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Changes in the land cover: Land uses in Maysan Governorate from 2012 to 2022 using remote sensing technology and geographic information systems

By

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Abstract

Not Available

Introduction

The physical condition of the Earth's surface and the direct surface face, including soil, plants and water, is called the Land Cover, as this cover relates to and refers to the types of surface features on the Earth's surface (lakes, rivers, forests, buildings, facilities, etc.).

As for the appearance of the land after man has modified it, it is called land use

The integration of remote sensing applications and geographic information systems aims to provide researchers with advanced tools and means to manage the environment by supporting the data received through these applications in a comprehensive analysis of the system at all local, regional and global levels in all stages. In addition to the importance of these applications in observing and revealing the vital relationship between the components of nature, which led to the development of new technologies. Moran et al. (2004).

Many changes have occurred in the patterns of land cover in Maysan Governorate as a result of changes in their uses and their interaction with each other, especially agricultural lands due to human factors and natural factors, and this constituted a reason to study and analyze changes in patterns of land cover and land uses using satellite visuals In addition to the use of geographic information systems in building a geographical information base for each of the types of land cover patterns and their uses, and indicators of environmental degradation in the land cover patterns in the study area.

The issue of land uses is considered one of the important topics, and the importance of this topic lies in the fact that it is considered one of the forms of spatial variation of activities within the city. At the general level, we note that there is great interest in planning land uses, which constitutes the basis for organizing and planning cities in order to achieve the best and optimal use of lands that are considered as resources. and limited resources.

As for the Palestinian cities, they did not receive the required attention in the study of land uses, despite the importance of this subject and the role it plays in analyzing the past and studying the present and the future.

Second: The importance of the research and its justification: The importance of the research is due to several things, the most important of which are:

1. The issue of land uses is one of the forms of spatial variation of activities within the city.
2. Understanding the structure of the city depends on the land use map.
3. This type of studies is considered an important stage in the development and planning of any area, in order to identify the characteristics of existing uses and give a vision and develop a plan for the use of these lands in the future.
4. Urban expansion in the city and the high natural population increase and ways to confront it.
5. The important location of the city.
6. Making geographical studies and social studies enjoy their position among planning studies, because these studies have become an important basis in supporting planning and development projects.
7. The remarkable growth witnessed by the city, which led to significant demographic changes, which resulted in negative aspects
8. In the services sector in the city, which did not grow in a manner parallel to the population growth.
9. The plans that were made for the city did not take into account the needs of the city and the population and did not take into account the correct distribution of land uses.

Research Objectives: In light of the aforementioned importance, this study seeks to achieve a set of objectives, the most important of which are:

1. Know the factors affecting land use in the city.
2. Provide clear pictures of the most common land uses in the city and solve the problems resulting from the misuse of those lands.
3. Highlighting and clarifying information about land use in Maysan Governorate for decision makers, through analysis by following the scientific method.
4. Linking the land uses in the city with the planning levels and showing the importance of each level with the land use.

Fourth: Research Limits:

Spatial dimension: Maysan Governorate:

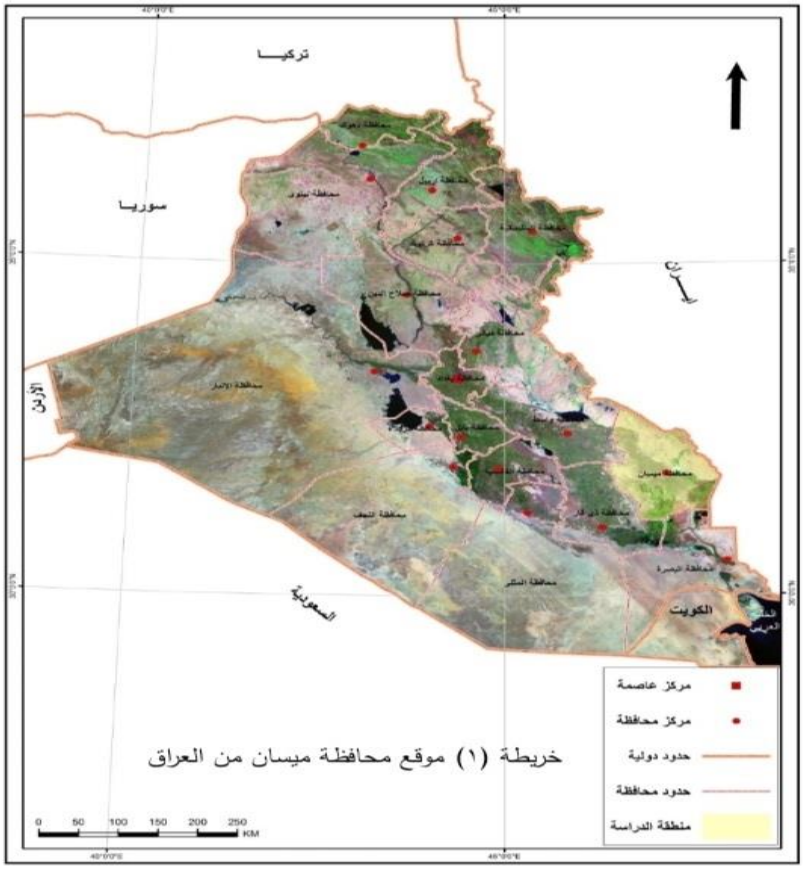
The study area was represented by Maysan Governorate, which is located in the southeast of Iraq, which is bordered on the north and northwest by Wasit Governorate, from the west by Dhi Qar Governorate, from the south by Basra Governorate, and from the east by the Republic of Iran.

It extends between latitudes (31.80 and 32.52) north, and longitudes (46.32 and 47.52) east. Its area is 16,396.86 square kilometers, which is equivalent to (3.8%) of the total area of Iraq.

Map No. (1) shows the location of Maysan Governorate in Iraq.

Temporal dimension: Land use changes were selected in Maysan Governorate during 10 years, from 2012 to 2022.

Map No. (1) *The location of Maysan Governorate in Iraq*



Source: *Arts Magazine, Supplement to Issue 125 (June 2018)*

Research Methodology

In this study, several methods have been adopted to achieve the research. It has been adopted:

1. The descriptive approach: by studying the structural plans that were made for the city and describing what is in it and comparing it with each other and what is on the ground.
2. The analytical approach: This is done by studying the reality and understanding the factors influencing the current patterns of land use in the city in order to justify and analyze the reasons for the differences between the theoretical planning of the city and the reality of work in it.
3. The collection of information was relied upon

a. Library sources: These include books, references, periodicals, and related theses

B subject of research.

T. Official and semi-official sources: These include statistical reports issued by official bodies such as the Central Statistical Department, the Ministry of Agriculture, the Ministry of Commerce, and research centers.

w. Aerial photos and land plans for Maysan Governorate.

c. Field study: By conducting a field survey of land uses in order to identify how the patterns of land use in the city have developed.

Defining land uses

More than one definition of the term land use can be presented, including:

1. It is the process through which recommendations are made to monitor suitable places for different human needs, with the aim of issuing decisions related to the allocation of lands for public and private purposes. (Ghuneim, 2001, p. 33)
2. It is a set of sequential and interdependent procedures that are prepared and implemented with the aim of achieving the optimal use of land through studying and evaluating all economic and natural factors related to it. (Ghoneim, 2001. p. 33)
3. Paying attention to the patterns of land use in the different floors and floors and the ways of displaying these uses. (Sakhnini, 1998, p. 201)

The importance of land use planning

1. An increase in the population, which necessitates knowing how and where it increases, given its importance to the land use plan.
2. The continuous decrease in land area in different countries.
3. Preserving the Earth's natural resources.
4. Facing problems resulting from changing land use patterns.
5. The emergence of many problems, such as pollution, overcrowding, and the deterioration of agricultural lands, forests, and water resources.
6. Increased pressure on public services and utilities due to the increasing population.
7. The rapid development of the population's life and its repercussions on the increase in the demand for land.
8. Work on distributing jobs and jobs to all regions fairly.
9. Developing land management through patterns that control the behavior of the population and their prevailing economic and social conditions. (Ghneim, 2001. p. 136)

Theories of land use: There are many theories that dealt with land uses in cities, including:

Agricultural site theory

The first to try to create "Von Thunen" is the German agricultural expert "Von Thunen", a scientific theory that seeks to explain the location of economic activity. It tries to explain the agricultural patterns that grow and thrive around urban centers. The basic premise of this theory is that production costs decrease with increasing distance from the city or market, while transportation costs rise.

In order to verify the hypothesis, Tonen set a set of conditions: (Brad ford p74).

1 An isolated area consisting of one city and its own agricultural area around it.
2 This city is considered a market for the crops of this region to which it belongs, and it does not import anything from any other region.
3 This area of the city does not export products to any other city.
4 The area surrounding the city includes a natural environment suitable for plant and animal production.
5 Farmers who want to get the most profits live in this area.
6. In this region, one method of land transportation is used, so that the transportation cost is proportional to the distance.

By applying this, it became clear that the value of the land close to the market is greater than the value of the land far from it in case the area is equal, and the formula in which the value of the land differs depending on the distance from the market is expressed as follows:

Market price Production costs Crop fare. Village value = amount of production

Thus, the farmer's profit depends on the relationship between the cost of transportation, the cost of production, and the selling price

Express it in the following mathematical form:

Profit = selling price of the product (production cost + transportation cost).

Tonen concluded that the farmer's profit decreases with increasing distance from the market. (Ghneim, 2001. p. 152)

Traditional theories of urban land uses

The first theories is the theory of central rings developed by the sociologist (E.Burgess) Ernes Burgess

Which is based on the following idea:

The development in the city takes the external direction from the central area of the city, so five circular areas are formed with the same center, and each area has a name as follows:

1) The city center and this area is the nucleus that contains all services, activities, and financial and service centers. (Ghoneim, 2001, pg. 42)
2) The second area, which is the transition area, which is characterized by the diversity of land uses, where different levels of residential areas begin to emerge.
3) The third area, which is the workers' housing area, and is characterized as popular housing for low-income people.
4) The fourth area, which is the best housing area: it is for middle-income people.
5) The fifth region, which is the remote suburbs area: which extends along the main transportation lines and is characterized by the presence of housing for middle- and high-income people. (Haider, 1994, p. 145)

As for the second theory, which is the theory of (sectors), it was demonstrated by the American H. Hoyt in 1939 AD. He said that the internal structure of the city is dominated by roads from the city center to the suburbs, and the difference in accessibility leads to different land prices, which makes them different. This theory consists of five regions, as in the theory of the central ring, with the exception of the second region, which Hoyt considered the transitional region and not from the field of light industry and wholesale trade. (Ismail, 1993, p. 275)

As for the third theory, it is the theory of multiple nuclei, which was presented by two geographers:

Harris and Ullman (1945) According to them, the city will grow by a number of clear intentions, and not by a single nucleus so that professional land use is encouraged around these intentions by several factors including that commercial or industrial activities are closely related other activities, they must be located in one area.

These theories show the importance, usefulness, and value of land. For example, an organization is concentrated in the center of cities, where differentiation, differentiation, and competition are intense (CBD), central works, different uses, land prices, and very high wages. For population and social problems. (Al-Saidi, 2000. p. 16)

Factors Affecting Land Use

Land uses are affected by several factors, the most important of which are:

1) Political Factors:

The prevailing political situation in a particular region generally affects the lives of its inhabitants, including the impact on the land use policy therein. The study area was affected, like other Iraqi cities, by the existing political situation, and its land uses were changed repeatedly due to the political conditions that Iraq went through. (Al-Saidi, 2000, p. 46)

2) Economic Factors:

These factors are external and internal regional forces interacting with each other to appear in its current form. In other words, the relationship between the external economic power and the internal economy affects the level of this region, and the regional power affects the rate of progress of the city in the development process. (Allam, 1991. p. 307)

3) Social Factors:

Society is the product of continuous and changing integrated tasks and processes, for example, in a commercial center located in the center of the city, there is a significant activity and other activity associated with it.

In the city, there is a heterogeneous activity, such as the presence of a high-level residential area surrounded by different unorganized spaces, and there is a main activity in an abandoned place.

The social processes affecting land use fall into three categories:

1. Control and gradient.
2. Centralization and decentralization.
3. Invasion and Occupation (Allam, 1991, p. 363)

Topographic factors:

Since urban activities tend to be located in the plains and in areas close to transportation routes, in order to achieve the principle of easy access to these uses, which created a shift in the forms of Cities, which were dominated by the multi-arm shape, which is commensurate with the transportation lines linked to the civic centers.

5) Soil

Soil here means the composition and structure that determines the nature of use. For example, buildings need excellent soil with a strong and enduring structure.

6) Competition Factor:

The concept of competition depends on the fact that similar activities cannot be conducted in the same geographical area at the same time. There is a common use in cities based on factors of competition between different population groups on the one hand and the use of different lands on the other hand. Commercial and industrial applications in cities are

the best applications given Because of its high returns from the economic point of view, it is followed in the second place by the use of housing in terms of competitiveness.

7) Technological Advances:

Which directly affects the lives of the population and thus the nature of the patterns of uses practiced in the cities as well as affects the movement of the population and the architectural aspect. (Ghoneim, 2001, pg. 43)

Risks of Random Land Use

Indiscriminate land use leads to many social, economic and organizational problems and ultimately leads to the decline and decline of the city.

The most important risks arising from random land uses:

1) Environmental and Health Hazards:

Proper planning of land uses eventually reaches a stage in which the city avoids environmental and health risks if there is a commitment to what is planned. But if there is random use or misuse, then this leads, for example, to harm the environment in which people live. For example, industrial sites must be chosen in areas far from populated areas to protect people from pollution and harm from various industries. As well as for housing, there is a need that they are held in areas unsuitable for agricultural use. And we must keep pace with the Earth constantly renewing its productivity and not depleting it

2) Economic Risks:

The directive plan is prepared by the authorities responsible for organizing the lives of citizens and achieving the interests of individuals and society, and this in turn increases the costs for the authorities, so these costs are lost if they are not used after the citizens' commitment to the applicable law. Citizens also bear part of these costs in the event that the citizen does not comply with the applicable laws and regulations, and the citizen bears additional costs for providing services or finding an alternative for them. (Ghneim, 2001, pg. 67)

Security risks:

The purpose of the structural plan developed by the competent authorities is the welfare and safety of citizens. And apart from the danger of harming society when preventing or allowing certain uses, this must be in line with the capabilities and capabilities of society and the devices on which it is based.

Therefore, it is necessary to take into account these risks and keep them away from them as much as possible, and this comes through the optimal use of the land.

4) Social Risks:

The citizen's non-compliance with building and organization laws results in a set of risks that threaten social security and the fragmentation of society and its unity.

5) Urban hazards and distortion of the urban fabric:

These risks manifest in the indiscriminate use of land by citizens and non-compliance with building permits and licensing laws. For example, there is an overlap of applications that leads to the distortion of buildings, the obsolescence of cities, the demolition of many homes, and the inconsistency between the construction methods used.

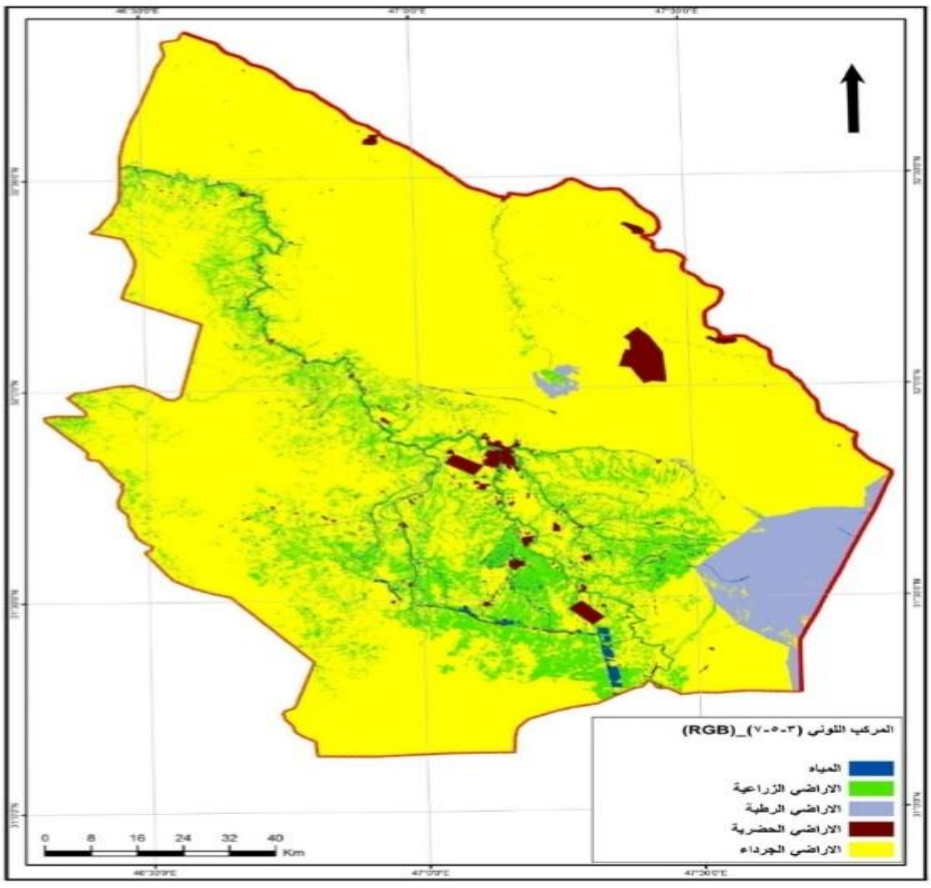
6) Contradictions and cracks in land use:

There are contradictions and overlaps between rural and urban uses, the best example of which is the urban expansion at the expense of the green belt surrounding cities and the changing landscape images due to urban sprawl and urban facilities. In several countries, proposals were made to change land uses and subject them to regulatory conditions and studies, in an attempt to make a change in the form of a scientific and studied figure. (Al-Saidi, 2000. p. 27)

Land cover and land use in Maysan Governorate for the year 2012

Map (2) shows the land cover and land uses in Maysan Governorate for the year 2012

Map No. (2) *Land uses in Maysan Governorate*



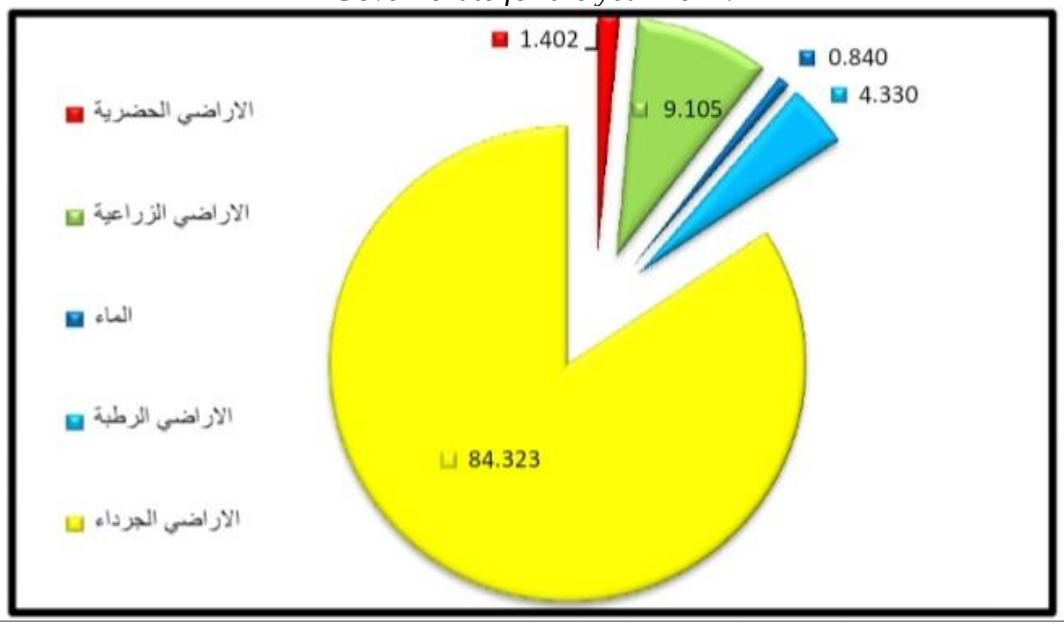
Source: *Mustafa Helou Ali (Land Cover Classification and Land Use in Maysan Governorate, Arts Magazine 2018)*

Table No. (1) *shows areas and percentages of land cover and land use for the year 2012*

Class symbol	Class	Area	Percentage
1	urban lands	229,814	%1,4016
2	Farmland	1492,994	%9,1054
5	Water	137,696	%0,8398
6	wetlands	709,954	%4,3298
7	Barren lands	13826,403	%84,3235
Total		16396,861	%100

Source: *Based on the previous map*

Figure No. (1) *shows the percentages of land cover and land use classes in Maysan Governorate for the year 2012.*



Source: *Based on the previous table*

From the previous figure and table, lands in Maysan Governorate can be divided into the following categories:

First: Class (7) Barren Lands: This class ranked first among the rest of the other classes in terms of the large area, as is the case in the subsequent years, as its area reached (13826,403) square kilometers, at a rate of (84.3235%) of the total area of the study area. .

Second: Class (2) Agricultural Lands: The area of agricultural lands reached (1492,994) square kilometers, representing 9.1054% of the total area of the governorate, and in this area it ranked second.

Third: Class (1) Urban Lands: Urban lands occupied the third rank in terms of area, as the area of this class reached about (229,814) square kilometers, with a rate of (1.4016%) of the total area of the study area.

Fourth: Class 4 Wetlands: which is represented by wetlands devoid of trees, with an area of (709,954) square kilometers, with a ratio of (4,3298) of the total area of the study area.

Fifth: Category (5) Water: This category came last, constituting an area of (137,696) square kilometers, with a rate of (0.8398%) of the total area of the governorate.

Table No. (2) *Areas and percentages of land uses in Maysan Governorate for the year 2022 AD*

Class	Area	Percentages
green lands	945,604	%6,150
Waterbodies	921,464	%5,99
arid soils	3489,682	%16,19

Source: *Iraqi Ministry of Environment, Environmental Protection and Improvement Department in the southern region, Maysan Environment Directorate.*

From the comparison of the previous tables, we notice a decline in the area of green lands in the study area from 1492,994 square kilometers in 2012 to 945,604 square kilometers in 2022, due to the expansion of urbanization and urban areas at the expense of agricultural lands and green spaces.

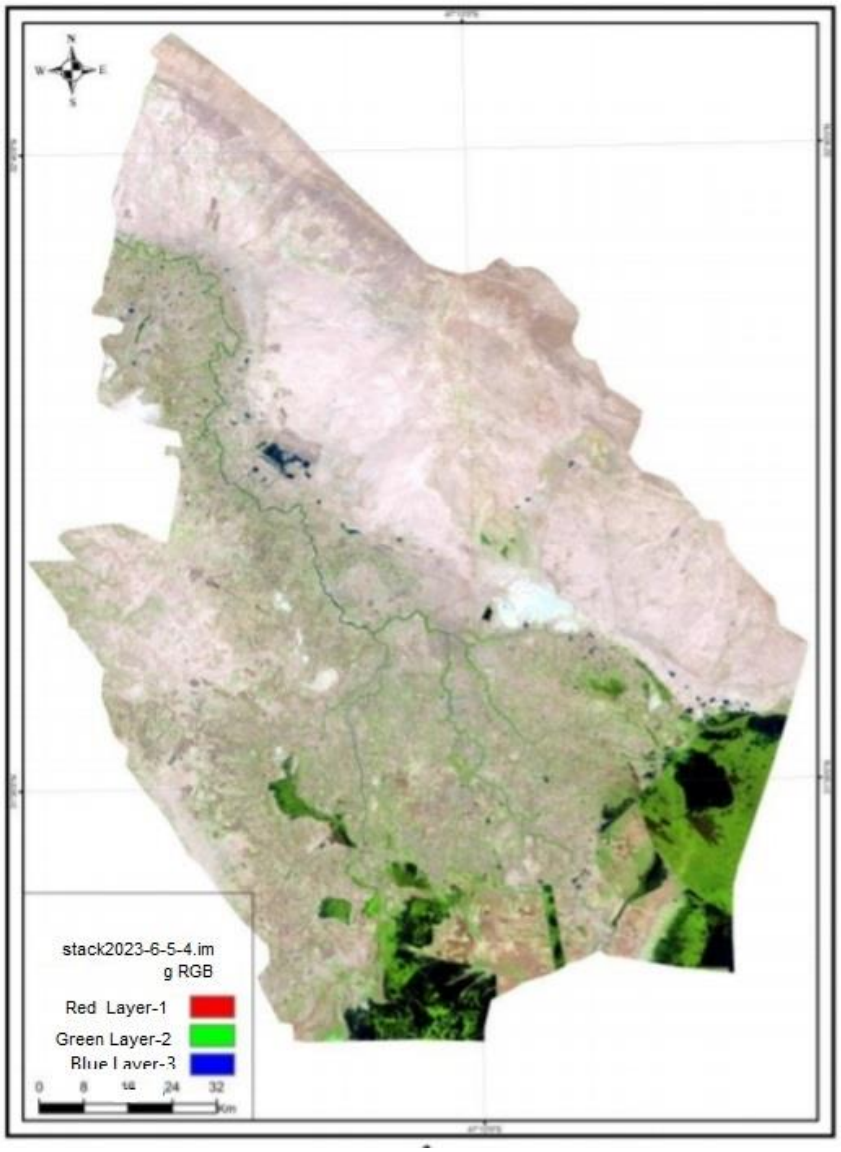
While the area of water bodies increased from 137,696 sq km in 2012 to 921,464 sq km in 2022, i.e. an increase from 0.8398% in 2012 to 5.99% in 2022.

As for the barren lands, their area decreased from 13826,403 square kilometers in 2012 to 3489,682 square kilometers.

square kilometers in 2022 AD, and to become 16.19% of the total area of the governorate after it was 84.323% of the total area of the governorate in 2012 AD

And map No. (3) shows the distribution of lands in Maysan Governorate for the year 2022 AD

Map No. (3) *the distribution of lands in Maysan Governorate for the year 2022 AD*



Source: *Directorate of Water Resources in Maysan Governorate, 2022*

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