Desertification in Iraq and how to Combat it

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Abstract

Iraq faces many environmental challenges as a result of its geographical location within arid and semi-arid regions, as well as the economic, political and security conditions it faced. Desertification comes at the forefront of these challenges as it is considered one of the dangerous environmental manifestations because of its direct impact on food security and the impact on human health, which is the goal and main tool for development. This problem has been exacerbated during the last two decades due to several reasons, the most important of which are climate change, low rainfall rates, misuse of natural pastures, overgrazing and urban sprawl at the expense of agricultural lands in addition to unsustainable farming methods and wrong practices in irrigation operations and the increase in land areas affected by salinity and the significant deterioration in vegetation and those Covered by Moving sand dunes as a result of land degradation and erosion. In addition to the phenomenon of drying marshes, as they dried more than more than 90% of its area, and the research dealt with dividing the land of Iraq according to its production capacity into eight comprehensive sections for eight varieties.

Keywords: Iraq, desertification, overgrazing, salinity, marshes

1.Introduction

Desertification has become one of the biggest serious problems with negative effects for a large number of countries in the world, especially those that fall under dry, semi-dry or even humid climatic conditions. This problem has increased dramatically over the last two decades, which has created negative effects on all environmental, social and economic levels in A large number of countries in the world Iraq is among the countries affected by this phenomenon for several reasons, including climate change, low rates of rainfall and poor independence of natural pastures due to overgrazing and urban creeping at the expense of agricultural lands without observing the laws and regulations. In addition to unsustainable cultivation methods and poor irrigation, the increasing rates and levels of water have also resulted. The current surface of the rivers of Iraq to the exacerbation of this phenomenon and its extension to areas that were previously considered among the most fertile agricultural regions in the countries of the world that most of the regions of Iraq are affected by desertification in all its forms and drought to a degree or steamship. He lived up to the level of the threat that he posed [1], and in December of 2000 the Fourth International Conference to Combat Desertification in the City of Bonn in Germany held this agreement that was negotiated during the period) 1994-1992) and became effective on December 26, 1996 when it was ratified at that time by 60 countries, bringing the number later to more than that, and the goal of the conference was to reach practical decisions In the field of combating desertification, protecting the environment and natural resources, twenty Arab countries participated in the conference. This volume of Arab participation reflects the extent of concern that all Arab countries feel without exception from the encroachment of desertification and the resulting environmental, economic, social, cultural, and even political and security effects [2] We participated in this conference to shed light on this expanding phenomenon in all regions of the Arab world.

2.The Aim of the Research

An attempt to find appropriate and reasonable solutions to reduce desertification in Iraq and limit desertification to the basic sectors of life such as industry, agriculture, and others.
3. Research Importance

The phenomenon of desertification is one of the most threatening phenomena to plant and animal life, and the spread of this phenomenon has resulted in a lack of natural vegetation, agricultural production and crawling of forests for housing, overgrazing and logging. Therefore, this phenomenon threatens the life of mankind. Therefore, the countries of the world combined make tremendous efforts to stop this dangerous phenomenon through international organizations such as the United Nations and other regional organizations, where the United Nations General Assembly in December 1974 issued two decisions: The first: An invitation to countries in general to pay attention to studies of desertification and cooperation among them to investigate this phenomenon and how to combat it.

The second: A decision to hold an international conference in 1977 on desertification. The conference was held from August 29 to September 9, 1977, when the word desertification began as an alternative to previous terms such as desert encroachment and the word desert. Its impact is horrific. Less dry, such as woods, weeds, and savannah. Perhaps the reason for this deterioration is what we see when sand dunes crawl on villages and oases and their farms and destroy them, as well as when they crawl on paved roads and railways. [3]. In this research, we will address desertification and its causes, the results of desertification in Iraq, and ways to combat desertification.

4. Meaning of Desertification:

The term desertification appeared in the forties of the last century and was popularly used in the late seventies of the same century, which means a deterioration in the productivity of dry areas, especially those that depend on irrigation due to salinity, semi-dry and semi-humid conditions due to lack of rain or due to the irrational exploitation of natural resources by man [4]. Also, desertification is defined as a process of pushing and displacing agricultural, pastoral and forest land uses and retreating beyond its secured and safe borders from the risk of drought [5], and the phenomenon of desertification is the phenomenon of turning agricultural land and natural pastures in semi-arid regions into desert unproductive due to drought. F has been going on for several years and due to the irregular exploitation of it by humans. The sand and semi-sand dunes and the accumulation of salts are numerous, although the definitions of the concept of desertification multiplied, but they meet at one point is that desertification deteriorates in the environment, especially in the elements of soil, water resources and natural plant, which leads to less productivity of natural resources resources, whether the change in nature due to investment is not optimal by humans or due to the encroachment of the desert by them [6], desertification has natural and other human indicators, and despite the conviction of the importance of the latter and being closely related from the heart of the problem, the evidence for its development as a basis for measurement has not yet been provided systematically and in light of much concern. Other bars proved to be difficult to monitor and therefore were not used as preliminary indicators in the UNEP assessment.

So we will list here the most important natural indicators that are: the invasion of sand dunes of agricultural lands, the deterioration of agricultural lands dependent on rain, salinization of the soil, deforestation and destruction of forest plants, a decrease in the quantity and quality of ground and surface water, degradation of pastures, low fertility of agricultural lands, increased erosion activity. Hydro and air, increased sediments of dams and rivers, increased earth storms, and increased dust volume in the atmosphere. And these and other indicators can be used to determine the status or status of desertification in different regions of our Arab countries, which means the degree of progress of desertification in the lands determined by climate, land, soil and vegetation on the one hand and the degree of human pressure on the other hand.

The phenomenon of desertification and salinization is accelerating in Iraq, and the proportion of agricultural lands suffering from salinization is estimated at 50% due to the neglect of the previous regime for years in the agricultural and irrigation sector and wasting the bulk of Iraq’s resources on its reckless military adventures. This statistic, at the very least, dates back to the period before the catastrophe of the invasion of Kuwait in 1990. So, now that Iraq has suffered 13 years under the weight of the economic blockade and was subjected to a third war. Add to that the environmental catastrophe that the regime implemented by drying the marshes of Iraq, as it dried more than 20,000 km2, equivalent to 90% of this area, which represented the largest water area in the ecosystem in the Middle East, as it exceeded twice the size of Lebanon. It is known that the marshes were rich in its plant, agricultural, animal and fish resources, in addition to preserving the environmental balance. According to the latest study by the University of Exeter, the British showed that the risk of salinity in the lands has become very high and that the disaster of the loss of animal settlement areas is inevitable and inevitable due to the drying of marshes. The regime implemented the crime of dehydration under the pretext of expanding the scope of agricultural lands, while official statistics that spread these allegations...
lie, the area of arable land has decreased from 5.78 million hectares in 1994 to 5.54 million hectares in 1998. This clearly shows that the real goal of this operation is to suppress the armed opposition forces that were operating in these areas. Now that the regime has fallen, the marshes can return to their previous nature if the operation was carried out according to environmental, scientific, economic and social studies to avoid the negative consequences of this return [2].

5. Climate change and desertification and their impact on food security:

The sudden change in climate was unprecedented over previous times. For thousands of years in ancient agricultural societies, the temperatures and rainfall were supportive of ancient human life. As well as the climate, which is one of the important natural factors affecting the geographical distribution of the population due to the effects that affect various human functions, as well as its impact on the quality of the soil and natural plants. Iraq is affected by drought, climate change and desertification. Also, the types of erosion may lead to soil erosion, causing its productivity to deteriorate, as the loss of one centimeter of the surface layer of the soil leads to a decrease in the production of agricultural crops by more than 2%.

Today, desertification threatens vast areas of Iraq and also threatens the livelihood of thousands of populations. Desertification is one of the main factors that lead to a failure in the balance between population growth and food production, as agricultural lands are eroded in some areas of Iraq due to soil erosion and degradation and because of the lack of methods of sustainability in agriculture, irrigation and overgrazing in lands with poor soils, as well as urban sprawl on the Good Lands [7]. Desertification is the last stage of land degradation, which leads to the arrival of the soil an advanced stage of erosion of its fertile layer. Land degradation occurs in arid, semi-arid, dry, and sub-humid areas due to the inappropriate exploitation of resources as a result of the decrease or loss of biological and economic diversity of lands planted with field crops, pastures and forests, either because of land use or due to a negative process that results from human activities and housing patterns that

Its status is as follows:

- Soil erosion by wind and water.
- Degradation of the soil's physical, chemical, or biological properties.
- Long-term loss of natural vegetation.

The effects of climate change and the resultant lack of rain and high temperatures have led to a drought wave that almost covers the entire country, as Iraq has witnessed in the past few years the worst droughts experienced by it, and Iraq’s lands deteriorate rapidly as a result of desertification and depletion of the natural capabilities of the land, which leads to the deterioration of its ability to sustain crops or wildlife, as well as negative impact on human conditions. The 2009 Environmental Statistics Report indicates the intensification of land desertification in the country, as the proportion of lands threatened by desertification is about 92% of the total land of Iraq, as well as the emergence of a real and worsening scarcity in water resources due to the lack of water imports from neighboring countries. It is expected that the measure of vegetation cover in the agricultural lands in Iraq will decrease by 8% by 2020, based on the assumption that the average temperature will increase by 1% and decrease the rainfall rates by 2%.

More specifically, except for the direct consequences of human intervention through livestock grazing, low productivity and changes in the composition of species, plant varieties, the indirect effects are strongly embodied in the form of physical chemical changes in the soil (loss of soil nutrients and salinization), Physical changes (total contraction of the formation crust, compression) and soil erosion. The ability to withstand effects is closely related to soil degradation, which not only limits the restoration of land productivity, but also leads to land degradation quickly and irreversibly. The various stages of the desertification process should be appreciated. Comprehensive assessment when evaluating this process [8].

The lands of Iraq are divided according to their production capacity into three comprehensive sections, according to eight categories

Table (1):

**First: arable land**
And the arable lands of Iraq are divided into four varieties (the first - the fourth) and they are different in their productivity.

**Second: The lands are not suitable for cultivation, but they are suitable for rangelands or forests**

It includes lands of varieties (fifth, sixth and seventh) with an estimated area of 125 million acres and represent 72.1% of the territory of Iraq.

**Third: The lands that are not suitable for agriculture, rangelands or forests**

It includes the lands of the eighth variety, and this variety is not suitable for agriculture, rangelands or forests in view because of its natural conditions and harsh environment, it may be suitable for breeding and caring for wildlife, and this area is wet. The lands are 12 million acres and represent 6.9% of the area of Iraq. Table 1 below shows Land uses according to suitability for agriculture.

| Type of use | The space \( \text{million acres} \) | The proportion of the area of Iraq % |
|-------------|----------------------------------|----------------------------------|
| 1           | All kinds of crops, vegetables and orchards | 0.4                              | 0.2                              |
| 2           | Earth use is limited by providing resources such as water | 8.4                              | 4.8                              |
| 3           | Exploited to grow cereals | 9.6                              | 5.5                              |
| 4           | Specific and need investments to fix it | 16                               | 9.2                              |
| 5           | You need to reclaim | 15                               | 8.6                              |
| 6           | Suitable as hairdressers of forests | 22.4                             | 12.9                             |
| 7           | Suitable as hairdressers of forests but limited | 88                               | 50.6                             |
| 8           | Unused | 12                               | 6.9                              |
|             | Unused | 2.25                             | 1.3                              |
| Total       |                                  | 174.05                           | 100                              |

Ministry of Planning sources indicate for the year 2012 that the area of arable land in Iraq is about 44.46 million dunums, and the area of cultivated land reached about 17.2 million dunums in (2012).[9]. Also, the arable lands can be divided according to their ability to produce into four categories and as such explaining “coming” in Table No. (2)

**Table 2. Distribution of arable land according to the viability for agricultural production.**

| Item                               | The space \( \text{k}^2 \) | The space \( \text{million acres} \) | The ratio% |
|------------------------------------|----------------------------|----------------------------------|------------|
| Excellent for Planting             | 710.0                      | 0.284                            | 0.06       |
| Very good for Planting             | 4304                       | 17.216                           | 38.7       |
| Medium quality for agriculture     | 4776                       | 19.104                           | 43.0       |
| With limited capacity              | 1965                       | 7.86                             | 17.7       |
| Total                              | 11755                      | 44.46                            | 100.0      |

Source: [10]
6. Causes of desertification:

6.1. Reduced vegetation

A decrease in the vegetation cover occurs naturally due to drought or due to human activities. When removing the plant, the soil will be exposed to sunlight and dry quickly because the presence of the plant helps shade the soil. In addition, the presence of plant roots helps to keep the soil in place, and when it is removed it will not be. Soil has anything to protect it; Thus it will be washed away more quickly by the wind, which reduces the fertility of the earth; This is because the top layer of soil that will be swept away by the wind is often the richest layer of nutrients, and once removed, the land will lose its fertility and will no longer be able to support the growth of plants, and as a result the land will become dry and free from plants; Then it will later be classified as a desert. [11]

6.2. Climate changes

Dry and semi-dry ecosystems are characterized by variable or scarce rains, and therefore climate changes such as those that lead to long droughts can quickly reduce the biological productivity of these ecosystems, where these changes can continue for only one season, or may continue for several years and decades. In addition, the effect of global warming may increase the risk of desertification by up to 20%. [12]

6.3. Population increase

Overpopulation is one of the most serious causes of desertification; As the world has witnessed a huge increase in human numbers recently. This leads to overgrazing, over-cultivation and deforestation. [13]. The population of Iraq is 36 million, according to estimates by the Central Bureau of Statistics for the year 2014, of which 50.9% are males and 49.1% are females distributed over eighteen governorates. The population is 21.2%, while the lowest population is found in the governorates of Muthanna and Maysan 2.9% and 2.2%, respectively. The urban population is 23.7 million, while the rural population is 10.5 million. As for the population growth rate in Iraq, it is estimated at 3.1%, which is considered one of the high growth rates in the world.

6.4. Agriculture

A portion of farmers resort to agriculture intensively in order to increase productivity, and this requires the use of many fertilizers and pesticides. As a result of the continuous use of agricultural lands, nutrients from the soil will be depleted more quickly, leading to the spread of desertification.

7. Desertification damage:

There are many damages to desertification, we mention three aspects of which are [14]

7.1. Dust storms

The expansion of the desert areas around the world increases the occurrence of storms that carry dust and dust with huge amounts, to move them later to lands far from the desert, causing great damage to these lands to the point that they may reach their burial completely and then turn them into a desert.

7.2. Food Security

When the areas suitable for cultivation are shrinking, the world faces the problem of providing agricultural crops necessary to achieve food security, especially as the number of people around the world continues to increase and requires a significant increase in food production.
7.3. Biological diversity:

Climate change accompanied by changing the biological characteristics of the soil in large areas around the world poses a great danger to plant and animal diversity and their multiplication, and some species may not find the appropriate medium for their livelihood and reproduction due to one of the causes that die in large numbers, which causes their complete extinction.

8. Desertification risks

1- Eliminating and radically destroying the vegetation, one of the most important damages to environmental and natural desertification

2- Soil erosion and erosion

3- The accumulation of salts in the soil and their loss of nutrients, which makes them unfit for cultivation

4- The deterioration of breeding, which makes it more vulnerable to natural disasters such as sandstorms, floods and forest fires

One of the economic risks of desertification is relapse of food due to the lack of nutrients and water and the scarcity of plant and animal production, which leads to the spread of poverty, famine and poor economic conditions.

9. Water Pollution

Pollution, lack of water, widespread poverty and hunger lead to poor hygiene and use of impure water, which increases the percentage of diseases and extinction of plants that need a fertile environment.

Mass migration is one of the most important consequences of desertification, as large groups of people migrate from one country to another due to desertification, famine, poverty and deteriorating economic conditions.

10. Of the harm desertification to human health

The spread of infectious diseases due to population migration and desertification is also a torch for the collapse of society and the outbreak of conflicts and disputes between different groups. The phenomenon of desertification is affected and affected by climate disasters, problems of global warming and climate change. All the consequences of desertification mentioned above, in turn, weaken the economies of the developing countries affected by desertification, especially when they do not have resources other than cultivating them. In order to break the downward spiral.

The dangers of desertification are much deeper than the visible, because humans face the effects of desertification by developing survival strategies that increase the problem of desertification because they depend on the overexploitation of natural resources, and therefore the residents of any spot suffering from desertification find themselves stuck in a closed circle in which the attempt to cope with desertification and find solutions to desertification are the same as the results of desertification and they are also among the reasons leading to the aggravation of the phenomenon of desertification in addition to the collapse of solidarity in society and the outbreak of conflicts between individuals and groups [15].

Conclusions

- Land degradation and desertification affects the ability of countries to produce food and thus entail
- Reducing regional and global food production as they also cause the food deficit event in the threatened areas, with the consequent effects on food reserves and food overruns in the world.
- The phenomenon of desertification in Iraq and salinization is accelerating, and the percentage of agricultural lands suffering from salinization is estimated at 50% due to negligence for years in the agricultural and irrigation sector. Add to that the environmental disaster and drying of the marshes of Iraq if they dry more than (20000) km², which equals (90%) of its area, which represented the most water area in the ecosystem in the Middle East, if more than twice the area of Lebanon.
The successive government neglected the agricultural sector, as there is no plan to reform the lands and combat desertification. There are many reasons for the desertification problem in Basra, and one of those causes is the drought that afflicted its lands. The reason for the drought is due to two things. The first is the lack of rain in Iraq in general and Basra in particular in recent years, where years of (1991%) witnessed and yet the rains have an impact great in the occurrence of droughts and confinement, and then the occurrence of dust storms. As for the second reason for drought, it is the lack of water from the Tigris and Euphrates rivers, which negatively affected agriculture in Iraq, and these two reasons are the main factors in the expansion of the phenomenon of desertification in Iraq.

Recommendations

- Through what we presented in this study, we can put some recommendations that we consider necessary to advance the process of combating desertification from them.
- The necessity of spreading environmental awareness of the importance of controlling desertification and combating it through reducing it.
- Preventing the exhaustion of agricultural lands and trying to change the uses of agricultural lands to other uses.
- The need to establish centers and organizations specialized in combating desertification, through cooperation between those centers and research and scientific institutions to limit the spread of desertification.
- The government should develop a ten-year plan to combat desertification.
- Contracting with foreign companies specialized in the production of agricultural crops to establish giant farms in Iraq.

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