the biotic environment (Eyre, 1977, p. 10). These plants are the Reeds (Phragmites communis) and Papyrus (Typha angustata). They are the largest plants by size; the average height of reeds is 20 feet and can reach 24 feet (Salīm, 1957, p. 315). They are found in the form of small forests that constitute islands in the middle of the marshes and sometimes extend for distances of more than 50 km in length

and 30 km in width. As for papyrus, its height reaches 8 feet, and its presence is concentrated on the outer edges of the marshes where the water depth decreases. Club-rush (Cyperus) grows alongside it.

In general, researchers divide the plants in these marshes into the following groups:

1. **Emergent Plants**: These are plants for which a part of their foliage is below the water surface. They are usually large, straight plants such as reeds and papyrus.
2. **Floating Plants**: Most of these plants have roots embedded in the bottom, while some have roots floating under the water. Their leaves float on the surface of the water. These plants grow in areas where the water is calm and shallow. They include knotweed (Polygonum glabrum), duckweed, and Suaeda aegyptiaca (al-Muhaydī and Shabānah, 1978, p. 3). Plants that do not extend their roots to the bottom include floating Ghazīyah, Ghaybah, and paspalum, which is a long grass (Husted, 1948, p. 178).
3. **Submerged Plants**: Their existence and growth are linked to the presence of water, and they die when the area is exposed to drought. Their species include hornwort (Ceratophyllum demersum), buttercup (Ranunculus sphaerospermus), and shining pondweed (al-Khayyāṭ, 1986, p. 7).
4. **Amphibious or Terrestrial Plants Found Near Water Bodies**: Their presence is concentrated on the margins of the marshes where the water recedes in the summer. They include the club-rush that we mentioned, tamarisk, foxtail, and others (al-Sa'd and al-Mayyāḥ, 1983, p. 28). Table 3-3 shows some species that were not mentioned.

The inhabitants of the marshes—who are called 'Mi'dān', as they are sellers of dairy products from buffalo and cattle—use reeds and papyrus to build their houses in various attractive shapes, as described by the traveler Thesiger during his visit to these marshes (Thesiger, 1956, p. 230). They also use them as fuel and for lighting. They use the thick, hard stems, which are 5 cm in diameter, to pole their boats (this is called a 'mardī').

Reeds are the best fodder for buffalo when they are small and their stems are still tender; at this stage, they are called 'ankar'. The reeds remain suitable for fodder for a period of 6 months (from April to October). Then, the inhabitants burn large areas of reeds in some places to promote the growth of new reeds with tender stems to ensure sufficient fodder for their livestock.

The population has utilized reeds for many industries that are now considered folk industries (folklore), such as the making of mats (ḥaṣīr and bārīyah), by crushing and weaving their stems. They are the bedding of the houses, a substitute for carpets, which were not known until recently. These mats are

Table 3-3: Aquatic Plant Species in the Permanent Marshes.

Common Name	Scientific Name
Swamp sawgrass (Ḥarīj)	Cladium mariscus
Eelgrass (Khuwayṣah)	Vallisneria spiralis
Floating fern (Ighzayrī)	Salvinia natans
Fringed Waterlily (Ka'ībah)	Limnanthemum spp.
Water Clover (Zāmrah)	Marsilea sp.
Johnsongrass (Ḥaliyān)	Sorghum halepense
bearded sprangletop (Sabaṭ)	Diplachne fusca
Sword-leaf dogbane (Kambāz)	Trachomitum venetum
paspalum (Salhū)	Paspalum distichum
Creeping water primrose (Kūbānī)	Jussiaea repens
Saltmarsh Bulrush (Sajil)	Scirpus maritimus
Dwarf flat sedge (Jarakht)	Cyperus pygmaeus
Indian sweet clover (Girṭ)	Melilotus indica
Barnyard grass (Dinān)	Panicum crus-galli
Pondweed ('Armūṭ)	Potamogeton
Galingale ('Algah)	Cyperus longus
Pondweed (Sa'd)	Potamogeton spp.
Common sowthistle (Marīr)	Sonchus oleraceus
Morning glory (Shwayl)	Cressa cretica
Turkey tangle (Girāṭ al-Khayl)	Lippia nodiflora
Torpedo grass (Murrān)	Panicum repens

Source: The table is based on a number of Arabic and English resources and was borrowed from: a group of researchers (2012), The Marshes of Iraq (publication series of the Supreme National Commission for Accountability and Justice) p. 85.

used in building huts and in making granaries. They are sold to be used as fuel for the brick factories scattered around the edges of the region. It was discovered that reeds are suitable for paper manufacturing, so a paper factory was established in the al-Hārthah sub-district, north of the city of al-Baṣrah, in 1971, and began production in 1972. In 1974, another factory was established in the al-Majar al-Kabīr sub-district, south of the city of al-'Amārah (Maysān Governorate). The Statistical Abstract 2012-2013, issued by the Central Statistical Organization (Ministry of Planning), refers to 3 paper industry establishments employing 199 technicians and workers, both male and female.

As for papyrus, the 'Mi'dān' offer it as fodder for their animals when reeds are not available. They also use it to make the rafts known as 'Chibāshah' on which to build their houses. The 'Mi'dān' eat the roots of the papyrus at the beginning of its growth, which resemble the heart of the palm tree (jummār) in shape and taste. They also collect from its opened heads, in the spring season, a yellow, flour-like substance called 'khirrayṭ', from which they make

sweets. Furthermore, they benefit from papyrus by pressing it into panels to build their houses.

The natural Vegetation and the Flora have not been studied to determine their families and species, which are numerous in this region. Only 32 varieties have been studied and classified (Thesiger, 1956, p. 13). Therefore, we call on all research centers concerned with the marsh environment to conduct a systematic scientific study of the biotic reality, both plant and animal, therein. We call on them to hold international scientific conferences and seminars to benefit from the expertise of others in the development and enhancement of this unique and distinct environment, which can be considered a (nature reserve) (al-Khayyāṭ, 1986, p. 7).

b. Animal Communities

Buffalo and Cattle

The natural conditions, including the availability of abundant quantities of water and a dense vegetation cover in the permanent marsh region, have helped support a once-large animal population. The buffalo[1] is considered the most important animal in this environment, and its breeding represents the main occupation that the inhabitants have practiced here since ancient times. The Miʿdān raise it and rely on its products for making various dairy items—yogurt, milk, and cream (qaymar). They also benefit from its meat and its dung for fuel. It is noted that buffalo breeding occurs alongside cattle breeding, just as sheep are usually raised with goats.

The buffalo, which can only live near the marshes to the point that it seems like an amphibious animal, is limited in number. On the Arab world level, its numbers do not exceed 2.5 million head, 90% of which are concentrated in Egypt and Iraq, with a few in Syria (al-Khaffāf, 1999, p. 354). The buffalo is an animal whose numbers are declining. Livestock statistics indicate the presence of 718,000 head in the years (1953-1954), with the vast majority of these animals concentrated in the permanent marshes (Central Bureau of Statistics, 1954). It was reported in livestock statistics that its numbers decreased to slightly more than 120,000 head (al-Saʿdī, 2008, p. 187), and decreased again to 101,923 head, of which 26% are concentrated in the marshes of Maysān Governorate, where their count in this governorate reached 26,500 head. In al-Chibāyish district (Hawr al-Ḥammār), its numbers decreased to 11,000 head in each of the district center, al-Fuhūd sub-district, and al-Ḥammār sub-district (ʿAbd-al-Ḥusayn et al, 2012, p. 100). In general, the Statistical Abstract (2012-2013) issued by the Central Statistical Organization (Ministry of Planning) indicates that the numbers of buffalo in Iraq, most of which are in the marshes and the permanent marshes, have followed an irregular trend over time (p. 23): 184,000 in 1974; 146,000 in 1976; 170,000 in 1978; 141,000 in

(1) The type of buffalo in Iraq is classified as the Iraqi buffalo. It is distinguished by its ability to adapt to the environment in which it lives and is one of the excellent breeds in the world

1986; 118,000 in 2001; 286,000 in 2008. Our interpretation of this numerical increase in 2008 is that it is due to the actual livestock survey, whereas the numbers in the preceding years appear to be estimates.

Despite the variation in the numbers of this animal, it is generally few. Out of 41 million head of cattle and buffalo in the Arab world, the number of buffalo in Iraq is only 2.5 million (al-Khaffāf, 1999, p. 353). At the level of Iraq, the number of animals (sheep, goats, cattle, buffalo, and camels) was (12,093,000) head in (2008) (Annual Statistical Abstract, 2012-2013, p. 23), and the number of buffalo constitutes only 2.4% of that, with their number being 286,000 head, as previously indicated. The buffalo is an animal of few numbers, and perhaps this is due to the difficulty of raising it, which is confined to the marshes and other water bodies. It seems that its numbers are tending to decrease. Perhaps it will be among the animals on the path to extinction, which necessitates declaring the marshes of southern Iraq—its suitable geographical environment—a (nature reserve) where international law prohibits encroachment for reasons of destruction and sabotage.

As for cattle, they are usually raised alongside buffalo, but their numbers are few in this region. They are not like the buffalo, which seems like an amphibious animal that must live alongside water. Therefore, cattle are much more widespread in their geographical distribution, living in the countryside even far from water bodies. The National Livestock Survey indicated the presence of 2,552,000 head of cattle in 2008 throughout Iraq (Annual Statistical Abstract 2012-2013, p. 23), and this number means they are about 9 times the number of buffalo.

In addition to cattle, the traditional family in this area raises other animals, namely sheep and a few goats and poultry, and their numbers vary among the different parts of the marshes.

Birds

The marshes form a suitable environment for the life of birds, especially in terms of climatic conditions in the winter and the availability of water and sources of seeds on which they feed. These marshes are a station to which birds from very cold Siberia migrate in the winter on a seasonal journey, where there is warmth and where the necessary elements for building their nests are available. They usually return to their homelands after sensing the rise in temperatures, so they arrive in the autumn and return in the spring.

Among the well-known migratory birds are: the Mallard, the Teal, the Pochard, the Chinese Duck, the Grey Heron, the Little Grebe, the White Pelican, the Red-breasted Goose, and the songbird. The researcher Bashīr al-Lūs, in his study titled “The Birds of Iraq,” in its first and second parts, enumerated 22 species, as shown in Table 3-4. Researchers have identified 42 important and key areas for birds in southern Iraq, and the number of migratory birds to Iraq has been estimated at 10,089,000 birds. Marsh Dwellers

Table 3-4: Bird Species in the Marshes of Southern Iraq.

Common Name	Scientific Name
Cattle Egret	Bubulcus ibis
Black-winged Pratincole	Glareola pratincola
Gadwall	Anas strepera
Mallard	Anas platyrhynchos
Eurasian Teal	Anas crecca
Black-winged Stilt	Himantopus himantopus
Black-necked Grebe	Podiceps nigricollis
Little Grebe	Tachybaptus ruficollis
Common Redshank	Tringa totanus
Common Sandpiper	Actitis hypoleucos
Mute Swan	Cygnus olor
Greylag Goose	Anser anser
Little Bittern	Ixobrychus minutus
Purple Heron	Ardea purpurea
Black-crowned Night Heron	Nycticorax nycticorax
Great Cormorant	Phalacrocorax carbo sinensis
Common Tern	Sterna hirundo
Bridled Tern	Sterna anaethetus
Gull-billed Tern	Sterna nilotica
Common Moorhen	Gallinula chloropus
Little Egret	Egretta garzetta
Greater Flamingo	Phoenicopterus roseus

Source: al-Lūs, Bashir (1965), The Birds of Iraq, Part One and Part Two, al-Rābiṭah Press, Bāghdad. Quoted from: Group of Researchers, 2012, p. 104.

practice the craft of bird hunting, which is a seasonal craft whose practice is linked to the presence of birds, and it is practiced by a small number of marsh families. However, some from outside the marsh community practice hunting as a hobby, for pleasure and amusement. The methods of bird hunting are varied; sometimes hunting is done by shooting, and sometimes by nets. In the bird and hunting season, researchers estimate the amount that reaches the market for sale at 200 tons annually (ʻAbd-al-Ḥusayn et al, 2012, p. 103).

Fish

The marshes provide a suitable environment for the presence of fish, with water, sunlight, and food resources on which they feed—aquatic plants, algae, crustaceans, and aquatic insects—in addition to the absence of fast water currents.

Researchers have found 65 species of fish in these marshes, the most famous of which are: binnī (Barbus sharpeyi), giṭṭān (Barbus xanthopterus),

shabbūṭ (Barbus grypus), shilig (Aspius vorax), ḥimrī (Barbus luteus), and jirrī (Silurus triostegus). The inhabitants practice fishing for these fish to use them as food, and they sell some of what they catch in the markets near the edges of the marshes.

II. Population and Human Life

1. Population

The focus of the population censuses conducted in Iraq was limited to classifying the population based on the urban economic environment. They distributed them into tables for urban and rural populations, thereby overlooking the geographical environment. Because such details require advanced techniques, expertise, and effort, these censuses focused on counting the Bedouin population and describing their numbers in special tables, as they live a distinct lifestyle that differs greatly from that of both urban and rural dwellers. Based on this classification adopted by the population censuses, the census of the marsh dwellers was included within the tables of the rural population in this region that we are studying, which is the region of the permanent marshes.

To distinguish them, determine their numbers, and describe them demographically, we primarily relied on identifying al-Ahwār region in each administrative unit of the southern governorates—Maysān, Dhī-Qār, and al-Baṣrah—based on the percentage of water covering the area of the administrative unit, as is in Table 3-1. Based on this percentage, we distinguished between the rural inhabitants and the marsh dwellers in all these administrative units.

Table 3-5 reveals to us that the rural population in this region, numbering 447,078 in 1947, constituted 13.3% of the rural population in Iraq, whose number at that time was 3,369,845. This percentage dropped to 11.2% in 1957 out of a total rural population of 3,853,754. The percentage dropped again to 10.6% in 1965 when the rural population of Iraq was 3,935,616. The percentage dropped significantly in 1977, reaching 6.1%, when the rural population of Iraq was 4,354,443. In 1987, this percentage rose to 7.9% when the rural population of Iraq was 4,866,230. At the last census in 1997, this percentage dropped significantly to 4.6% of the rural population in Iraq, which numbered 6,977,196.

The general trend in the size of the rural population in the study area was downward, which is attributed to migration, especially to neighboring and nearby cities, particularly the centers of the southern governorates: al-Baṣrah, al-ʻAmārah, and al-Nāṣirīyah. As for the slight increase we observed in 1987, it may not be a real increase, and some numbers might have been manipulated, which is expected as the country was under the conditions of a fierce war with Iran.

Table 3-5: Rural Population Numbers in the Administrative Units of the Southern Marshes Region.

Administrative Unit	1947	1957	1965	1977	1987	1997	2007
al-Madīnah District Center	34,627	77,612	29,999	12,893	19,469	58,101	58,321
al-Huwayr Sub-district	-	-	40,883	12,579	41,454	25,170	25,516
Ṭalḥah Sub-district	-	-	-	10,234	24,473	15,020	-
al-Qurnah District Center	-	-	-	24,499	5,264	79,232	78,369
al-Dayr Sub-district	47,962	-	33,291	26,595	30,234	18,249	18,251
al-Chibāyish District Center	-	-	16,209	14,808	18,239	4,366	6,117
al-Ḥammār Sub-district	33,174	31,377	5,665	2,508	2,505	489	684
al-Fuhūd Sub-district	-	-	9,245	11,711	16,042	9,424	13,207
al-Faḍlīyah Sub-district	47,606	50,260	43,233	14,939	23,302	19,304	27,082
Qal'at Ṣāliḥ District Center	38,223	12,463	11,701	8,925	6,217	14,108	18,949
al-'Uzayr Sub-district	-	14,017	14,587	22,043	23,180	18,401	24,657
al-Majar al-Kabīr District Center	50,739	31,931	32,033	14,625	25,020	15,816	21,230
al-'Adl Sub-district	62,527	-	-	14,418	14,302	9,410	12,776
al-Khayr Sub-district	-	-	-	-	-	-	-
al-Kaḥlā' District Center	55,850	43,178	41,434	-	23,707	28,869	38,737
Banī Hāshim (al-Rāfi'ī) Sub-district	-	-	-	-	-	-	-
al-Maymūnah District Center	-	69,198	36,302	24,087	20,126	31,210	41,899
al-Salām Sub-district	-	29,878	35,493	29,402	21,527	17,308	23,219
al-Rifā'ī Sub-district	-	-	-	-	9,134	-	-
al-Kumayt Sub-district	21,922	21,249	12,878	17,176	15,556	-	-
al-Musharraḥ Sub-district	25,452	19,383	91,971	17,100	12,464	12,961	17,406
Total	**447,078**	**429,979**	**418,001**	**265,283**	**352,215**	**318,999**	**418,217**

In order to separate the rural population from the marsh population, we will rely on the percentage of the administrative unit's area that is covered by the marsh waters. Permanently, throughout the year, it will not allow for the emergence of a rural environment and rural lifestyle. We have adopted the following basis:

1. For marshes covering more than 75% of the administrative unit's area, and it can reach 90%, the population census described them as rural, but in reality, they are not rural but marsh dwellers, as the area is too vast to allow for a rural lifestyle.
2. For marshes covering a percentage between 50%-75% of the administrative unit, its area are used to calculate the marsh population from the rural population.
3. For marshes covering a percentage of 30%-50% of the administrative unit's area, they are seen as administrative units where conditions are

Table 3-6: Marsh Population Numbers (1947-2007).

Administrative Unit	1947	1957	1965	1977	1987	1997	2007
al-Madīnah District Center	24,627	77,612	29,999	12,893	19,469	52,291	52,489
al-Huwayr Sub-district	-	-	40,883	12,579	41,454	23,912	22,716
Shahīd ʻIzz al-Dīn Salīm	-	-	-	20,234	24,473	13,520	18,434
al-Qurnah District Center	-	-	-	35,706	85,396	39,616	42,301
al-Dayr Sub-district	38,370	-	26,633	21,276	24,187	14,599	21,666
al-Chibāyish District Center	-	-	16,209	14,808	18,239	4,366	12,516
al-Ḥammār Sub-district	33,174	31,377	5,665	2,508	2,505	489	6,891
al-Fuhūd Sub-district	-	-	9,245	11,711	16,042	9,424	14,671
al-Faḍlīyah Sub-district	28,564	30,156	25,940	8,963	13,981	11,582	16,209
Qalʻat Ṣāliḥ District Center	26,756	8,724	8,191	6,247	4,352	7,050	8,001
al-ʻUzayr Sub-district	-	7,008	7,294	11,026	-	9,200	1,101
al-Kaḥlāʼ District Center	27,925	21,589	20,717	-	7,151	14,500	16,001
Banī Hāshim (al-Rāfiʻī) Sub-district	-	-	-	-	-	-	-
al-Maymūnah District Center	-	-	-	8,029	9,753	10,403	11,231
al-Salām Sub-district	-	14,939	17,746	14,602	10,763	8,651	9,575
al-Rifāʻī Sub-district	-	-	-	-	4,567	3,871	4,011
al-Kumayt Sub-district	10,961	10,624	6,439	8,588	7,778	9,610	10,160
al-Musharraḥ Sub-district	12,712	9,691	10,985	8,550	6,232	6,500	7,000
Total	259,722	227,685	241,962	212,238	325,205	252,454	288,668
al-Kumayt Sub-district	21,922	21,249	12,878	17,176	15,556	-	-
al-Musharraḥ Sub-district	25,452	19,383	91,971	17,100	12,464	12,961	17,406
Total	**447,078**	**429,979**	**418,001**	**265,283**	**352,215**	**318,999**	**418,217**

suitable for a rural environment and life. Therefore, we assume that the marsh population in them constitutes (15-25%) of the rural population.

4. For marshes covering less than 30% of the administrative unit's area, they will be disregarded, as we believe that the environmental conditions only allow for the emergence of semi-marsh people who are usually concentrated in their geographical distribution in the seasonal marshes.

On this basis, we determined the numbers of the marsh population as they are in Table 3-6 (The population numbers for the al-Rāfiʻī sub-district were included with the al-Kaḥlāʼ district center due to not being mentioned in the censuses. al-Rifāʻī sub-district is a new creation).

Studies and research on the permanent marshes indicate that they are among the oldest regions inhabited by humans, dating back more than 5,000 years BC. The marsh dweller preserved the specificity of his life since ancient times, perhaps due to the difficulty of their geography. Although Iraq was

under foreign control for long centuries, the latest being British control, no party tried to approach or enter this region.

Studies indicate that the inhabitants of the marshes are the heirs of the Sumerians and Babylonians, and they are the link between the ancient inhabitants of Mesopotamia and the population of Iraq today. The Sumerians, considered among the world's oldest inhabitants, settled it in 4000 BC. It was the first cradle of human civilization, as exploratory missions found many archaeological sites in it, indicating that these places were dry land surrounded by the waters of the marshes.(1) The inhabitants of the marshes are described as follows: Marsh Dwellers, Marsh Arabs, and 'Mi'dān' (sellers of dairy products from buffalo).

A large number of tribes inhabit the marshes, including Āl-Bū-Muḥammad, al-Furayjāt, Banī Asad, al-Khayqān (al-Khaygān), Banī Sa'īd, Banī Ḥasan, al-Bū-Khalīfah, al-Sarāy, Āl al-Baṭṭāṭ, and others.

The marsh population is distributed among four types of settlements:

- **Settlements on the edges of the marshes**, called 'al-silaf' or the village. Due to their locations between the marsh water and the surrounding land, where they are spread near waterways and on the banks of rivers, we see that some houses in them are built of brick and mud, while the majority of houses are huts and reed huts (ṣarā'if). These settlements are larger in size than the other types of settlements.
- **Settlements on natural islands**, observed scattered in the permanent water areas. Their height reaches 3 meters above the surrounding water level. They appear clearly in the low-water season (ṣayhūd), and water submerges parts of them in the flood season. They are called 'al-īshān' and are usually inhabited by buffalo breeders.
- **Settlements on fixed artificial islands**, made by the marsh dwellers. They are called 'al-Chibāyish', and a single island is called 'al-Chibāshah'. Marsh dwellers made great efforts here to provide an alternative to dry land; these islands are made of layers of mud, reeds, and papyrus and are fixed with stakes. They are widespread in the al-Chibāyish region in Dhī-Qār Governorate and in the villages of al-Bayḍah and al-Sa'ādah in Maysān Governorate (al-Khayyāṭ, 1975, p. 152).
- Alongside these types, we observe **settlements on mobile artificial islands**, which are called 'al-dibin', and also called 'al-tahal' in Maysān Governorate. It is a platform of reeds, papyrus, and mud floating on

(1) 122 archaeological sites have been confirmed in the al-Ḥammār Marsh, some of which date back to the Sumerian Early Dynastic period (around 2800-2350 BC). These sites are distributed among al-Chibāyish, al-Iṣlāḥ, al-'Akīkah, al-Sayyid Dakhīl, and Karmat Banī Sa'īd. 48 archaeological sites have been confirmed in the al-Ḥuwayzah, al-Ṣuḥayn, al-Wādīyah, and Ruwaydah areas, most of which date back to the Parthian and Sassanian eras, with some being older, dating back to the first millennium BC (Nicholson, Clark, & AMAR 2001, p. 3, as cited in 'Abd-al-Ḥusayn et al, 2012, p. 87).

the water, accommodating one hut and some animals. It is usually inhabited by buffalo herders who push it from one place to another as needed, so it serves as a temporary dwelling (Ḥamīd, 1986, p. 131).

The dwellings of the marsh inhabitants in these settlements are varied:

- The 'ṣarā'if' are built from reeds and papyrus and are usually longitudinal in shape and perhaps the most widespread.
- As for the huts (akwākh), what distinguishes them from the ṣarā'if is that their walls are built of mud instead of woven reeds, and their presence is concentrated on the edges of the marshes and on the banks of rivers. This hut is called a 'Chimāmī' (plural: Chimāmīl).
- In addition to these dwellings, we see the muḍīf, which is a dwelling for guests and a place for meetings made of reeds. The people of the village contribute to its construction as it is owned by all of them, although its ownership is attributed to the tribal sheikh.
- We also see the 'sitrah', which is built from reeds and papyrus and is a shelter for animals (a pen). It usually adjoins the family's dwelling, and there may be no partition between them.
- There is also the 'shuguṣ', which is formed from mats (ḥaṣīr and bārīyah), and is usually used as a temporary shelter for rice growers and fishermen, serving as a temporary dwelling.

In order to determine the size of the marsh population and to know the demographic value of what they constitute of the population reality in the three southern governorates and Iraq, it must be pointed out that the population in these governorates constituted 15.3% of the total population in Iraq in 1997, where their population numbers reached 3,366,417 out of Iraq's total population of 22,046,244 (including the population numbers in the Kurdistan region). According to the projections of the Central Statistical Organization, this percentage reached 16.0% in 2012. This percentage means that the population of southern Iraq (Maysān, Dhī-Qār, al-Baṣrah) constitutes about 1/6 of the population of Iraq.

The rural population, including the inhabitants of the marshes, constituted 14.5% of the rural population in Iraq, where their count was 1,015,107 in the three governorates in 1997, out of the total rural population of Iraq of 6,977,196. This percentage dropped slightly to 14.1%, as the number of rural inhabitants in these governorates reached 1,483,893 out of the total rural population in the country, which numbered 10,528,231 according to the projections of the Central Statistical Organization in 2012.

This percentage diminishes when calculated for the marsh population, excluding the rural population. In general, the size of the marsh population appears to be small, around a quarter of a million people, living on an area of up to 8,900 km^2, rich in natural resources, although it seems to be

Table 3-7: Population Numbers and Annual Growth Rate in the Three Southern Governorates for the years (1947, 1957, 1965, 1977, 1987, 1997, 2012).

Year	al-Baṣrah	Dhī-Qār	Maysān	Total	Growth Rate %
1947	368,799	371,967	307,021	1,047,687	-
1957	503,330	458,848	329,840	1,292,018	2.1
1965	669,479	498,850	345,467	1,513,796	1.6
1977	1,008,626	622,979	372,575	2,004,180	2.8
1987	872,176	921,066	487,448	2,280,690	1.3
1997	1,556,446	1,184,796	637,126	3,378,368	3.9
2012	2,601,970	1,883,160	997,410	5,482,540	4.7

Source: Census data regarding population projections for the year 2012 are from the Central Statistical Organization, Annual Statistical Abstract 2012-2013, Table 2/8, p.13. The annual growth rate was calculated by the researcher.

a geographically challenging environment for humans. The average population density in these marshes is about 29 persons/km^2, which is below the national average density that currently reaches about 75 persons/km^2. This demographic reality becomes clear when comparing the data of the previous tables with Table 3-7.

All demographic studies and research—whether conducted by demographers, geographers, economists, or sociologists—point to extensive rural migration from the countrysides of the southern governorates. This migration occurred in the decades between (1947-1977) from the administrative units of the marsh region, amounting to 181,795 people, including migration from the marshes. This was calculated based on the 1947 and 1977 census data; the number of rural and marsh inhabitants was 447,078 and was reduced to 265,283. As for the decade between (1977-1987), it witnessed an increase in population from 265,283 to 383,530 people. If the migration from this region was to its peripheries where many industrial projects that needed labor were built between (1947-1977), then the population increase in the last decade (1977-1987) occurred due to the cessation of displacement migration and because of migration into this region, especially inside the marshes, to avoid conscription to the front lines during the Iraq-Iran war.

The implementation of economic development plans in some parts of the area surrounding these marshes, in the industrial, agricultural, and service sectors, was among the reasons that pushed the marsh inhabitants to leave the marshes and live outside them and nearby. In order to determine the demographic movement trend of the marsh inhabitants, we see a scientific necessity to first determine the trend of population change in the three southern governorates in general (urban and rural), then to determine the movement trend of the rural population, and after that, the marsh population, as shown in Table 3-8, which shows the small size of the population in these marshes in 1947. This may be due to many not registering their

Table 3-8: Population Numbers and Annual Growth Rate in al-Ahwār (without accounting for the effect of migration)

Year	Population	Increase	Growth Rate %
1947	259,722	-	-
1957	227,685	(-) 32,037	(-)
1965	241,962	14,277	1.0
1977	212,238	(-) 29,724	(-)
1997	349,295	24,090	2.9
2007	466,695	117,400	2.9
2016	605,747	139,052	2.9

Source: Population numbers after 1987 are calculated based on the annual growth rate of the rural population in the three southern governorates, which is 2.9%, without accounting for the effect of migration.

census records due to fear of the consequences. Therefore, we can add 15% to the registered population size, which is the estimate of the unregistered rural population by the experts who worked in the Ministry of Planning and presented their critical studies of the 1947 population census. At that point, their number would be 298,511, and so this size changes over the years.

Table 3-9 shows a decrease in the number of the marsh's inhabitants in the years between 1965-1977 due to the industrial, agricultural, and service development projects that were implemented in the area surrounding these marshes, which encouraged migration from the marshes to join the new labor market. As for the census results in 1987, they indicated a large population increase in the marshes, perhaps the cause of which was the Iraq-Iran War, which prompted some to enter the marshes to take shelter and avoid joining the battlefronts.

Due to the unavailability of actual data on the marsh population after 1987, we have resorted to using the annual growth rate of the rural population in the three southern governorates as a basis for calculating the population size in subsequent years up to 2016. These numbers may be inaccurate due to not accounting for the effects of migration to and from the marshes, but they provide us with a demographic picture.

2. Economic Activities (Subsistence Economy)

Due to the exceptional and unusual circumstances that the marshes went through in the 1990s, we have focused on the decade (1977-1987) in order to reveal the changes and transitions that occurred among the economic activities of the marsh inhabitants.

In the period before 1977, the economy of the marshes was undoubtedly a (living economy). The transformation and transition to a market economy occurred due to the implementation of development plans in the area surrounding the marshes. For example, we note that the percentage of workers in Activity (1), which is agriculture and fishing, was 70% in 1977. This

percentage decreased to 39% in 1987. Conversely, the percentage of workers in the ninth activity, which is social and personal services, increased from 21% in 1977 to 45% in 1987.

The transition from the first activity, related to agriculture, forestry, and animal husbandry, to the ninth activity, related to social and personal services, is a known transition in all developing countries. The transition did not occur from agriculture to industry, as the history of the European economy indicates. The partial transformation from a living economy to a market economy occurred clearly in the 1970s.

The marsh dwellers work in agriculture and animal husbandry. They cultivate summer crops on the edges of the marshes and on the dry islands within them, over an area approaching 4,000 km², which usually drops to 2,500 km² for winter crops. The percentage of summer crops reaches 45% of the area of the permanent marshes, and this percentage drops to 28% for winter crops.

The marsh dwellers practice sugar cane cultivation on an area of approximately 415 km², about 5% of the area of the permanent marshes. They also have an area for palm trees on the margins of the marshes of about 76 km², constituting about 1%. Rice is considered the most important summer crop and is planted twice: an early crop called (al-harfī) (from March to late May), and a late one called (al-aflī). Wheat is also considered among the most important winter crops. They also grow vegetables in limited areas close to their homes, mostly for family consumption. As for the types of dates produced here, they are Khaḍrāwī, Ḥillī, Jabjāb, and Barīm (al-Qaysī, 1994, p. 232).

The marsh dwellers raise the animals we have previously mentioned, foremost among them the buffalo, which is also a measure of wealth and social status. They also practice fishing and bird hunting, the most important types of which we have mentioned, and they raise poultry. They practice some simple handicrafts, such as mat making (buwārī, plural of bārīyah), which relies on reeds and is concentrated in the villages of al-Mallah, Abū Jawlānah, and al-Sūbāṭ in al-Chibāyish district, and in Ṭalḥah and al-Madīnah in al-Baṣrah.

Boat making is one of the most important means of movement and transport within the marshes. They are made in various sizes, including small ones called 'ṭarrādah', medium-sized ones called 'mashḥūf', and large ones called 'ga'dah' and 'bargash'. When modern engines are installed on them, they are called 'shakhtūrah' (plural: shakhātīr). Due to the importance of boats, every family has one, at the very least; it serves as the donkey for the village inhabitants, which has today been transformed into the pickup truck, serving as the urban family's car.

3. The Social Situation and Social Life:

Despite the society's openness to the surrounding rural and semi-urban communities in the circle of villages and surrounding sub-district centers since

the early 1950s, it remains semi-closed and still views its visitors as outsiders. The majority of families in it still live the extended family pattern (grandparents, children, and grandchildren). The grandfather rules the family with a patriarchal system; he is the one who commands and forbids. Polygamy is still a pattern that indicates patriarchal power, prestige, high status, and financial capability, although some of the new generations have begun to abstain from polygamy due to the difficulty of life.

Early marriage for females is a continuous situation; marriage can occur between (10-15) years of age. Likewise for the male, his marriage can occur between (13-15) years of age, as his livelihood is guaranteed by the father or grandfather. In a systematic study for a master thesis, it became clear that the al-Chibāyish district recorded a marriage rate of 580 per thousand, at a time when Dhī-Qār Governorate recorded a rate of 554 and Iraq recorded 513. These rates indicate a trend towards marriage at an early age (Ibrāhīm, 1987, p. 172).

The pattern of exchange marriage (guṣṣah bi-guṣṣah) still exists, but it is no longer as widespread as it was in the past, where a daughter would not be given as a wife to another except after being exchanged for a daughter from him! The family has only rarely known the concept of birth control and family planning methods. Therefore, the culture of having a large number of children, especially males, is prevalent, as social status and strength are linked to them, a situation that is in harmony with the prevailing customs and traditions in al-Ahwār. If we had community data on its gender composition (males and females) and age composition (according to five-year age groups), we would see that the base of the pyramid of infants is very wide.

Gender

Our multiple visits to the marshes al-Ḥammār, al-Ṣuḥayn, and al-Ḥuwayzah with students from the Department of Geography at the University of al-Baṣrah at the end of the 1970s and the beginning of the 1980s revealed many socio-economic phenomena, perhaps the most prominent of which are gender relations, where women appear on equal footing with men within the family and in society. It is not strange for a woman to receive you as a guest, and does not feel awkward until the husband or father arrives. It is not strange for a man (the husband) to receive you while holding an infant on his chest, rocking him and singing to him to prevent him from crying and screaming, or feeding him with a nursing bottle if he does not breastfeed from his mother. He is proud to make tea to offer to his visitors, and he sees helping his wife with household chores as a humane aspect. Perhaps this situation is not seen in the western areas near them, which are semi-urban communities.

Gender characterized by male superiority and control is not seen in "primitive" societies. It is non-existent in family relations the deeper we penetrate into the marsh. This is the case in the isolated interior of Socotra Island, espe-

cially the community isolated within the island and isolated by the highlands between these highlands and the Arabian Sea, which opens onto the Indian Ocean. The same is true during our visits to some isolated African communities in Ethiopia and Chad!

Education and Work

The data in the illiteracy table from the 1957 census indicate a widespread prevalence of illiteracy. In five administrative units, it ranged between 88% and 95%, as shown in Table 3-9.

Illiteracy rates decreased after two and three decades. We refer here to what the results of the population censuses in (1977-1987) showed (avoiding the 1997 census due to the inaccuracy that occurred as the marshes turned into refuges for those fleeing from the authorities). The 1977 data indicate that the illiteracy rate among the rural population of the three southern governorates was 74.0%, and it dropped to 45.0% in the 1987 census. This is a large drop, part of which may be due to inaccuracy, as the census was conducted during the years of the war with Iran.

Table 3-10 clarifies the reality of the variation in this percentage among the three governorates. In the 1977 census, it exceeded the average for the three governorates, reaching 81.8% in the rural areas of Maysān Gover-

Table 3-9: State of Illiteracy in Some Administrative Units in the Permanent Marshes Region (1957).

Administrative Unit	Population	Population Under 5	Illiterates	Illiteracy %*
al-Chibāyish	27,007	6,864	27,597	92.0%
Garmat Banī Sa'īd	36,450	6,334	26,962	90.0%
al-Maymūnah	69,698	11,691	53,869	93.0%
al-Majar al-Kabīr	31,931	5,700	24,791	95.0%
al-Madīnah	23,924	5,089	17,054	91.0%
Total	**199,010**	**35,678**	**150,273**	**92.0%**

(*) Illiteracy rate was calculated by the researcher after subtracting the number of children under five from the total population.

Source: Ministry of Social Affairs, General Directorate of Census, Results of the 1957 Census.

Table 3-10: Rural Population, Number of Rural Illiterates, and their Percentage in the Southern Governorates (1977-1987).

Governorate	Rural Population 1977	Illiterates	Illiteracy %	Rural Population 1987	Illiterates	Illiteracy %
al-Baṣrah	127,786	79,381	62.1%	151,926	55,199	36.3%
Dhī-Qār	227,045	174,952	77.1%	274,829	129,495	47.1%
Maysān	125,896	102,928	81.8%	120,595	63,768	52.9%
Total	**480,727**	**357,261**	**74.0%**	**547,350**	**248,462**	**45.0%**

Source: Ministry of Planning, Central Statistical Organization, Results of the population censuses.

norate, and dropping to 62.1% in the rural areas of al-Baṣrah Governorate. The 1987 census results show a rise in the illiteracy rate in the rural areas of Maysān Governorate to 52.9%, while in other rural governorates, the illiteracy rate decreased and the scope of education expanded, with an increase in the number of educated people. Taking al-Chibāyish as an example: an administrative center and police station were established there after World War I, and in the early 1930s, a six-grade elementary school was founded, along with four other one-teacher schools inside the marsh. Small clinics and mobile clinics in steam boats were also established. Since the 1980s, the number of elementary schools has increased to nine schools for boys and girls, distributed among the large villages inside the marsh, in addition to a secondary school in the center of al-Chibāyish. There are also a number of clinics, two veterinary clinics, and 10 police stations, some with postal services.

Generally, the deeper a marsh community is situated within the wetlands, the more it retains its distinct socio-economic traits, due to diminished external influence.

III. Tourism and Recreation

1. Tourism

Tourism, as it is known today, traces its institutional origins to 1898, with the founding of the International League of Tourist Associations (Ligue Internationale des Associations Touristes LIAT) in Luxembourg City. This organization was later renamed the International Tourism Alliance (Alliance Internationale de Tourisme AIT) in 1919. In 1925, the International Congress of Official Tourist Traffic Associations was held in The Hague, marking the beginning of formal cooperation among national tourism bodies. This congress laid the foundation for what would eventually become the International Union of Official Travel Organizations (IUOTO), established in 1947

The formulas proposed by researchers to define the concept of tourism have varied greatly. Perhaps among the earliest of these attempts is what the Committee of Statistical Experts of the League of Nations defined in 1937: tourism is the movement of persons to a place other than their residence for a period of not less than (24) hours, and it excluded travel for work or study (al-Ghālī, 2008, p. 18). In 1963, this concept was developed at a United Nations conference on tourism held in Rome to include any travel outside of work hours for the purpose of recreation, business, or attending conferences or seminars for a period of not less than (24) hours.(1)

The fact that geographers have a concept of tourism, as do economists, sociologists, and others, and each focuses on a specific aspect. We believe, in

(1) Some concepts define tourism by distance, not less than 100 km, more or less, while others define it by time—a day, four days, or more. All of them confirm that the goal is not work or study, but recreation and cultural enrichment..

brief, that tourism is the movement from one's place of residence and work to where a person finds recreation and cultural enrichment in another place, which could be within or outside their country, for a period of not less than 24 hours. This is because a duration of less than 24 hours means the travel was for the purpose of leisure.

2. Leisure

The formulas that define this term (leisure) have varied, with researchers in psychology, sociology, economics, geography, and others contributing to the concept. In general, these formulas converge on the idea that leisure is time outside of work hours, aimed at relaxation, enjoyment, and getting away from all causes of psychological pressure, stress, and anxiety. We can define it as: breaking the paths of life's daily routine and resorting to where there is relaxation, contemplation, and pleasure.

There is no doubt that scheduling daily life and setting aside a specific time for recreation for an hour or more daily, depending on the individual's need and the nature of their daily life, will make life more engaging. This leisure, or leisure time, is like providing new energy, both physical and psychological, for the time to come. This is our vision of leisure and its psychological and social necessities.

One might find leisure in a temple or shrine, in reading a religious book, in a symphony hall, in a painting gallery, or in a tragic or comic theater or in reading poetry and literature. Perhaps a researcher finds their recreation by sitting in a café, or walking down a street under the moonlight. The relationship between the need for leisure and the level of culture and education is direct. Reading books, newspapers, and magazines, and watching movies are all forms of leisure, as are sports stadiums and attending seminars and conferences. While they are beneficial and provide knowledge, they are at the same time leisure.

There are scientific research and studies, to which geographers have contributed, that examine the demand for leisure services and methods for its future estimation. The fact that must be pointed out is that leisure is a demand sought by the population of all age groups—children, young people, adults, and the elderly, both male and female. Therefore, city planning requires the allocation of spaces calculated according to the population for public parks, amusement parks, sports fields, cafes, casinos, and many other means, methods, and tools of leisure.

We note that the main goal of tourism is leisure. Observing natural, environmental, archaeological, and folkloric scenes is culture and learning, and it is achieved through leisure.

3. Natural Components for Tourism in the Marshes

Every region or tourist center has components for tourist attraction. The southern marsh region of Iraq has natural components that make it a natural tourist area, which was the background for creating a distinct environment with its biotic cover (plants and animals). It is an area for nature tourism and eco-tourism, and its components are:

a. Geographical Location

The geographical location of the permanent marsh region offers tourists an opportunity that is not limited to visiting it and enjoying its tourist scenes, but also to enjoy diverse tourism of Sumerian archaeological sites and religious and folkloric sites in al-Baṣrah. The three southern governorates have embraced these marshes, creating in them a natural and vibrant environment that attracts tourists.

The peripheries of Hawr al-Ḥammār are not far from the Shaṭṭ al-'Arab and the ancient confluence of the two rivers at al-Qurnah. It takes a few hours by motorboat to exit the marsh to al-Qurnah and then to Garmat 'Alī, which is the new confluence point of the Tigris and Euphrates.

If we take the al-Chibāyish district center as a starting point, it is no more than 50 km from the city of al-Nāṣirīyah and 100 km from al-Baṣrah. Perhaps the relatively distant city is al-'Amārah. This location offers the tourist an opportunity to visit the cities of al-Nāṣirīyah, al-Baṣrah, and al-'Amārah with all their natural landscapes and religious, historical, and folkloric antiquities. Likewise, we can take the village of al-Ṣuḥayn as a starting point to enter the al-Ṣuḥayn Marsh.

The village of al-Ṣuḥayn is located in the al-Majar al-Kabīr sub-district in Maysān Governorate. It is one of many groups of villages that extend linearly in two groups: an eastern group between the west bank of the Tigris River, starting with the village of al-Ṣuḥayn and ending with the village of al-Huwayr to the south; and a western group starting with the village of al-Sharmūjīyah to the north and ending with the village of al-Chibāyish to the south.

Those wishing to visit the al-Ṣuḥayn Marsh travel to the city of al-'Amārah by car, reaching the city of al-Majar al-Kabīr on a modern paved road. After that, they switch to river transport, as a number of motorboats are available in this city. The boat takes them on a journey on the al-Majar al-Kabīr River, then enters al-'Adl, a branch of the al-Majar al-Kabīr, which is a river whose banks are not visible during flood days. This river journey to reach the village of al-Ṣuḥayn takes about two hours (al-Hāshimī, 2006, p. 26).

The elements of tourist attraction are prominent in the vast aquatic landscape, especially in late winter and early spring, due to the rise in the water levels of the Tigris River, when this scene expands greatly. The prevalence of warmth during this period is another factor that attracts tourists from central and northern Iraq. Among the elements of attraction are the plant

communities, most importantly reeds and papyrus, which grow in the form of thickets, creating an environment for birds to hatch, fish to breed, and a shelter for some wild animals that live near the marsh, such as the jackal and the wild boar. It is common for the inhabitants to leave their homes early in the morning to collect the tender shoots of reeds and papyrus as fodder for their animals. The floating flowers on the water's surface with their various colors form a beautiful sight.

Animal communities, including migratory birds seeking warmth, such as the Mallard, the Goose, the Pelican, and the Coot, among others. They constitute a catch and an enjoyable hobby for tourists, and it is necessary to enact legislation to limit overhunting. In addition, there are various types of fish, and fishing using local methods is an enjoyable hobby for tourists. Night fishing festivals can also be organized in the middle of the marsh, and day festivals for bird hunting, with gifts and prizes awarded to the distinguished. The well-known fish here are: bunnī, Giṭṭān, shabbūṭ, ḥimrī, jirrī, and ṣabūr.

Human life is also an element of tourist attraction, as people live in floating huts; a narrow waterway separates one hut (Ṣarīfah) from another, and they visit each other by means of 'mashḥūf' (a small boat). This is a unique settlement pattern, similar to the villages of Southeast Asia on the banks of rivers, coasts, and bays.

The trip can be concluded in the southern triangle of Iraq: a visit to areas at or sometimes below sea level at the point where the Shaṭṭ al-'Arab flows into the Gulf; a visit to see the world's densest and most diverse date palm groves; and it also offers an opportunity to see the Shaṭṭ al-'Arab, the port of al-Baṣrah, the movement of the tides, the old city of al-Zubayr, and historic al-Baṣrah. As well as a visit to Ur, the Ziggurat, and some archaeological sites in Dhī-Qār Governorate, and the confluence of the al-Musharraḥ and al-Kaḥlā' rivers in a distinctive natural scene in the city of al-'Amārah.

In general, access to this region is easy by river transport and by car for the residents of the southern governorates. The process of getting there is also not difficult for the residents of the central governorates and the rest of the governorates. Al-Baṣrah airport greatly facilitates access for those who do not wish to rely on their private cars or public road transport.

al-Ahwār have its small tourist domain, represented by the movement of the residents of the southern governorates, and its national tourist domain, which extends to all borders of Iraq. There is no doubt that making organized efforts is in the interest of Iraqi tourism and the local governments in the three governorates towards creating the infrastructure for developing the marshes and improving tourism requirements therein, and towards promoting them Arab-wide and globally. This will expand their domain to become the Arab world and the world at large, attracting tourists from Arab countries and from all over the world, for al-Ahwār is truly the "Venice of the East."

b. Aquatic Natural Landscape

In this subsided geological basin, submerged in water, where the elevation of the land surface does not exceed 5 meters at its outer edges and slopes southward in a gradual descent until the elevation is zero or below zero, the water rises above the land surface and covers it, especially during high tide in the Gulf.

The area of the permanent marshes is 9,177 km^2. Its area was once double the current area, estimated at about 20,000 km^2 (al-Anṣārī, 2008, p. 410). It first shrank due to water storage projects in Turkey and Iran and because of the drainage plan when the former regime felt that it had become a refuge for the opposition. It is known that severe human intervention in nature leads to its destruction, which does not allow the natural environment to return to its former state. Researchers cite as an example of this what happened in the Dust Bowl region in the United States and in the Bonanza area, where human activities led to the elimination of natural vegetation and the destruction of the soil (Husted, 1948, p. 178).

This vast spatial area, submerged in water, presents a rare natural image. The Iraqi marshes (al-Ahwār) possess a rare natural landscape that is not paralleled in the Arab world, as we have indicated, nor in West Asia.

This aquatic scene is distributed among several marshes:

- **Hawr al-Ḥuwayzah**

The majority of this marsh is located in Maysān Governorate, extending from south of the al-Musharraḥ sub-district in Maysān Governorate southward to the city of al-Qurnah in al-Baṣrah Governorate, and from the Iraqi-Iranian border in the east to east of the Tigris River in the west, extending 80 km in length with an average width of 30 km. The currently submerged area within Maysān Governorate is 1,200 km^2, while 250 km^2 of its area lies within al-Baṣrah Governorate. This marsh is fed by the al-Kaḥlā' River, which branches off the Tigris River with a discharge of 60 m^3/s, in addition to the al-Musharraḥ and al-Majar rivers and the Iranian rivers of al-karkhah, al-Ṭīb, and al-Dwayrij. It discharges its water into the Tigris River through the al-Kassārah channel at a rate of 15 m^3/s and through the al-Suwayb channel into the Shaṭṭ al-'Arab at a rate of 25 m^3/s. Researchers describe its waters as balanced in terms of salinity; the salinity of the water entering and leaving it is 2.5 mmho/cm, and its storage capacity is estimated at about 7 km^3/year.

- **Hawr al-Ḥammār**

The area of the northern part of the marsh located within Dhī-Qār Governorate that is currently submerged is 365 km^2. It includes the marshes of al-Kurmāshīyah, Um Nakhlah, al-Shuway'irīyah, al-'Abrāt, and al-'Adl. This part is fed by a number of river branches that diverge from the right bank of the

Euphrates River. The current water discharge is 44 m^3/s through more than 10 outlets.

As for its southern part, represented by the marshes of al-Musaḥḥab and al-Ṣallāl in al-Baṣrah Governorate, the currently submerged area is 100 km^2, and it is fed by water coming from the Garmat ʻAlī River. Thus, the total submerged area in this marsh is 465 km^2. It must be noted that Hawr al-Ḥammār used to have an average area of 1,750 km^2, which would increase during the flood season to 2,900 km^2 and shrink during the low-water season (al-Ṣayhūd) to 600 km^2. In general, this marsh extends from Garmat ʻAlī in al-Baṣrah Governorate in the east to Sūq al-Shuyūkh in Dhī-Qār Governorate in the west. The water salinity in this marsh is estimated at 5.6 mmho/cm, with an average depth of two meters and a storage capacity of up to 5 km^3/year.

- **The Central Marshes Group**

They extend over the lands of the governorates of Dhī-Qār, Maysān, and al-Baṣrah, from Maysān Governorate in the north to the Euphrates River in al-Baṣrah Governorate in the south, and to the west of the Tigris River in the east, with an average total area of 4,000 km^2, which used to increase during the flood season to 6,350 km^2. The water salinity in this group of marshes decreases to 4.5 mmho/cm, their average depth is 2.5 m, and their storage capacity is 10 km^3/year. Among them is the Abū Zarag marsh, into which water discharges at a rate of 50 m^3/s from a number of rivers and streams branching from the left bank of the Euphrates River.

Additionally, there is the al-ʻAwaynah marsh, whose submerged area is 15 km^2, fed from the tail end of the al-Bidʻah channel within the Euphrates River with a discharge of 2 m^3/s. As for the marshes on the left bank of the Euphrates, their total submerged area is 105 km^2, and they are fed by a number of small rivers: Abū Ṣubāṭ, Abū al-Nirsī, and Abū Juwaylānah.

Researchers believe that taking water from the al-Haddām and al-Butayrah streams to these marshes will raise their water level, lower the salinity level, and improve the water condition. As for the ʻAwdah marsh and the al-Ghamūgah marsh, they are among the marshes that are still semi-closed. As for the al-Qurnah marsh, most of its parts have stagnant water due to the lack of inflow and outflow channels.

What enhances the beauty of the vast and far-reaching aquatic landscape is the presence of natural islands and artificial islands (Chibāshāt) that humans create to build their huts and villages, surrounded by buffalo, livestock, sheep, and sometimes poultry, as well as the long reed guesthouses (maḍāyif), under a clear blue sky on most days of the year.

c. Climate

We have already mentioned the comfortable climate that the permanent marshes enjoy, especially in the months of March and April.

d. Biotic Environment

The permanent marsh region is characterized by an environment with plant and animal diversity, which we referred to when discussing the characteristics of the natural structure. There is no doubt that this environment has created an opportunity for eco-tourism, where tourists can enjoy watching the buffalo, of the distinguished Iraqi breed, swimming in the marsh waters. Likewise, they can enjoy the types of fish that appeal to them for their meals, and the resident and migratory bird species.

The forests of reeds and papyrus, which are the symbol of the marshes, scattered in their geographical distribution, along with floating plants, algae, and colorful floating flowers, all paint a natural picture that is very relaxing and informative

In addition, this environment, with its clear blue sky, is far from forms of pollution, especially noise pollution,(1) which is a type of pollution that humans suffer from everywhere, both physically and psychologically.

These marshes are far from all sources that cause noise. It also has air that is far from sources of pollution, so the tourist enjoys a beautiful tranquility and diverse and beautiful environmental scenes.

The tourist can enjoy the pleasure of fishing and bird hunting and eat meals that are produced by this environment itself (among the unusual dishes is 'ṭābaq' bread, which is a bread made from rice flour, and grilled fish). They can also have the famous 'qaymar' (cream made from buffalo milk), drink buffalo milk, and other local dishes.

The tourist experiences a beautiful and unique natural and human environment. Iraqi officials and decision-makers should pay attention to preserving the features of this natural and human environment and benefit from international experts to take advantage of their experience in preserving it before the hand of the modern world changes its features forever.

The relative cultural isolation that the marsh community lived in for successive generations in the same manner as their ancestors, in a pattern of subsistence economy, and the traditions they followed are what preserved their marshes, their social advantages, and their social relations. The inhabitants of the marshes still settle their disputes peacefully, and armed conflict rarely occurs among them.

We hope that these sons of the marshes will continue to ride their fantastic boats (mashāḥīf), shouting their beautiful songs that declare their love for life and for their existence in this romantic environment. These marshes are

(1) Noise Pollution is the pollution resulting from noise. Many definitions have been proposed by researchers for the concept of noise, and the Encyclopaedia Britannica, as well as the Encyclopedia Americana, have published definitions for it. In general, noise is unwanted sound waves; the human ear is very sensitive and can tolerate sound waves with a frequency ranging between 20 hertz and 2,000 hertz, where the hertz expresses the frequency or number of vibrations per second (al-Muẓaffar, 2011, p. 4).

among the last places in the world that humans can still preserve as a nature reserve and a unique human society with its socio-economic lifestyle.(1)

Some researchers indicate that civilization is necessary, but it might sweep over the environment and destroy its unique natural and vital advantages. They give examples of the sweeping, destructive effects of civilization from Guam, Easter Island, and even New Zealand. Therefore, civilization must be introduced to these marshes in a gradual way that preserves their uniqueness.

e. Means of Access and Recreation

Sustainable tourism development has several objectives, foremost among them reducing negative impacts on communities and maximizing economic benefits. The development of tourism activity in the southern marshes can be considered part of the regional map for the socio-economic development of Iraq.

In 2004, the Center for Restoration of the Iraqi Marshlands (CRIM) was established with the aim of preparing and following up on marsh restoration programs in accordance with international standards, the World Heritage Convention, and the Ramsar Convention, which was organized in the Iranian city of Ramsar in 1971, an agreement concerned with wetlands and their conservation.

CRIM works towards restoring the ecological balance of southern Iraq, which is a national and regional goal due to its effects that cross borders into Iran and the Gulf. It also works to develop the marshes and consider them a development region for advancing their diverse resources and creating suitable conditions for tourism.

The literature on tourism, which is based on several sciences including economics, sociology, geography, and planning, has resulted in what is today called Tourism Science. The increasing global, regional, and domestic tourism movement has encouraged systematic thinking about providing the necessities of tourism, and so this science was born. It is taught in academic departments under names like the Department of Tourism, the Department of Tourism and Hotel Management, and others, in faculties of administration and economics, faculties of liberal arts, or in special institutes for tourism and hotel management.

The literature of these sciences concerned with tourism, and tourism science itself, point to a number of requirements for tourism activity and its development, which are:

1. Transport.
2. Accommodation.

(1) We do not mean by this that the marsh community should remain isolated from civilization, but we are thinking about mechanisms to preserve its distinctive model.

3. Food.
4. Recreation.

Regarding transport and travel to the tourist center or region, it is assumed that the following elements are available:

1. Comfort.
2. Safety.
3. Capacity.
4. Speed.
5. Frequency.
6. Regularity.
7. Comprehensiveness (Integration).
8. Appropriate fares.
9. Responsibility.

These elements are essential and are demanded by the tourists and their families, and their provision will encourage tourists to return. These elements are required whether the mode of transport is an airplane, a train, or a bus.

al-Baṣrah airport can provide facilities for tourists coming from the Kurdistan Region, from Bāghdad Governorate and its north, or from the central governorates. Here an important demand arises, which is to offer a special discount for tourists heading to the southern marsh region (al-Baṣrah). Iraqi Airways should issue a tourist airline ticket for the marsh region, as it is its role to provide facilities and encourage domestic (national) tourism.

Likewise, the element of comprehensiveness (integration) is also an important element. The tourist needs comfortable and fast transport from the airport (al-Baṣrah), for example, to the place of accommodation, i.e., their designated place of residence. Similarly, in the case of a tourist traveling by train from Bāghdad to al-Baṣrah (al-Ma'qil), it is necessary to provide a wide, fast, comfortable, and safe transport network to take them to the international station (Bāghdad), as well as a transport network to take them from the al-Ma'qil station (al-Baṣrah) to their designated place of accommodation. As for those arriving by bus, they can be transported door-to-door, and their trip should be comfortable, fast, and safe, with some services available.

Regarding accommodation or places for tourists to stay, there must be good hotels with health and comfort amenities. We suggest that they be built in the towns surrounding the marsh. For example, for the al-Ṣuḥayn marsh, hotels should be built in the town of al-Majar al-Kabīr, and for the al-Qurnah and al-Ḥammār marshes, they should be built in al-Qurnah, al-Madīnah, and Sūq al-Shuyūkh. Caution must be taken against building them inside the marshes, as that would cause them to lose their continuity as a nature reserve, for construction would quickly lead to negative consequences that

undermine the survival of the marshes as a nature reserve whose characteristics are defined by its native state.

We envision an arc surrounding the marsh region for the construction of the required hotels in al-Shaṭrah, Sūq al-Shuyūkh, al-Madīnah, al-Qurnah, Qal'at Ṣāliḥ, and al-Majar al-Kabīr.

We propose that the furniture in these hotels—beds, chairs, tables, seating mats, wardrobes, etc.—be made from the plants of the marsh, just like the furniture of the marsh inhabitants. It would also be most pleasant for meals—breakfast, lunch, and dinner—to focus on the food products of the marsh: fish (masqūf fish), birds, chicken, and dairy products, prepared using the same local methods, with purified water provided for drinking and cooking.

As for recreation, schedules should be organized for trips to the distant parts of the marshes by 'shakhtūrah', which is a large boat with a diesel engine, and to nearby areas by 'mashḥūf', which is propelled with a 'mardī', a thick, hard, long pole made of reed.

In the arrival areas, cafes with a folkloric character should be established for rest, drinking coffee and tea, and having some refreshments and marsh products.

Annual festivals can also be organized, announced through various media outlets in Iraq and the countries of the region, especially the Gulf. A festival for hunting birds with a shotgun can be organized for a period of a week; provided that the marsh administration must therefore establish programs to compensate for the birds that are hunted. Also, there could be another festival for fishing using traditional local methods (exclusively with the 'fālah' spear), and a festival for fishing 'al-shīḥ', a local small fish that the marsh inhabitants catch at night by the light of dim oil torches. This type of fish jumps into the boats at night, making this a nocturnal festival.

Among the festivals that can be organized are a photography festival, another for rural songs, a third for folk poetry, a fourth for painting, a fifth for local folkloric products and crafts, a festival for racing with 'shakhtūrah,' and another with 'mashḥūf.'

It is also possible to build a raised platform inside the marsh, in a deep area far from the villages, suitable for swimming around it, and for floating and relaxing in swimwear to enjoy the warm winter sun. This could be a recreational demand for some tourists, especially foreigners.

We emphasize again the necessity of carrying out these and other human activities without compromising the natural structure of the marshes in order to preserve them as a nature reserve. We have a bitter experience in this matter when the Ministry of Culture implemented many civil projects in the Babylon area, hoping to provide what is civically required for tourists, but this

transformed Babylon from an archaeological site into a historical one, which was a great loss for Iraq.

It could be useful to use advertising means via TV networks and social media to encourage visits to the marsh region, which in much of its human life is still close to ancient times—the Sumerian and Akkadian eras: the subsistence economy pattern, the patriarchal extended family, and the absence of any sign of gender bias in favor of men, for the marshes are full of working women. It is an opportunity to see the direct effect of the natural environment on people's lives: the building of traditional structures (the ṣarīfah and maḍīf), transport by the mashḥūf, the meals, and the generosity of the local community.

The Iraqi marshes hosts a cooperative subsistence society that has not yet been corrupted by greed. It is a society that is very close to primitiveness and a natural way of life. This is an invitation to lovers of sociology, anthropology, human geography, and economics, as it is an invitation to lovers of the natural environment that is still pristine, to all intellectuals, pioneers of tourism, and folklore in the world. Visit the marshes before civilization destroys them, lest you lose the chance to see a unique image unparalleled in the whole world.

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Appendix

Draining of the Marshes and the National Project for their Restoration

We previously noted that the area of these marshes was estimated at 15,250 km^2, as recorded in the early 1950s in the book The Marsh Arabs by the traveler Wilfred Thesiger, who visited the region multiple times. And if this estimate was exaggerated, having been made during the flood season at that time when their area expands, then their commonly accepted area, which is transmitted by the references, is 9,177 km^2. This is a figure we have also noted.

The water has receded from vast areas of these marshes, so that their area today is slightly more than 1,000 km^2, due to the decline in the quantities of water that flow into them via the Tigris and Euphrates. This discharge between 1938-1973 was estimated at about 2,600 m^3/s, while it decreased between 1973-1998 to less than 830 m^3/s.

The decline in this discharge is due to a number of irrigation, storage, and hydroelectric projects in the upper Euphrates basin in both Syria and Turkey, and on the Tigris River in both Iraq and Iran. In Iraq, the al-Ramādī Dam was built to divert the waters of the Euphrates to the al-Ḥabbānīyah Depression in 1951. And the Sāmarrā' Dam was built on the Tigris River to divert floodwaters to the al-Tharthār Depression in 1954. At the beginning of the 1960s, the Dūkān Dam was built in 1961, and the Darbandikhan Dam in 1962. Iran also constructed the Dez Dam on the Kārūn River in 1962. The Keban Dam was completed in Turkey in 1975 for the purpose of generating electrical power.

In general, Turkey has built 12 projects on the Tigris River basin, all for the purpose of generating electrical power except for two for irrigation. Iran has established 18 projects, divided between power generation and irrigation. And Iraq has established 12 projects, the majority of which are for irrigation purposes ('Abd-al-Ḥusayn et al, 2012, pp. 149-150).

On the Euphrates basin, Turkey has constructed 11 projects, divided between irrigation and power generation. Syria has constructed 4 projects, three of which are for irrigation. As for Iraq, it has constructed 6 projects, all for irrigation purposes ('Abd-al-Ḥusayn et al, 2012, pp. 151-152).

It would have been possible to mitigate the negative effects of these projects on the marshes and to reduce the field necessities for both sides, Iraq and Iran, in their war, which drove them to build roads and dams and remove everything that impeded the movements of the armed forces, as the peripheries of the marshes were often part of the military theater. And one cannot overlook the draining operations carried out by oil companies and their affiliated institutions.

In the 1990s, areas amounting to about 6,500 km^2 were drained with the aim of obtaining dry land for cultivation. About 2,045 km^2 were actually used for agriculture, distributed between Maysān (677.5 km^2), Dhī-Qār (712.5 km^2), and al-Baṣrah (655 km^2) (al-Sāmarrāʾī, 2004).

The recent and deliberate draining operations, for political and security reasons, passed through four stages:

- **First Stage**: Constructing and raising earthen embankments along the courses of the rivers feeding the marshes within Maysān Governorate, with lengths ranging between 6-18 km for seven rivers.
- **Second Stage**: Constructing two earthen dams that cut off the ends of all rivers, tributaries, and streams heading towards the Central Marshes before they reach them.
- **Third Stage**: In this stage, the water of the Euphrates River (the old course) was diverted to the Main Outfall Drain from the al-Faḍlīyah site to a point 5 km east of the city of al-Nāṣirīyah, from where the water eventually ends up in Khawr ʻAbd-Allāh, north of the Gulf.
- **Fourth Stage**: Preventing the Euphrates water from reaching al-Ḥammār marsh after constructing high embankments on the river's course in Dhī-Qār and al-Baṣrah Governorates. The width of these embankments at their base was 25 meters, and at the top 6 meters, with a height of up to 7.5 meters and a length of 145 km (ʻAbd-al-Ḥusayn et al, 2012, pp. 154-156).

The operations of these stages were carried out at the beginning of the 1990s. Without a doubt, no conviction can be formed for any justification for the draining operations, whether security, military, or otherwise. Many scientific studies have pointed to the devastating results that occurred due to these operations.

Destroying the environment does not take a long time, but repairing it and restoring its properties and balance requires centuries. Data indicate the possibility of re-inundating 15-20% of the area that the marshes used to cover if capabilities and time are mobilized, and scientific plans based on the experiences of other countries are put in place.

Center for Restoration of the Marshes and Wetlands

The Council of Ministers, in its 39th session held on August 2, 2011, approved the draft law for the National Commission for the Marshes and Wetlands in Iraq, one of the formations of the Ministry of Water Resources. On December 28, 2011, the Center for the Restoration of the Marshes was established to carry out the tasks of the aforementioned law, and its name today is: The Center for the Restoration of the Iraqi Marshes and Wetlands.

Nature Reserves

In 1969, the International Union for Conservation of Nature (IUCN) recognized ten types of protected areas:

1. Nature reserves for scientific purposes.
2. National monuments (rare physiographic features).
3. Wildlife sanctuaries (for endangered wild animals).
4. Biosphere reserves (for wild and marine plant biodiversity).
5. National parks.
6. Protected landscapes (land and coast).
7. Natural resource reserves (forests and minerals).
8. Anthropological reserves (reserves where human activity is mixed with the work of nature).
9. Multiple-use management areas (Tourism and resources that must be used in a sustainable development manner).
10. World heritage sites (sites where natural and cultural heritage are intertwined, applicable to marshes surrounded by the oldest urban centers in human history).

Ramsar Convention

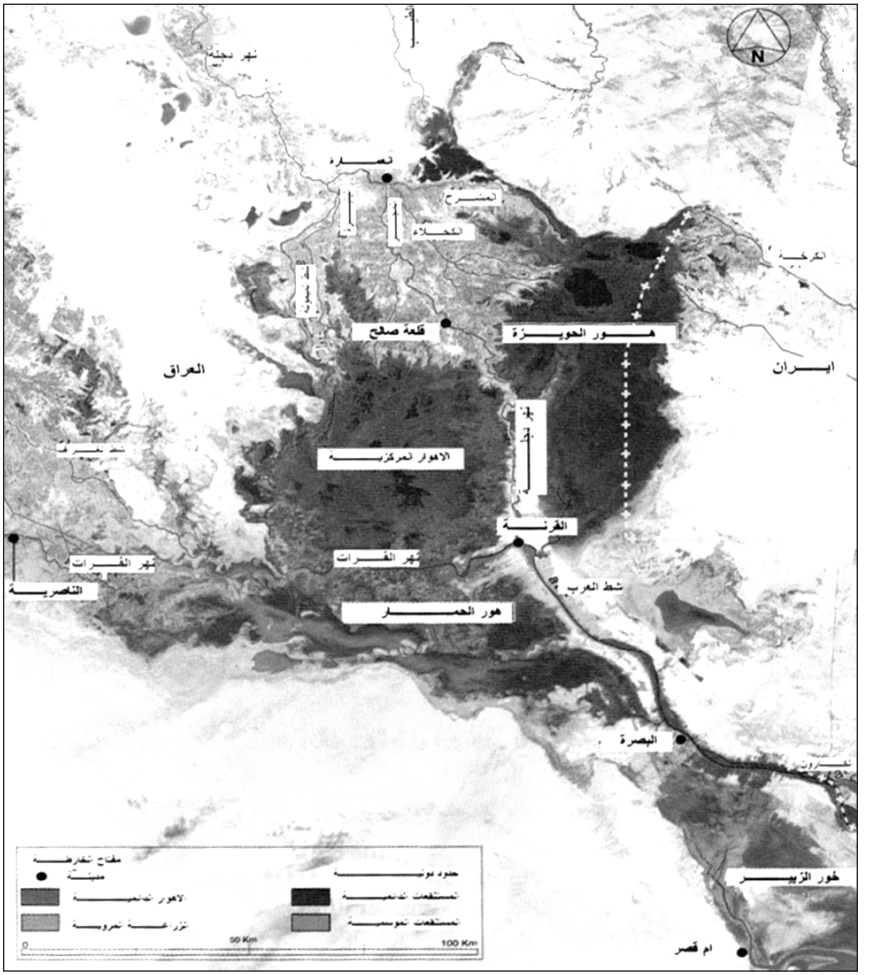
It is an international treaty that calls for the conservation of Wetlands(1) and halting their degradation.

The convention was concluded in the Iranian city of Ramsar on the southern coast of the Caspian Sea in 1972.

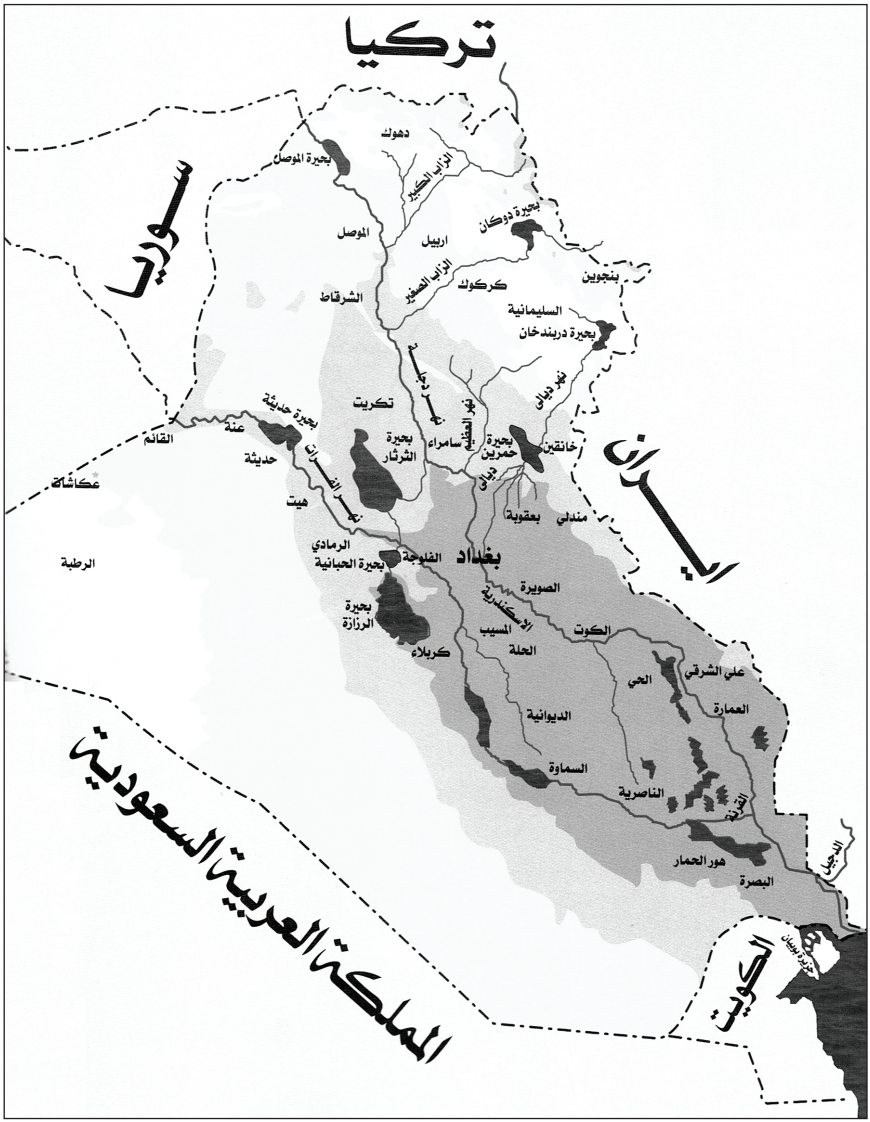
Iraq submitted a request to the Standing Committee of the Ramsar Convention at its meeting held from June 13-17, 2016, in Switzerland, to consider the Central Marshes, al-Ḥammār marsh, and al-Ḥuwayzah marsh—already registered as a nature reserve titled "The Garden of Eden"—as a Ramsar site.

(1) Wetlands are lands that are totally or partially submerged in water throughout the year or for part of it.

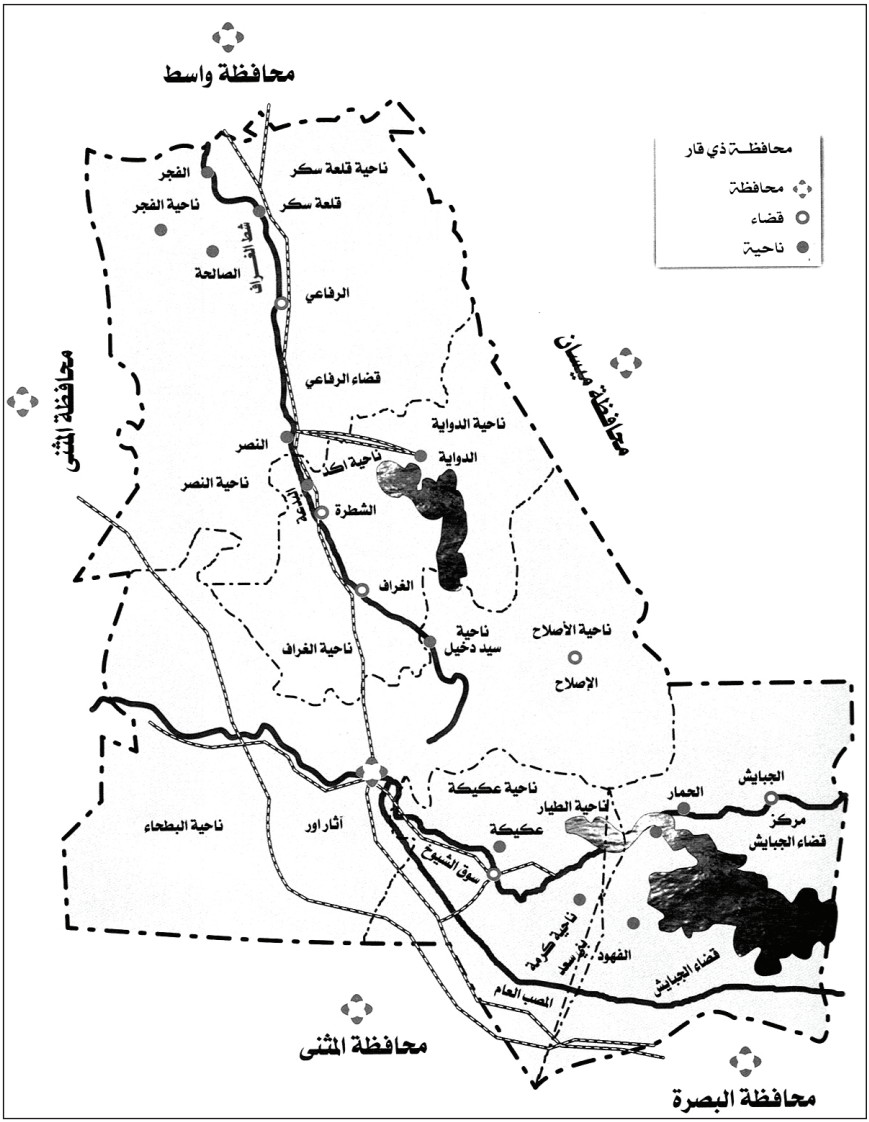
Picture 3-1: Satellite image of the Southern Marshes region in Iraq (1973).



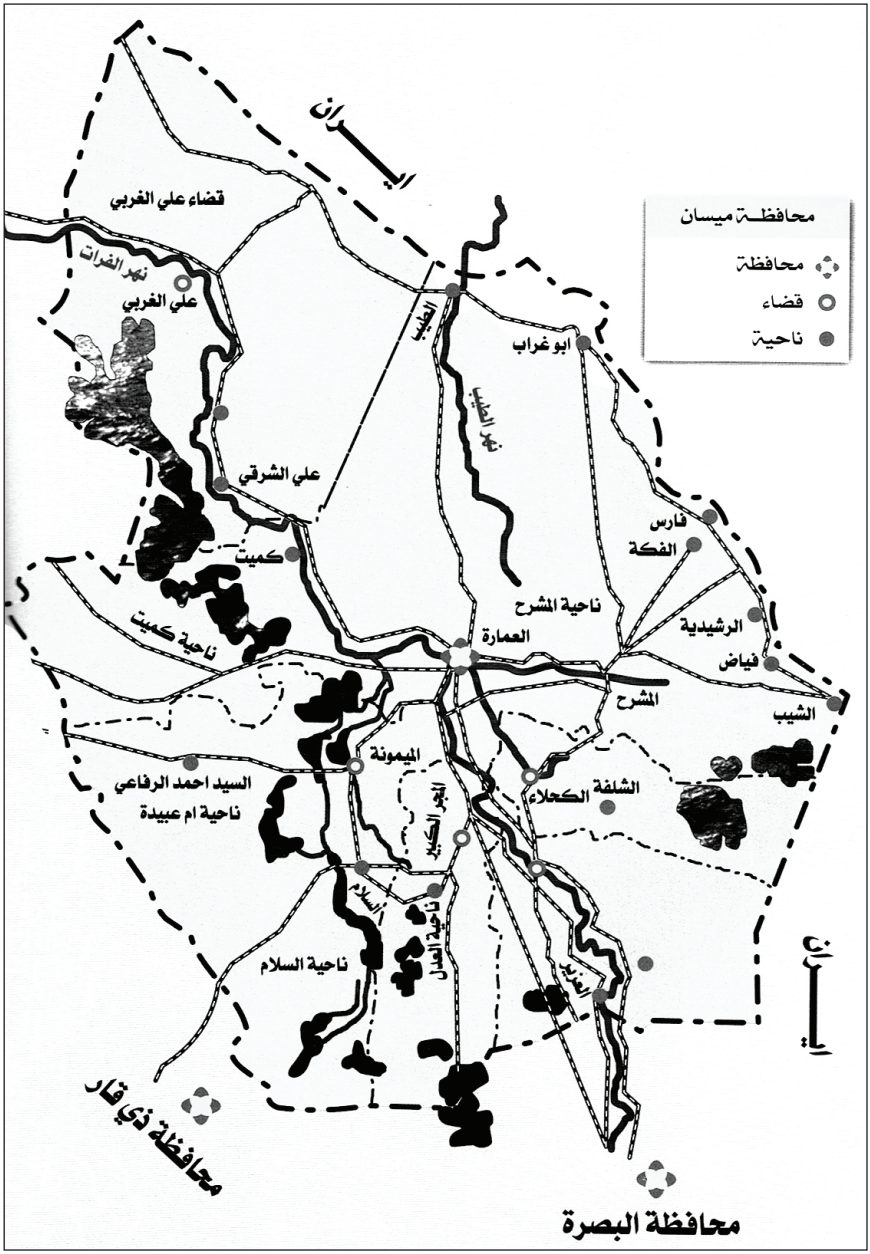
Map 3-4: Locations of the Marshes in Iraq.



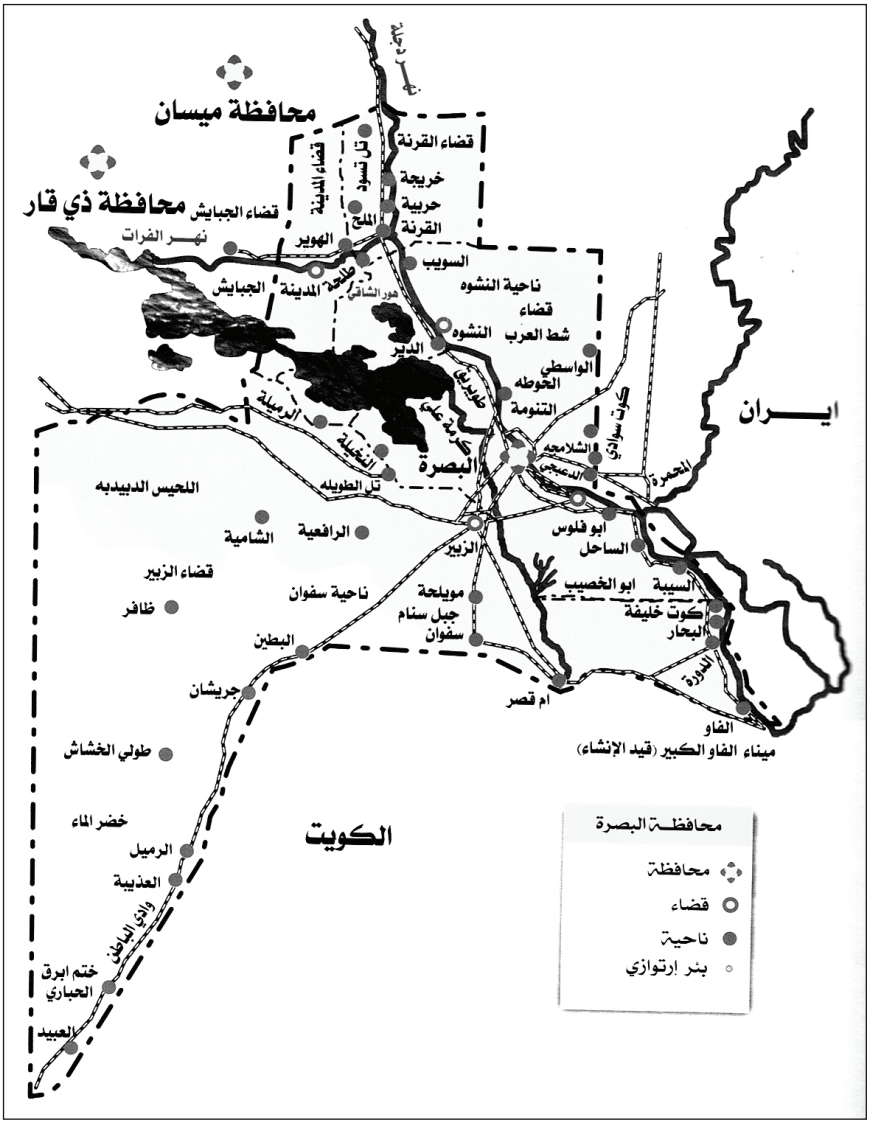
Map 3-5: Locations of the Marshes in Dhī-Qār Governorate.



Map 3-6: Locations of the Marshes in Maysān Governorate.



Map 3-7: Locations of the Marshes in al-Baṣrah Governorate.



al-Rafidain Center for Dialogue (RCD)

al-Rafidain Center for Dialogue RCD is an Iraqi independent think tank that works on encouraging dialogues in educational, political, cultural, and economic affairs, among all elites, in order to enhance the democratic experience, achieve societal peace and help governmental and societal institutions actualize their role and enhance their performance by providing them with experiences and strategic visions. RCD represents a free forum for dialogue characterized by objectivity and impartiality and it invests its outcomes to help decision-makers and guide public opinion towards establishing a state based on institutions.

al-Rafidain Center for Dialogue is considered one of the distinguished think tanks in Iraq that brings together on its platform the active political, economic, and academic elites who guide visions and influence decision-making and public opinion. The Center was established on February 2, 2014, in the city of al-Najaf al-Ashraf as a virtual group in the virtual world, comprising a number of academics, intellectuals, and politicians. The idea later evolved to acquire legal status by registering RCD in the NGO Affairs Directorate of the General Secretariat of the Iraqi Council of Ministers.

Vision

The center is a cultural hub where the opinions of elites and decision-makers from all their political, religious, and national spectrums converge. It provides a positive dialogic environment that enhances the creation of common ground among those opinions and contributes to building a prosperous country.

Mission

RCD's mission is to encourage and develop objective and serious dialogues between Iraqi elites and decision-makers in a manner that enhances the democratic experience and achieves societal peace and sustainable development in Iraq through the following objectives:

1. Enhancing societal peace through constructive dialogue among Iraqi elites.
2. Strengthening national responsibility, supporting the state's democratic experience, and building its institutions.

3. Assisting state institutions in solving problems by providing suggestions and consultations in various fields through its diverse publications and informed experts.
4. Expanding common ground between political and social entities through neutral dialogue that strengthens the relationship between the citizen and the state.

Means

1. Organizing seminars and panel discussions in the fields of RCD's concerns and following up on their outcomes with media coverage to promote them inside and outside Iraq.
2. Issuing books and strategic reports, conducting research and studies, and publishing them in print and electronically.
3. Forging partnerships with local and international research and academic institutions and think tanks with shared objectives.
4. Collaborating with esteemed universities to hold scholarly events and forums.
5. Establishing research departments and specialized committees to promote scientific research.
6. Holding dialogues between differing parties to promote social integration.

Structure

al-Rafidain Center for Dialogue RCD consists of an administrative structure formed in accordance with its internal regulations, which includes: the Board of Directors, consisting of the founder, Mr. Zayd al-Ṭālaqānī, as Chairman of the Board and eight members; a CEO and his deputy; a Board of Advisors; and a number of scientific and administrative departments, which are: the Department of Research and Development, the Department of Administrative, Legal, and Financial Affairs, and the Department of Protocols and Public Relations, in addition to an Advisor for Cultural Affairs and International Cooperation.

Like any giving and fruitful institution, al-Rafidain Center for Dialogue has been exposed to a considerable number of challenges, harassments, and targeting that have attempted to undermine it, yet it has insisted on continuing its triumphant march with sustained giving and strength of will.

RCD addresses several local, regional, and global issues through its diverse publications in the following fields:

1. Political Science and International Relations.
2. Economics and Development.

3. Sociology.
4. Intellectual Affairs and addressing social phenomena.
5. Strategic and Military Affairs.
6. Technology and Cybersecurity.
7. Constitutional, Social, and Legal Issues.
8. Geography.
9. State and Society.
10. Environment and Climate Change.
11. Artificial Intelligence and Digital Transformations.

RCD's Research and Scientific Connections Locally, Regionally, and Internationally

As a research center that works to promote dialogue with the other, al-Rafidain Center for Dialogue is keen to build bridges of cognitive and research cooperation by establishing connections with Arab and foreign research centers and institutions around the world. This is done through cooperation agreements signed with institutions and centers of significance at the Iraqi, Arab, regional, and global levels, including Foreign Service Institute of the Iraqi Ministry of Foreign Affairs, Center for Banking Studies of Central Bank of Iraq, Salahaddin University-Erbil, International Crisis Group ICG (Belgium), Geneva Institute for Water, Environment and Health GIWEH (Switzerland), French Institute for Research and Analysis of International Policy CFRP, China Institutes of Contemporary International Relations CICIR, Emirates Center for Strategic Studies and Research, Russian International Affairs Council RIAC, Governance and Policy Think Tank GPTT (Iran), The Arab Institute for Democracy (Tunisia), Center for Afghanistan, Middle East & Africa CAMEA at the Institute of Strategic Studies Islamabad ISSI (Pakistan), and other important institutions.

al-Rafidain Center for Dialogue RCD has managed to be a pioneer in holding forums through its largest annual forum (RCD Forum), an international forum held annually in the capital, Baghdad. It discusses the most prominent topics and developments at the local, regional, and global levels, provides a free space for discussing opinions in the fields on which it is based among elites of high importance at the local and international levels, and dedicates its outcomes to building the state and its institutions and promoting the culture of dialogue and coexistence at all levels.

RCD receives support and funding from its sponsoring institutions through public agreements and in accordance with applicable Iraqi laws and regulations, and it is keen to announce the sources of this support and funding with transparency and clarity. This support for the RCD's activities is represented by

contributions from the administrative body (Board of Directors), internal and external donations, grants, endowments, and unconditional gifts, in addition to financial grants from international organizations, United Nations agencies, Iraqi and international donors, humanitarian and development bodies, and private companies such as Central Bank of Iraq CBI, the Iraqi Ministry of Oil, Communications and Media Commission, European Union Mission, British Petroleum BP, Trade Bank of Iraq TBI, Iraqi Economic Council IEC, Wādī al-Khayr Company for Agricultural Investments, al-Thiqah International Bank, al-Nāfidhah Company for Internet Services and Information Technology, Iraqi Business Council, Wajh al-Qamar Company for Investments and Contracting, Madīnat al-Ma'ālī Company for Investments and Contracting, and Ta'līm Platform.

Additionally, RCD receives support from reputable, legally licensed Iraqi institutions, most notably al-Waṭanī by Earthlink, which is the first and leading company in Iraq specializing in fiber optic technology (FTTH) and the largest provider of internet services in Iraq, and Asiacell, the first telecommunications company in Iraq and the main provider of high-quality mobile communication and internet services, with a subscriber base that has reached 19.7 million. And Maṣrif al-'Ālam al-Islāmī (Islamic World Bank), one of the most important Iraqi banks in the field of economic development, which is a private joint-stock company founded by an elite group of locally and regionally renowned businessmen.

Publications

I. Authored Books

No.	Book Title	Author	Year of Publication
1	The Iraqi Economy After 2003	Zayn-al-'Ābidīn M. 'Abd-al-Ḥusayn Ṣādiq 'A. Ḥasan	2018
2	The Iraqi Marshes: Regional Analysis Through Interdisciplinary Lenses	'Abd-'Alī Ḥ. al-Khaffāf Ḥusayn 'A. al-Zayyādī Khālid G. al-Farṭūsī	2019
3	Lectures on the Iraqi Affair	Group of Authors	2019
4	Building Iraq: Reality, Foreign Relations, and the Dream of Democracy	Luqmān 'A. al-Faylī	2020
5	The Political Economy of Education in Iraq	Prof. Dr. Kāmil 'A. al-Fatlawī Prof. Dr. Ḥasan L. al-Zubaydī	2020
6	Between Two Generations: A Series of Dialogues Between a Young Iraqi and His Older Brother	Luqmān 'A. al-Faylī	2021
7	Central Bank of Iraq: Roles, Tasks, and Future Options	Group of Authors	2021

No.	Book Title	Author	Year of Publication
8	Iraq 2020: RCD's Strategic Report	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	2021
9	Summary on State Succession: A Legal Study in Light of the Provisions of International Agreements	Dr. Abū-Ṭālib H. al-Ṭāliqānī	2021
10	The Philosophy of the Frameworks of the Interrelationship between Ethics and Law: A Critical Legal Study of Reality and the Post-Secular World	Prof. Dr. Iyād M. Ṣayhūd	2021
11	The Social Contract According to Shaykh al-Nā'īnī in Iraq	Prof. Emer. Dr. 'Abd-al-Amīr Zāhid	2022
12	New Visions for Managing the Oil Extraction Industry in Iraq	Prof. Dr. Jawād K. al-Ka'bī	2022
13	Contemporary Iraqi Problems	Prof. Dr. Walīd 'A. Jabr	2022
14	Iraq 2021: RCD's Strategic Report	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	2022
15	China and Technology Companies: Arms of Espionage and Sources of Superiority and Digital Hegemony	Prof. Dr. Ḥasan L. al-Zubaydī Dr. Karrār A. al-Budayrī Dr. Aḥmad Amīn	2022
16	Financial and Administrative Corruption in Iraq: A Geopolitical Vision	Prof. Dr. Ḥusayn 'A. al-Ziyādī	2023
17	ISIS's Violations of International Humanitarian Law	Dr. Fāḍil 'A. al-Gharrāwī	2023
18	Energy Sources and the Future of Mankind	Dr. Ḥusayn al-Shahristānī	2023
19	Studies in Contemporary Islamic Movements in Iraq	Group of Authors	2023
20	Islamic Presence in Europe and Its Future: A Study in Light of Contemporary Orientalist Sources	Hibah Ḥ. al-Rumāḥī	2023
21	Najaf 2050: A Future Vision	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	2023
22	Evaluation of the Iraqi Government's Work During a Full Year 2022-2023	Group of Authors	2023
23	Iraq's Two Inflamed Decades: The Proliferation of Crises and the Intractability of Solutions (5 Volumes)	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.) Asst. Lect. 'Ammār K. Ḥamīd (ed.)	2024
24	Iraqi Kirkuk and the Conflict of Sub-Identities	Dr. Dahhām M. al-'Azzāwī	2024
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No.	Book Title	Author	Year of Publication
26	Iraq 2022: RCD's Strategic Report	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.) Prof. Dr. As'ad K. Shabīb (ed.)	2024
27	Iraqi Military Establishment 2003-2020	Dr. 'Imād H. al-Rubay'ī	2024
28	Iraq 2023: RCD's Strategic Report	Prof. Dr. As'ad K. Shabīb (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	2025
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II. Translated Books

No.	Book Title	Author	Year of Publication
1	War Without End: The Iraq War in Context	Michael Schwartz	2019
2	Political Philosophy: An Introduction	Jason Brennan	2019
3	Resource Rents and Economic Growth	Peter Kaznacheev	2019
4	Iraq: A Political History from Independence to Occupation	Adeed Dawisha	2019
5	Patriotic Ayatollahs: Nationalism in Post-Saddam Iraq	Caroleen Marji Sayej	2020
6	Al Qaeda, the Islamic State, and the Global Jihadist Movement: What Everyone Needs to Know	Daniel Byman	2021
7	Illusions of Victory: The Anbar Awakening and the Rise of the Islamic State	Carter Malkasian	2021
8	Waging Insurgent Warfare: Lessons From the Vietcong to the Islamic State	Seth G. Jones	2021
9	The Iraqi Federation: Origin, Operation and Significance	Farah Shakir	2021
10	Global Trends 2040	US National Intelligence Council	2021
11	The Arab Shi'a: The Forgotten Muslims	Graham E. Fuller Rend Rahim Francke	2021

No.	Book Title	Author	Year of Publication
12	Rulers, Religion, and Riches: Why the West Got Rich and the Middle East Did Not	Jared Rubin	2021
13	Soldiers and Citizens: An Oral History of Operation Iraqi Freedom from the Battlefield to the Pentagon	Carl Mirra	2021
14	Security in the Persian Gulf Region	Fatemeh Shayan	2021
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30	Iraq: Power, Institutions, and Identities	Andrew J. Flibbert	2025
31	Earth for All: A Survival Guide for Humanity	Sandrine Dixson-Decleve et al.	2025

III. Dissertations Series

No.	Title	Researcher	Year of Publication
1	Iran's Position on the Iraqi Invasion of Kuwait 1990–1991: A Historical Study	Rimāḥ S. al-Ma'mūrī	2021
2	Consequence of Violating the Rules for Justifying Criminal Judgments in Iraqi Legislation: A Comparative Study	Asst. Lect. Yūsuf F. Ḥirz-al-Dīn	2021
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12	Regional Environment and Combating Terrorism in Iraq	Dr. Bāsim M. Yūnus	2025

IV. Publications in English

No.	Publication Title	Publication Category	Year of Publication
1	Najaf 2050: A Future Vision	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	2025
2	The Iraqi Marshes: Regional Analysis Through Interdisciplinary Lenses	'Abd-'Alī Ḥ. al-Khaffāf Ḥusayn 'A. al-Zayyādī Khālid G. al-Farṭūsī	2025
3	Iraq 2021: RCD's Strategic Report	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	Forthcoming

No.	Publication Title	Publication Category	Year of Publication
4	Iraq 2022: RCD's Strategic Report	Prof. Dr. Ḥasan L. al-Zubaydī (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.) Prof. Dr. As'ad K. Shabīb (ed.)	Forthcoming
5	Iraq 2023: RCD's Strategic Report	Prof. Dr. As'ad K. Shabīb (ed.) Prof. Dr. Aḥmad S. al-Ma'mūrī (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.)	Forthcoming
6	Iraq 2024: RCD's Strategic Report	Prof. Dr. As'ad K. Shabīb (ed.) Prof. Dr. Miqdām 'A. al-Fayyāḍ (ed.) Asst. Lect. 'Ammār K. Ḥamīd (ed.)	Forthcoming


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This book frames the Marshes not merely as a body of water, but as a resilient cradle of Mesopotamian civilization that has survived both natural shifts and deliberate human devastation—most notably the desiccation campaigns of the former Ba'athist regime.

The work is a multidisciplinary deep dive, leveraging a specialized cohort of researchers to examine the region through several critical lenses:

- Environmental & Geological: Detailed analysis of the geological formation, biodiversity, and endemic species of this unique ecosystem.
- Historical & Cultural: Exploration of the ancient theories of origin and the long-standing human traditions that define the area.
- Contemporary Challenges: A sobering look at the modern threats of climate change, regional damming, and shifting water policies.

The book moves beyond historical documentation to offer a forward-looking vision for sustainable development and eco-tourism, highlighting the Marshes' status as a UNESCO World Heritage site.

It is a vital, academic contribution to Iraq's national discourse and a must-read for those invested in environmental preservation and human heritage

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