

How to Cite:

Mahmoud, A. M., & Abdullatif, A. K. R. (2022). The environmental effects for the risks of urban sprawl on agricultural lands in the district of Dallowiya. *International Journal of Health Sciences*, 6(S6), 8288–8306. <https://doi.org/10.53730/ijhs.v6nS6.12064>

The environmental effects for the risks of urban sprawl on agricultural lands in the district of Dallowiya

Akram Mezher Mahmoud

Department of Geography, College of Education, Samarra University

Prof. Dr. Abdul Karim Rashid Abdullatif

Department of Geography, College of Education, Samarra University

*Corresponding author email: Karim12@uosamarra.edu.iq

Abstract---This study deals with the environmental effects of the problem of urban sprawl facing agriculture in the district of Dallowiya, one of the districts of Salah El-Din Governorate. This problem has affected the land and agricultural production in the district through the decrease in the size of the cultivated areas, which was accompanied by a decrease in production quantities as well as a change in the crop composition, There were many types of urban sprawl, the most important of which is the residential use, which acquired more than 8100 acres during the studied period, then the rest of the other uses represented in health, educational, industrial, commercial, service and governmental uses. The reason for the increased risks of urban sprawl is due to the influence of geographical factors, whether they are natural factors represented in the surface, climate, soil, water resources or human factors whose impact was very large and represented by the increase in population numbers and their needs for services and infrastructure, as well as government policy, economic level and social factor.

Keywords---urban sprawl, environmental effects, agricultural lands.

Introduction

The problem of urban sprawl is one of the serious problems facing agricultural lands in the world, including the Arab world, including Iraq, which has become a threat to food security and the future of the population and future generations because it has greatly affected the decrease in the size of the areas planted in various agricultural crops and thus led to a decrease in the quantities of agricultural production. By encroachment and urban sprawl, we mean the increase in construction on agricultural lands and exposing the population to

food shortages, which is a danger that threatens agricultural production as it works to reduce arable lands and others due to urban sprawl and the construction of industrial and commercial facilities and the rest of the infrastructure of cities and agricultural villages.

The increase in population numbers in Iraq, including Salah Al-Din Governorate and Al-Dallowiya District, which is one of the districts with a high agricultural and population density, has increased pressure on agricultural lands, especially during the past four decades, after the population was at the beginning of the establishment of the village (a district later) In 1962, it did not exceed 11.959 people, their number became 13.687 people in 1977, it rose to 56.986 people in 2007, and their number reached at the present time in 2021 to 73.702 people, and as a result of the family division, the demand for housing has increased. After the area allocated for residential use was 61968 acres 1987, it rose to 8108 acres in 2021. In addition to the housing needs of the residents of the study area, there are other coordinates that the residents need, such as health and educational services, markets, as well as infrastructure, and these urban sprawls have affected agricultural lands in the district as well as its direct impact on the lack of diversity of agricultural crops and the quantities of agricultural production produced, and the impact of this on food supplies for the governorates of Iraq in general and the study area in particular, and here lies the seriousness of this problem Which formed a motive for the researcher to take up this topic in research and analysis, to present proposals and appropriate solutions to address this problem.

The study problem is based on the following statement: The study area (Dallowiya District) suffers from a significant acceleration in urban sprawl of all kinds, and this has led to a significant decrease in the size of arable lands, a lack of diversity of agricultural crops, a decrease in production quantities, and an increase in the risks of environmental pollution. This was reflected in the food supply of the study area in particular and the rest of the province's districts and the governorates of Iraq in general. The study aims to show several things, including: the impact of urban sprawl on the decreasing size of the cultivated areas and Its impact on the decreasing amount of production for agricultural crops in the study area, as well as studying the environmental effects of urban sprawl at the expense of agricultural lands and the trends of sprawl and its negative effects, which led to A decrease in the size of arable agricultural lands, a decrease in production quantities and a lack of diversity of agricultural crops in the district using geographic information systems (GIS).

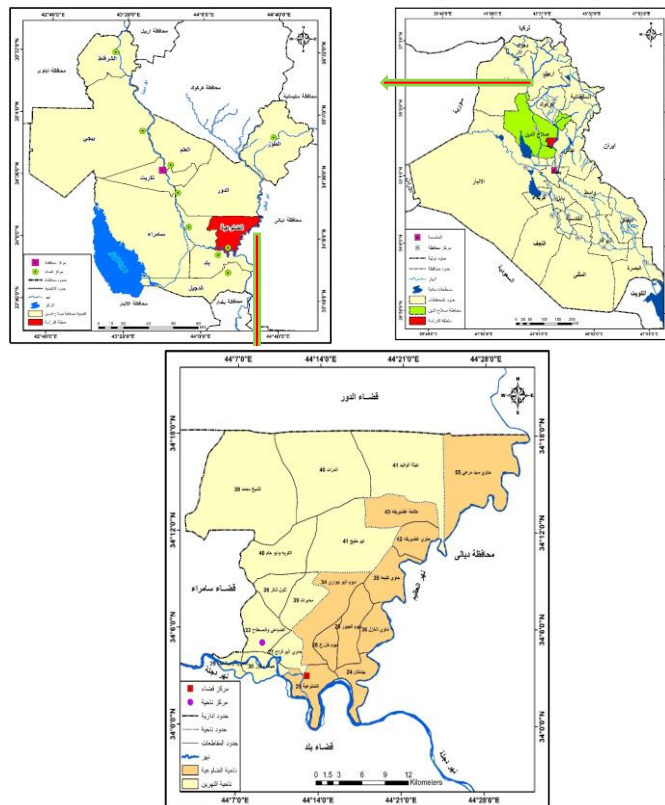
Al-Dallowiya District⁽¹⁾ is located in the southeastern part of Salah al-Din Governorate, 80 km south of the governorate center, within the northern parts of the sedimentary plain between the Tigris River and its tributary, the Azim River. Its coordinates are located between longitudes (07°, 44° - 28°, 44°) in the east and latitudes (00°, 34°-18°, 34°) north Map (1). It is one of the districts of Salah al-Din Governorate, which is bordered on one side by The north is Al-Dur district, on the west side is the center of Balad district, on the south side is Yathrib sub-district of Balad district, and on the east is the Azim River, which represents the separating border with the governorate of Diyala. The district includes two administrative units, the Dallowiya District Center and Al-Nahrain District. These

units include (21) agricultural districts, and the area of the district is about (316,000) acres Table (1). The percentage of the arable area is (93%) and as for the time limits of the study, it was determined in the year 2021 as a current reality, with reference to the areas of urban sprawl during the year 1987 and its change during the year 2021. Regarding the methodology of the study, quantitative and statistical methods, digital data and the analytical method were used, which helps to understand the phenomenon under study in an accurate manner, using geographic information systems (GIS) and satellite visuals (8.5 – Landsat) for the study area for years (1978-2021). In addition to the use of the functional and descriptive approaches and the field study of the study area.

Table 1
The provinces, their fame, their total area, the arable area of acres, and their population for the year 2021

District number	District name	Total area acre	%	The arable area acres	%	Populations 2021	%
25	Dallowiya	7028	2.2	6878	2.3	31495	42.7
24	Bishkan	7453	2.4	6373	2.2	2802	3.8
26	Diom Al-Jubour	9343	3.0	9227	3.1	1405	1.9
27	Hawi Albu Faraj	5833	1.8	5719	1.9	15704	21.3
28	Diom Khazraj	4277	1.4	4187	1.4	47	0.1
29	Al-Abouriya and Um Shuaifa	3100	1.0	3052	1.0	4750	6.4
30	Hayalla and Jazar	5398	1.7	5240	1.8	7430	10.1
32	Al-Dhaibi and Al-Mistah	5582	1.8	5362	1.8	5091	6.9
34	Diom Albu Jawari	15016	4.7	14816	5.0	706	1.0
35	Hawi Kalaya	9107	2.9	5401	1.8	349	0.5
36	Hawi Al-khazel	5368	1.7	4818	1.6	375	0.5
38	Talul Shukr	8067	2.5	7787	2.6	64	0.1
39	Sderat	8058	2.5	7952	2.7	130	0.2
39	Sheikh Mohammed	51558	16.3	45842	15.5	137	0.2
40	Al-Kariya and Abu Ham	16629	5.3	16033	5.4	150	0.2
40	Al-Marrat	33597	10.6	33297	11.3	174	0.2
41	Abu Halij	29695	9.4	28795	9.8	77	0.1
41	The Walid's Etha	30846	9.7	29346	9.9	631	0.9
42	Hawi Ghadrifeh	6679	2.1	5859	2.0	389	0.5
43	Talleah Gudhireve	13439	4.2	13153	4.5	288	0.4
55	Hawi Sayed Marei	40327	12.7	36139	12.2	1508	2.0
Total		316.400	100	295276	100	73702	100

Source: 1-Ministry of Agriculture, Directorate of Agriculture of Salahuddin Governorate, Division of Agriculture of Dawlawiya District, Planning and Follow-up, Areas and Fame of Agricultural Provinces, Salahuddin 2021 (unpublished data). 2- Ministry of Planning and Development Cooperation, Central Bureau of Statistics and Information Technology, estimates of Salahuddin governorate and administrative units, unpublished data, 2021



Map 1. the location of the study area in relation to Iraq and Salah al-Din Governorate 2021

Source: Researcher based on the map of Iraq and Salah al-Din administrative, the Directorate of Agriculture of Salah al-Din Governorate, Dullawiya Agriculture Division, planning and follow-up, catalogue and fame of agricultural provinces, Salah al-Din, 2021 and ARC GIS V10.3 program

First: Geographical characteristics of the study area:

The study area is characterized by distinct geographical characteristics that made it one of the most important agricultural areas in Salah al-Din Governorate, in addition to the spread of agricultural settlements in its various agricultural provinces. Among the most important geographical characteristics affecting agricultural production and urban sprawl, and its reflection on the environmental effects, are:

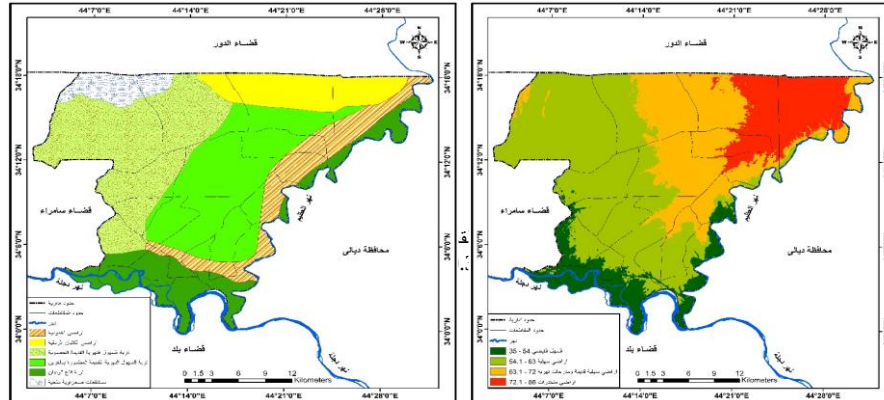
- Surface: The surface of the study area is characterized by flatness, like the rest of the sedimentary plain, and it is interspersed with some simple hills that do not exceed some meters only. The terraces of rivers are also spread on the banks of the Azim River, and the height of the study area ranges between less than (35-86) meters above sea level. Map (2).

- **Climate:** The climate of the study area is continental, similar to the climate of the other governorates of Iraq, as the daily and annual temperature range expands, and it is characterized by cold rainy winters and hot dry summers, and the characteristics of climate elements vary from season to season and from year to year. The temperature is characterized by a rise in summer, reaching (43.5°) in the month (August), while it decreases to (4.1°) during the month (January) in the winter season⁽²⁾, and with regard to precipitation, especially rain, the study area is characterized by a lack of Rainfall and its fluctuation from year to year, and other climate elements that affect agricultural and urban land uses is the element of wind, which is characterized by moderate speed, but it greatly affects the agricultural provinces north of the study area, which is characterized by the presence of large areas of sand dunes that greatly affect agriculture and Urban sprawl, as well as its effects on dust storms and their environmental repercussions.
- **Soil:** This factor is one of the main factors affecting the uses of the land in the study area, whether it is for agriculture, housing and other services. The soils of the study area are characterized by their spatial variation, as the rivers' shoulders soils prevail on the banks of the Tigris River and its tributary, the Azim River, while the old gravel and silt-submerged river plains soil prevail in the central provinces. As for the northern provinces, sandy and gully soils, desert salt marshes and parts of the old gravel and silt-submerged river plains soil. Map (3).
- **Water resources:** The study area is characterized by the multiplicity of water sources in it, as the Tigris River passes through its western parts, and the great tributary forms its eastern borders, which forms a peninsula. In addition, it is characterized by the presence of a network of irrigation projects represented in the projects of (Rasasi irrigation, Dallowiya North and South) Map (4). Another source of water is groundwater, although it is of little importance due to the high percentage of salt in it. Rain is the third source of water that helps irrigate crops, reduce the amount of irrigation, as well as its role in the natural plants growth and the formation of natural pastures.
- **Human characteristics:** The human being is the main driver of the agricultural process in any geographical area as well as his role in the development of infrastructure and services, and among the most prominent human characteristics that affect agriculture and urban sprawl in the study area, whose negative effects were reflected in the increased risks of environmental pollution in it:
- **Population:** The study area was characterized by its large population growth, after its population was not more than 21.632 people in the year 1987, it reached 42.403 people in the year 1997, and it rose to 56.986 people in the year 2007 and then reached to 73.702 people in the year 2021⁽³⁾. and this was reflected in the increased need for large numbers of housing units, as well as health, educational, religious and recreational services and transportation methods that the population needs. Therefore, This affected the decreasing of the cultivated areas and was also reflected in the environmental effects of the types of urban sprawl, and map (5) shows the distribution of the population at the district level for the year 2021.
- **Transportation methods:** The study area is characterized by the wideness of the transportation network and in its various agricultural districts,

especially during the period (2017-2021). The total lengths of the roads therein amounted to 536 km⁽⁴⁾, or the equivalent of more than 1000 acres of agricultural land, and the increase in the number of cars of different types had a great impact on increasing the risks of environmental pollution of all kinds.

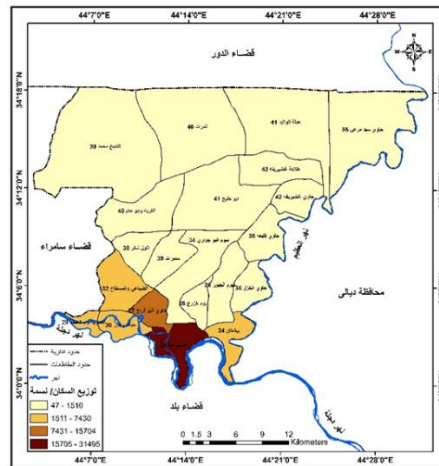
- The government policy and the economic level: These two factors are considered among the geographical factors affecting the urban sprawl and the change that took place in the increase in population numbers and the accompanying significant change in the increase in the size of the area that was deducted from agricultural lands, and this is represented by the state's action in distributing agricultural lands as agricultural contracts Or distributing plots of land to employees, and providing other agricultural requirements. The economic level also affects the phenomenon of urban sprawl, The rise in population numbers and family fission, as well as the transfer of large numbers of workers in agriculture to other jobs, represented in government jobs, government, service and industrial works, which led to a rise in income sources for the population, and its reflection on the demand for buying agricultural land, building housing, and establishing factories, factories and shops. Commercial, recreational services and the various wastes left behind by these uses greatly affected the pollution of the environment in the study area.

Map 2 surface features and elevations in the study area

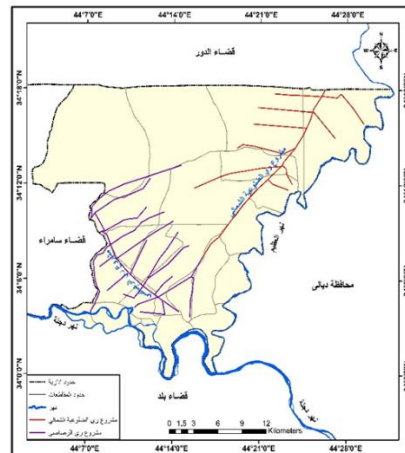


Map 2. surface manifestations and elevations in the study area Map(3) soil distribution in the study area

Map (4) water resources map (5) population distribution for the study area in 2021



Map 4. Water resources



Map 5. Population distribution for the study area in 2021

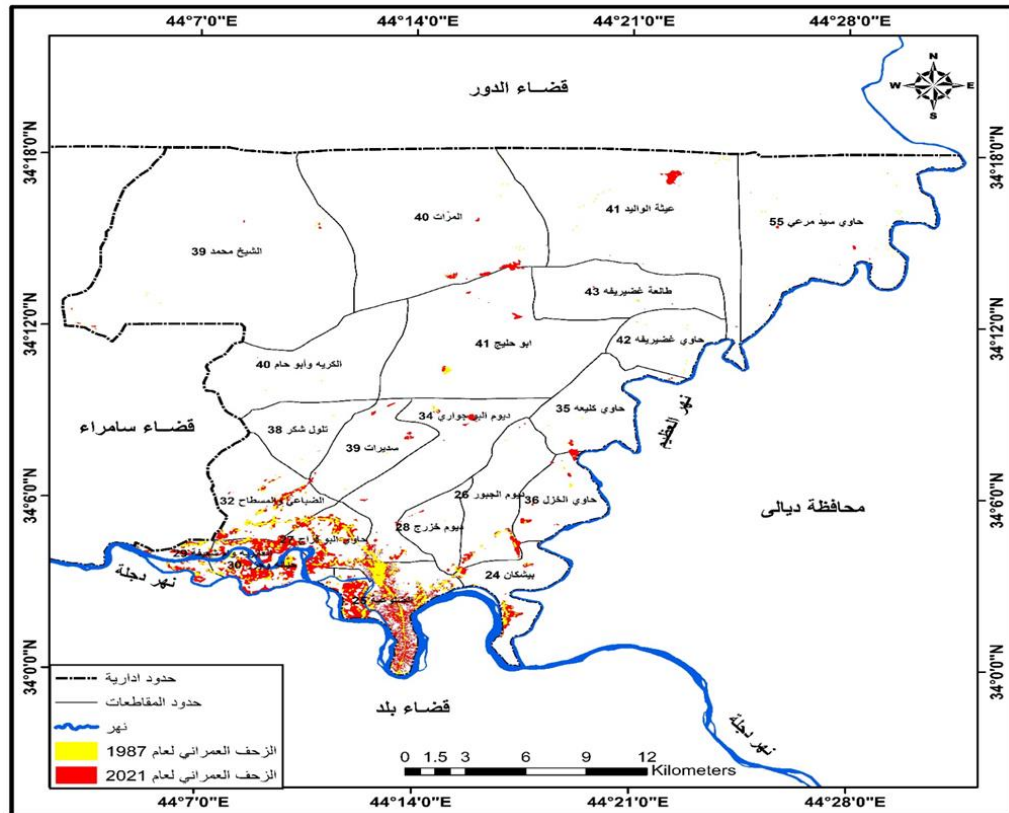
Third: The distribution of urban sprawl areas on agricultural lands in the study area for the period (1987-2021):

The urban sprawl areas in the study area amounted to about 79.4101 acres in 1987. The urban sprawl areas increased in the year 2021 to reach 51.48001 acres, With a change rate of 810%. It is noted from Table (2) and Map (6). the spatial distribution of urban expansion areas for the period of The study, as it was found that most of the districts of the study area had urban expansion, which had environmental consequences in the study area, and the urban sprawl areas occupied a percentage of 3.42% of the arable land area of acres for the year 2021.

Table 2
Geographical distribution of urban expansion areas of acres by agricultural districts in the study area for the period (1987-2021)

No.	District	The area of the urban expansion acres for the year 1987	%	The area of the urban expansion acres for the year 2021	%	The area of arable land Acre	The percentage % of urban sprawl for the year 2021 of acre of arable land
1	Dallowiya 25	326.94	32.22	3332.74	33.05	6878	48.46
2	Bishkan 24	45.57	4.49	479.27	4.75	6373	7.52
3	Diom Al-Jubour 26	16.46	1.62	269.84	2.68	9227	2.92
4	Hawi Albu Faraj 27	197.58	19.47	1586.26	15.73	5719	27.74
5	Diom Khazraj 28	9.55	0.94	52.24	0.52	4187	1.25
6	Al-Abouriya and Um Shuaifa 29	62.28	6.14	578.96	5.74	3052	18.97
7	Hayalla and Jazar 30	123.06	12.13	2206.94	21.88	5240	42.12
8	Al-Dhaibi and Al-Mistah 32	96.12	9.47	846.88	8.40	5362	15.79
9	Diom Albu Jawari 34	45.22	4.46	345.35	3.42	14816	2.33
10	Hawi Kalaya 35	5.89	0.58	15.18	0.15	5401	0.28
11	Hawi Al-khazel 36	27.39	2.70	167.81	1.66	4818	3.48
12	Talul Shukr 38	2.05	0.20	3.55	0.04	7787	0.05
13	Sderat 39	11.24	1.11	31.83	0.32	7952	0.40
14	Sheikh Mohammed 39	4.89	0.48	14.96	0.15	45842	0.03
15	Al-Kariya and Abu Ham 40	2.01	0.20	4.75	0.05	16033	0.03
16	Al-Marrat 40	3.96	0.39	13.49	0.13	33297	0.04
17	Abu Halij 41	18.28	1.80	92.41	0.92	28795	0.32
18	The Walid's Etha 41	3.97	0.39	8.37	0.08	29346	0.03
19	Hawi Ghadrifeh 42	2.95	0.29	6.64	0.07	5859	0.11
20	Talleah Gudhireve 43	6.36	0.63	10.81	0.11	13153	0.08
21	Hawi Sayed Marei 55	3.02	0.30	16.23	0.16	36139	0.04
Total		1014.79	100	10084.51	100	295276	3.42
Areas of urban expansion acres by type of use for the years 1987-2021							
Type of use	Residential	Educational	Healthy	Religious	Industrial	Commercial	Other uses (*)
The area of acres in 1987	619.68	28.05	0.88	48.97	107.66	3.2	206.35

Map (6) The spatial distribution of urban sprawl in the study area for the period (1987–2021)



المصدر: بالاعتماد على المرئيات الفضائية للقمر الصنا

Fourth: The environmental effects of urban sprawl on agricultural lands in the study area:

The problem of urban sprawl is one of the serious problems facing agricultural lands because of its dangerous effects in the short and long term, although it has some positive effects represented in creating new housing areas for the population and providing the services and infrastructure that you need. However, its negative effects are usually more and more prominent because this uncontrolled or unplanned growth is usually around major cities or densely packed cities that suffer from a lack of services⁽⁵⁾, and providing them leads to the deduction of large areas of agricultural land or farms, and this what The study area suffers from it. The effects of this problem were not limited to a decrease in the size of agricultural lands only, but was also reflected in the other effects represented by the change in the crop composition and the environmental effects represented by the change in the characteristics of the climate and environmental pollution, and the emergence of random areas that have appeared or are expected to appear in the future.

The environment is defined as that part of the world in which human affects and is affected by, that is, the part that he uses, exploits, affects and adapts to, and it is the environment in which human and living organisms live, consisting of (water, air, soil and land), and the environment is the field of human activity and other living creatures. He is entrusted with preserving it by God Almighty and responsible for its reconstruction, but what happens during the previous three centuries is the opposite of that, The human activity of the population has sabotage the environment and increase the environmental risks in it. Among the most prominent of these risks is the great pollution caused by human, Because of the economic activities he practiced, including urban sprawl and industrial activity, which led to serious pollution of soil, water and air alike. And Iraq, including the study area, is one of the places affected by environmental pollution as a result of the large urban sprawl on agricultural lands⁽⁶⁾, This problem is one of the most serious problems facing agricultural lands in many countries of the world, including Iraq, resulting from urban sprawl, which led to a large sprawl in the various uses of the land, whether it is housing, infrastructure or services needed by the population.

And pollution, by which we mean a change in the natural, chemical and biological properties of the components of the environment surrounding humans, represented by air, water and soil, and may cause damage to human life or to other living organisms, plants and animals, or cause damage and disturbance to living conditions in general⁽⁷⁾. The types of environmental pollution in the study area varied, as it was found through the field study that it included all components of the environment in the study area. The most important sources of environmental pollution, including the following:

Soil pollution: Soil is one of the elements of a balanced ecosystem, which is the loose layer of the earth's surface, and arable soil is an important source for food production, which demand is increasing day by day as a result of the large increase in population numbers, and the study area is one of the agricultural areas In which the soil has been exposed to the dangers of pollution, whether for natural reasons represented by the influence of the climate and water resources, or through human misuse of soil and water, as well as the use of wrong agricultural methods represented by the excessive use of fertilizers, pesticides, sewage and over-irrigation⁽⁷⁾, soil pollution is defined as the corruption that It affects agricultural lands in their natural, chemical or biological characteristics and properties in a way that makes them negatively affect, directly or indirectly, everyone living on its surface, whether human, animal or plant⁽⁸⁾, and the most important sources of soil pollution in the study area are the following:

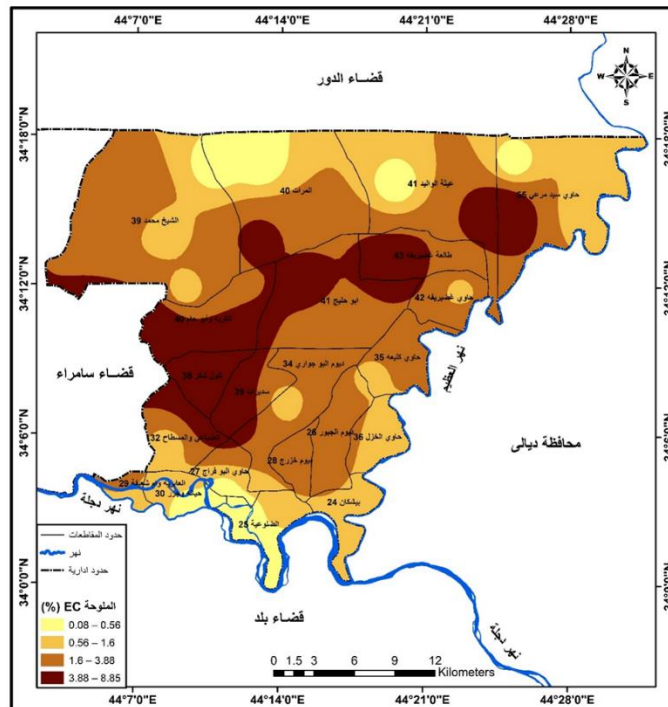
- Establishment of sewage tanks in agricultural areas, which are exposed to leakage inside, which leads to pollution and water pollution with toxic substances.
- Establishing blacksmith shops, replacing oil, washing cars, dyeing shops, and trade, as well as leftovers from restaurants and shops that are exposed to seepage into the depths of the soil, especially during the rainy season.
- Municipal units dumping various waste and heavy water for homes on agricultural lands directly without treatment, which leads to its leakage into

the depths of the soil and then contamination, and this is what was seen during the field study.

- Use of polluted water leaking from the main streams of irrigation projects in the study area.
- Soil salinization and waterlogging resulting from the excessive use of water in irrigating crops, as well as the influence of the climate factor through high temperatures and an increase in evaporation rate.

The problem of soil salinization is one of the most serious problems facing agricultural lands in Iraq, including the study area, map (7), as it is one of the products of soil pollution or waterlogging, whether that water is the result of excessive irrigation in irrigation projects or through sewage water that seeps into the depths of the soil surface due to the nature of the mixed soil with good texture that facilitates the process of leakage, and the seriousness of this problem lies in the leakage of this water into the soil layers and its access to the groundwater sources in those lands, and the use of this water by farmers will lead to serious problems represented in the pollution of agricultural lands As well as the high toxicity of foodstuffs obtained by the farmer and its impact on human health, who consume agricultural products that depend on groundwater contaminated with toxins.

Map 7 Soil salinity distribution EC % for a depth of 30 cm in the study area



Sewage treatment plants: sewage is the most important negative output in the various urban communities that affect public health. The sewage stations dispose sewage starting from collection to lifting until treatment⁽⁹⁾. In most cities of the

world, sewage is diverted to water stations, including seas and rivers, and most factories near these flats dump their waste there⁽⁹⁾. This is what is happening within the provinces of the study area, as the lack of sewage networks and treatment plants led to the dumping of this water directly into the Tigris River, which surrounds large parts of the agricultural provinces south and center of the study area. As is the case in the counties of (25 / Dallowiya, 24 / Bishkan, 29 / Al-Abriya and Umm Shuaifa), as farmers drain the domestic wastewater towards the river and its branches, as is the case in the eastern branch of the Tigris River adjacent to the district center and the branches of the western branch of the Tigris River within the provinces (29/Al-Abriya and Umm Shaifa, 30/ Hailey and Islands 27/ Hawi Al-Bofraj) Photo (1). These pollutants, in addition to their dangerous effects in the pollution of drinking water, irrigation and soil alike, they impede the movement of water, which leads to an Increased sediment size and weeds, which have become a suitable environment for rodents, insects and dangerous animals, as is the case for pigs, which have become present in large numbers, and represent a great danger. On the life of the population, in addition to its great role in the destruction of all kinds of crops, whether they are field crops, vegetables, or even fruit farms, and this is constantly seen in the study area.



Picture 1. A model of the housing proximity to the Tigris River and its branches in the study area

Veterinary units and butcher shops: The veterinary units provide veterinary health services for animals and poultry, and slaughterhouses carry out the daily slaughter of animals. These units aim to treat animals and protect humans from common diseases whose infection is transmitted from animals to humans⁽¹⁰⁾. There are several veterinary clinics in the study area belonging to the private sector located within the boundaries of the province (25 / Al Dallowiya, 27 / Hawi Al Bufaraj), In addition to the veterinary center for the treatment of animals of all kinds, and what increases the risks of the slaughter for livestock and poultry is the dumping of the waste of these animals near the areas of their slaughter on the main Dallowiya Street within the borders of the mentioned provinces, as there is no slaughterhouse in the study area subject to the condition of environmental and health safety, which causes the spread of odors And visual pollution, not to

mention throwing other wastes in the open, which leads, over time, to soil pollution and its environmental repercussions.

Dumps and landfills of rubbish and waste: The issue of waste and garbage is one of the eternal issues that accompanied the existence of human, And From his daily dealings and activities, there must remain many materials called (waste and rubbish) and with industrial and agricultural activity in light of the excessive population increase, Waste and garbage cause many environmental problems that affect people's health in a negative way, if they are not dealt with in a scientific, conscious and systematic manner⁽¹¹⁾. Public landfills are one of the oldest methods of garbage and waste disposal in the study area, as waste is one of the prominent environmental problems that researchers and those interested in the environment address to provide sound environmental methods and solutions to take advantage and dispose of them. The reason for this is due to the increasing types and quantities of waste in a way that began to threaten human health and life, and waste is defined as solid, liquid or gaseous materials resulting from manufacturing processes and domestic consumption⁽¹²⁾. Leaving it in open heaps leads to severe environmental pollution through microbes, flies, mosquitoes, mice and stray animals that are found in this garbage and a suitable environment for it to multiply and cause the spread of many infectious and endemic diseases and epidemics among the people who live near it⁽¹²⁾.

The accumulation and overstock of waste in agricultural lands leads to soil pollution as well as the deposition of decomposing materials from these wastes into the depths of the soil and groundwater, especially after rains during the winter season. In addition, the primitive burning process carried out by the municipal cadres in the study area leads to air pollution with toxic materials resulting from the burning process of various types of domestic, industrial and commercial waste. Air pollution with toxic materials resulting from the crafting process of various types of domestic, industrial and commercial waste, and this was seen during the field study at the site of the landfill north of the Dallowiya district center within the district (36 / Hawi Al-Khazal) picture (2) and picture (3). These wastes covered arable areas that could be invested in the cultivation of various agricultural crops. They are estimated at more than (30) acres of arable land.



Picture 3. The sanitary landfill site within District 36 / Diom Albu Jawari and Hawi Al-khazel



Picture 3. It shows that waste was treated by incineration without prior scientific steps at the sanitary landfill site in the study area

Human and industrial uses and workshops The presence of some human and industrial uses within the urban and residential mass helps to air and water stillness and chaos, as is the case in some factories in the study area, especially brick and gas plants, but it directly affects the environment within the study area, Also The disposal of solid waste leads to water pollution by disposing of them in water drains, It also results from the presence of wooden workshops and others within the residential block to the pollution and chaos of the population. It was clear from the field study that a large overlap was observed in the land uses in the study area, for example, picture (4). we find the overlap of industries, brick factories, block factories, agricultural lands, orchards, homes and other uses, and the impact of this significantly on the decreasing agricultural area, especially fruit orchards. And palm trees within the agricultural districts surrounding the Tigris River and its tributary, the Azim River. To address the effects of this problem, the following methods can be followed:

- Transferring all industrial laboratories and workshops of all kinds from residential and agricultural communities to one area from the center of Dallowiya district and Nahrain district away from water sources to avoid the risks of industrial pollution.
- Not giving a license to practice the profession to those who open workshops and laboratories within residential neighborhoods and agricultural areas.
- Imposing exorbitant fines for persons who violate the above-mentioned instructions for opening workshops.
- The commitment of the owners of industrial workshops and laboratories to abide by safety and security measures and to dispose of waste in a proper manner that does not lead to environmental pollution.

Table 3
The percentage change % in the areas of plant production in the study area for
the period 1997-2021

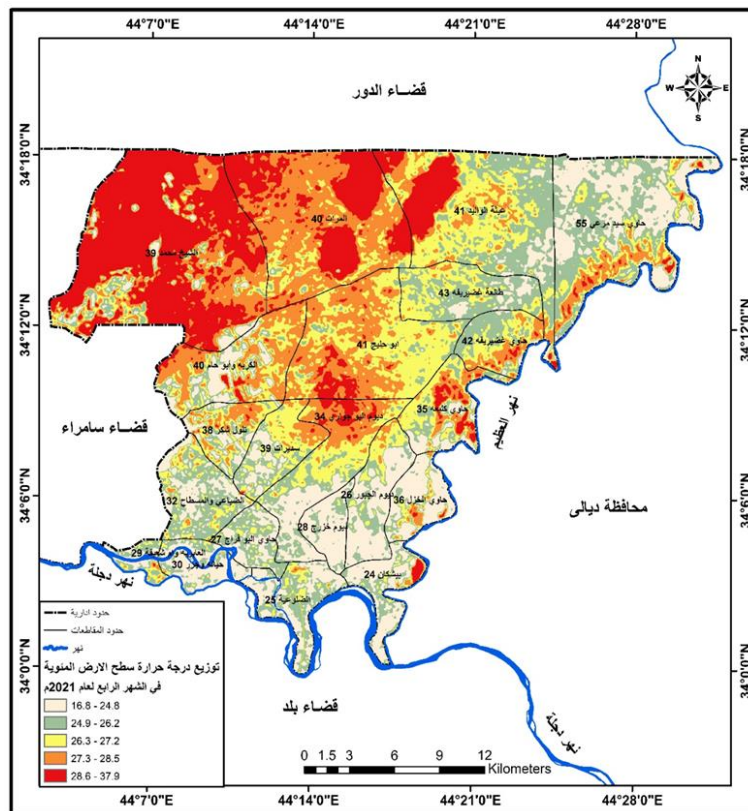
Plant production	Area acres 1997	Area acres 2021	Change percentage %
Cereal crops	40948	26400	-35
Field crops	3324	650	-80
Vegetable crops	20002	2998	-85
Fruit and palm trees	46334	6180	-86

One of the most prominent indications of climate change in the study area is the rise in temperatures, as temperatures and wind speed vary between areas planted with orchards and palm trees and between open areas devoid of cultivated plants. This is evidenced by the perceived difference in temperature between them, as is the case in the southern provinces of the study area, where the temperature decreases at a rate ranging between (1-3) degrees. And as is the case in the agricultural provinces (39/ Sheikh Mohammed, 40 / Al Murat, 55 / Hawi Al-Sayed Maree) and this was measured through the field study and the satellite visual (Landsat-8) of the study area for the year 2021, which shows the distribution of earth surface temperatures during the fourth month of 2021 Map (8), In addition, the wind speed varies between the exposed areas in the north of the study area or the central provinces that have been exposed to the removal of vegetation cover between Urban sprawl and the last side or the lack of water, as it was found that the exposed areas were greatly affected by this factor, and this was observed during the field study, as sand dunes and dust storms inundated large areas of cultivated land. Even the dwellings, which is evident from the picture (5) within the northeastern and western provinces of the study area (39/ Sheikh Muhammad, 40 / Al Murat, 55 / Hawi Al Sayed Maree, 41 / Aitha Al Walid)^(17,18).

The reality of the situation also applies to the rest of the other elements of the climate. As the wind factor is also one of the factors directly affecting the study area, as it works at times to cool down and reduce temperatures, and at times the wind leads to bringing dust into the study area, as the areas without vegetation cover lead to wind load for so much dust, while areas where there are dense trees help to repel the wind and the lack of dust access to it, as is the case in agricultural provinces (25 / Al-Dallowiya, 27 / Hawi Al-Bofraj, 29 / Al-Abriah and Umm Sha'ifa, 24 / Bishkan) As for the exposed areas, they are within the provinces (41 / Aitha Al-Walid, 40 / Abu Halij, 55 / Hawi Al-Sayed Marei), and these areas are due to the lack of vegetation cover It is constantly exposed to dust and sand dunes that affect the lives of the population and their farms and livestock alike, in addition to limiting urban sprawl, because they are areas that expel the population due to the pollution of their environment with sand and dust storms^(18,19).



Picture 5. Entering the sand dunes into one of the house in Al-Marrat/40 district



Map 8. Distribution of the Earth's surface temperature in the fourth month of the study area for the year 2021

Conclusion

The areas of urban sprawl in the study area amounted to about (1014.79) acres in 1987. The areas of urban sprawl increased in the year 2021 to reach (10084.51) acres, Which means percentage of change reached (810%). It is noted from Table (2) and Map (6), The spatial distribution of urban expansion areas for the study

period, as it was found that most of the districts of the study area had urban expansion which had environmental repercussions in the study area, and the urban sprawl areas occupied a percentage of (3.42%) of the arable land area of acres for the year 2021. The study shows the impact of urban sprawl on the environment of the study area, which is represented by soil pollution as a result of sewage tanks and the leakage of contaminated water towards irrigation projects, as well as the impact of industrial, trade and service activity in increasing the amount of solid and liquid waste and its impact on all components of the environment, not to mention the overlap of human uses. And agricultural land.

The sanitary landfill carried out by the municipality units and the people has led to the pollution of large areas of agricultural land, estimated at (30) acres within the sanitary landfill site. The rapid urban sprawl on agricultural lands led to a significant change in the cropping structure. The rate of change for the period (1997-2021) in cereal crops, field crops, vegetable crops, fruit trees and palms amounted to (-35%, -80%, -85%, - 86%), respectively, in addition to the decrease in the percentage of workers in agriculture, after the percentage of workers in agriculture was more than (78%) in 1997, it decreased to reach (32%) in 2021.

References

1. Abbas Zaghir Muhaisen Al-Mariani, Geography of the Environment and Pollution, 1st Edition, Al-Mizan Press, Najaf Al-Ashraf, 2016, pp. 25-26.
2. Abdel Fattah Al-Sayed Abdel Fattah, Urban Crawl on Agricultural Land in Al-Mawfieh Governorate, a geographical study using geographic information systems and remote sensing, Faculty of Arts, Cairo University, 1434 AH - 2013, p. 218, (unpublished message).
3. Abdul Karim Rashid Abdul Taif, spatial variation of agricultural land uses in the districts of Balad, Dawr, and Tuz Khurmatu in Salahuddin governorate, 2001, p.168.
4. Abdulrahman Mohamed Al-Saadani and praise Al-Miliji Al-Sayed Odeh, Recent Developments in Ecology, Environmental Problems and Scientific Solutions, 1st Edition, Dar Al-Kitab Al-Hadith, Cairo, 2007, page 25.
5. Ahmed Abdel Fattah Mahmoud, Ahmed Ali Kurdi and Amr Saeed, Pollution of the Agricultural Environment, 2nd Edition, Al-Wafa Printing House, Alexandria University, Alexandria, 2019, page 115.
6. Bhatta. B. Analysis of Growth and sprawl from Remct Sensing Data, Advances in Geographic- Information Science series Editcrs shivanand Balram, Canada. 2010, P 28?
7. Burring B. Soils and soil couaitons in Iraq, Baghdad, 1960, pp122-129.
8. Dahlawiya district was established by the letter of the Ministry of Planning No. 614/1833) on 21/1/2018 and the administrative code (27111) was given to number 21 provinces. The Al-Nahrain district was established according to the letter of the Ministry of Planning on 4/6 on 23/12/2018. The code (27112) was given within the directory of administrative units.
9. Maha Saad Al-Faraj, landfill sites in the State of Kuwait and their impact on residential areas, an analytical geographical study, the Kuwaiti Geographical Society, geographical messages 302, Kuwait, 2005, pp. 3-4.

10. Ministry of Agriculture, Directorate of Agriculture of Salahuddin Governorate, Division of Agriculture of Dhalawiya District, Planning and Follow-up, Total Agricultural Areas and Agroponsable Provinces and Fame, Plant Production, Salahuddin 2021 (unpublished data).
11. Ministry of Planning and Development Cooperation, Central Agency for Statistics and Information Technology, results of the general population census for 1987 and 1997, parts for each administrative unit, estimates of Salah al-Din governorate and administrative units for 2021, unpublished data, 2021.
12. Ministry of Transport, General Authority for Meteorology and Seismic Monitoring, Department of Climate, Weather and Climate Conditions of Samarra Stations, and Al-Khalis for the period (1985-2020), Baghdad, 2021. (Unpublished data).
13. Ministry of Water Resources, Directorate of Water Resources in Salah Al-Din, Water Resources Division in Dahlouia District, Planning and Follow-up Section, 2021. Unpublished data.
14. Mohamed Hassan Awad and Hassan Ahmed Shehata, Environment and Pollution Problems, Al-Azhar University, Al-Azhar, Faculty of Science, Cairo, 2017, p. 125-146.
15. Novoa, R. B. (2021). State of the art and future applications of digital health in Chile. *International Journal of Health & Medical Sciences*, 4(3), 355-361. <https://doi.org/10.31295/ijhms.v4n3.1772>
16. Reis Ahmed Al-Jubouri student, Geographical analysis of the soil in Dawlawiya district, master's thesis (unpublished), Faculty of Education for the Humanities, University of Tikrit, 2014, p.122.
17. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). The COVID-19 pandemic. *International Journal of Health Sciences*, 5(2), vi-ix. <https://doi.org/10.53730/ijhs.v5n2.2937>
18. The field study, based on the data of the Ministry of Planning and Development Cooperation, the Central Bureau of Statistics, the Salah Al-Din Governorate Statistics Department, the Country Statistics Division, (unpublished data) 2021.
19. The Ministry of Construction and Housing, the General Authority for Roads and Bridges, Salah Al-Din Roads and Bridges Directorate, the road register for Dahlouia district 2021, (unpublished data).
20. The Ministry of Interior, Salah Al-Din Governorate Police Directorate, Salah Al-Din Governorate Traffic Directorate, Al-Dhuluia District Traffic Interrupted, (unpublished data) for 2021.
21. Zainab Ahmad Ali, urbanised villages in Menoufia governorate during the second half of the 20th century, *ibid.*, p. 43-165.