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RESEARCH ARTICLE

ENVIRONMENTAL AND ECONOMIC FEASIBILITY STUDY OF THE PROJECT OF IMMOBILIZATION OF SANDY DUNES IN BABYLONPROVINCE IN IRAQ.

Hussein K. Eulewi Salah A. Khadim Bushra A. Hamza.
College of En. Sci. Directorate of Bab. En. Agri. Dep. of Babel, Al- Qasim Green Uni.

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Abstract

Desertification this scourge that threatens the whole world, especially Africa and dry and semi-arid areas in Asia and the Americas, In Africa were victims of drought and desertification in Somalia in 2012onlya quarter of a million victims of men, women and children, The United Nations estimates that desertification costs accounted for half of the costs that the world loses from the annual production for the whole world, so it has to be effective and pause to stop this scourge, which came on everything and everybody.

This study was conducted in the Babylon province , located between longitudes 43^{0} $42\bar{}$ - 45^{0} $50\bar{}$ east and latitudes 32^{0} $7\bar{}$ -33^{o} $8\bar{}$ north on the sand dunes area which is located towards the east of the province of Was it province ,these dunes formed by more than 50 years ago and remained in a state of constant motion without taking any previous procedures, the idea, as processed the first time the year 2014 was the preparation of this study to demonstrate the role of the control and treatment of area 913 square kilometers of these dunes in scattered areas.

The results showed that the soil analyzes of tissues soil of the area is alluvial loamy with the proportion of medium salinity and tissues sand dunes loamy,Using visuals satellite Land sat 7 for the years 2001, in 2006, Land Sat 8 2014 and Quick bird 2012 afternoon that there are eleven site for these dunes , the degree of desertification of the region, according to the world rankings is the kind of moderate and desertification in which the production at least 10%-15% , and that can be controlled at the present time using windbreaks through the use of resistant varieties environmental and climatic conditionsas well as the use of spray-axial and fixed irrigation systems also cultivate various crops of wheat, barley, corn and other , this could prove to be effective both fenders crops or whether there was a follow-up, maintenance and continuing to work for a period of not less than ten years.

Introduction:-

Desertification affects the lives of one billion in more than one hundred countries under rain-fed and irrigated agriculture systems b(3.6) billion hectares where he loses the world (10) million hectaresper year of land desertification and annual productivity losses, according to statistics from the nineties of the twentieth

Corresponding Author:- Hussein K. Eulewi Salah A. Khadim Bushra A. Hamza.
Address:- College of En. Sci. Directorate of Bab. En. Agri. Dep. of Babel, Al- Qasim Green Uni.

centuryexceeded42billiondollars, while the United Nations estimates that the costs of activities to combat desertification prevention, repair and rehabilitation of the land will not cost only half of this Annually in addition to the social problems associated with desertification and danger migration from the countryside to the city and the cross-border migration and others.

Desertification is known, according to the United Nations Convention of 1994 to combat desertification is exposed land degradation in arid, semi-arid and dry sub-humid, leading to the loss of plant life and biodiversity in, and lead to the loss of topsoil and then the loss of the ability of the land for agricultural production and support of animal and human life, is the sand dunes of the most dangerous results of desertification due to its negative effects on all vital aspects of life, Valaoasf dust and sand are hinting harmful, these storms pollute the environment and affect human health and agricultural production as damage physiological processes of plants(breathing, assimilation photosynthesis, pollination and flowering).

The poor soil and water management and climate factors harsh changed largely agricultural land to soil wasteland covered with sand from wind erosion and sand dunes, and the longer the problem of desertification in Iraq, especially the sedimentary easy in central and southern Iraq, most of the agricultural land, as it was the emergence of salt and cracked agricultural land degradation natural vegetation and sand dunes are moving.

Phenomenon has been exacerbated in the last two decades significantly as a result of practice is correct in the exploitation of natural resources (plant, soil, water), as irrigation methods is Almqguenh logging and Alhjert, overgrazing and agriculture in the territory unsecured rain depending on rain and caused by the military machine of destruction of class the surface of the soil, which made it vulnerable to erosion and that we observe through sand storms that have become familiar in recent years(Mustafa &Eulewi2013).

In the area of our research, there is an important point to be taking all their aspects, namely the region's vulnerability to sandy dunes of the kind semicircular For over the past fifty years and which are lengths between 40-50 meters and heights on average between 1 to 3.5 meters and may increase in some places (data Division cultivate the Nile 2014), and these values compared to a few countries of the world as it rises up, for example, 300 meters, the dunes semicircular most dangerous and its impact on the environment, agriculture and public facilities with the most difficult to install vital means, as it cannot grow plants on them, either due to reveal its roots and uprooted and either cover the plants, due to the speed of movement and the movement of sand dunes from its place and rapid loss of moisture due to perpetual motion constituent her which does not allow the growth of vegetation, Dunes of sand grains made up by 59% and the few remaining percentages represent granulated silt and some organic detritus Other, and ranges from the size of grains of sand between 0.02 to 2 mm and is composed chemically of the same chemical components of the rocks from which arose, the dunes are either homogeneous or heterogeneous, and color either be light yellow to the presence of metal quartz and the lack of organic material, or reddish-brown and the presence of iron oxides .

The aim of the study:-

1. Identify the sand on the map of the province of Baby londune sites and calculate the area and evaluated in terms of influencing the present and future.
2. Identify the best way to address the mand the expense of speculative costs necessary for this treatment and for the purpose of coverage of projects to combat desertification and restore their effectiveness as productive agricultural land.

Materials and methods of work:-

Location:-

Babil province, lies between latitudes 32 7-33 8 north and between longitudes 4342-4550 in the east, and is bordered to the east and the Was it province, to the west of Karbala and Anbar, either from the north bounded by Baghdad and south of Najaf and Qadisiyah, and Babil province represents the northern part of the region Euphrates in Iraq and the area accounted for 1.2% of the total area of Iraq (Figure 1).

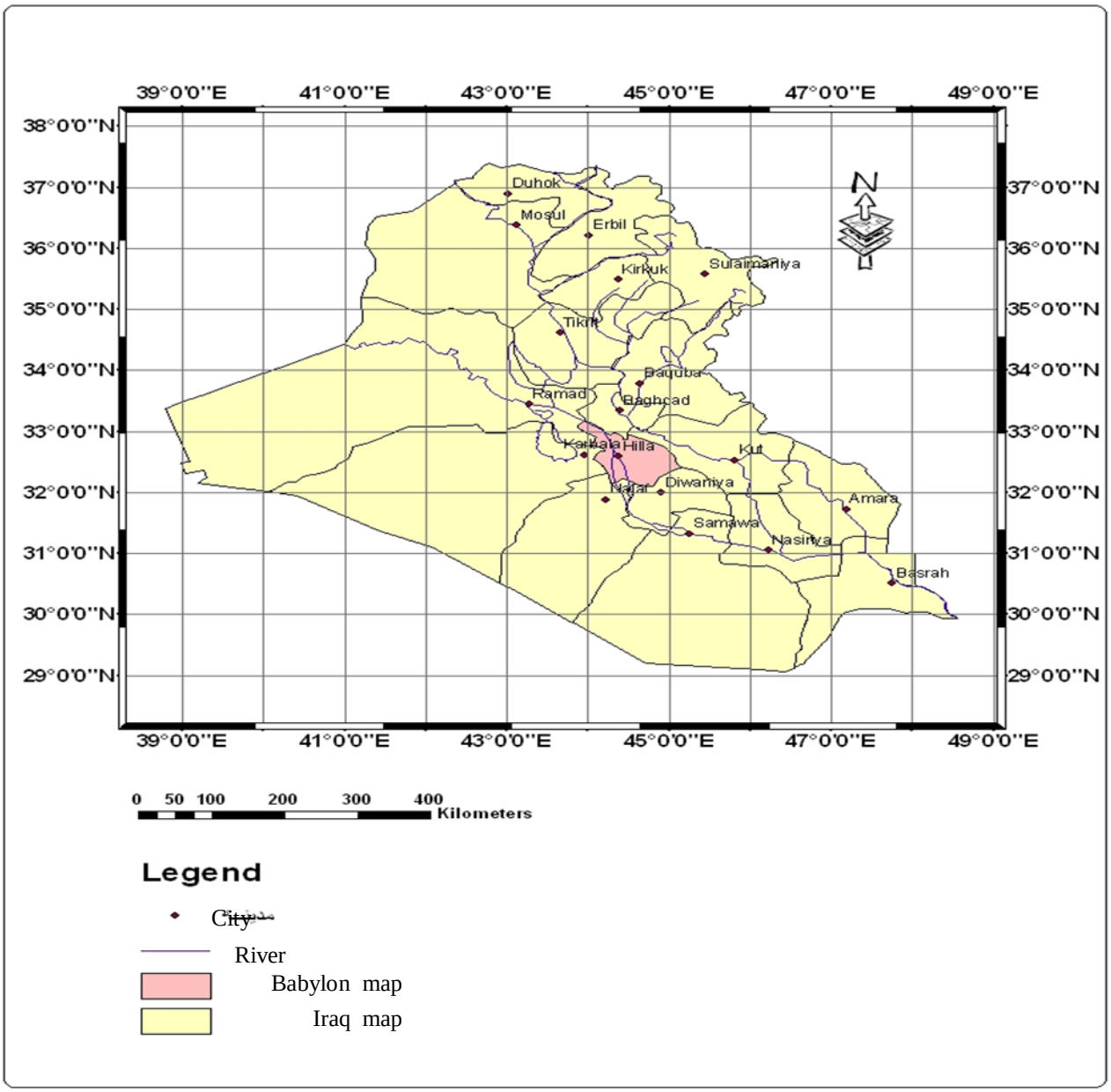


Fig.1:- Babylonl province geographical location for Iraq.

The climate :

The climate is characterized by a climate of Babylon province by observing two main summer and winter, as it extends the summer from May to September, while the winter shall be between November to February, with varying degrees of heat between these two chapters, as it recorded the highest average temperatures in July and August It is 42.6, 40.2respectively, while lower average temperature in winter was in January and February and were 10.9, 13.2 respectively, the annual total of rain falling on the province 98.5mm and the highest amount of rain fall to be in November(15.5mm), January(16.2 mm)and January(20.8 mm), while the highest rate of relative humidity record was in January is 70% (Encyclopedia of Hilla, cultural, 2012).

Soil of the site:-

Soil preservation are sedimentary, as made up of different layers Texture between loamy slimy to loamy mud slimy, with the difference installation of metal within the soil section where we find soft material (clay and silt) close to the

surface with the appearance of coarse sand particles to the rear and then followed by fine sand with the topography of the site flat in general.

The field work:-
has been done several site visits for two months from February to April / 2015 brought some samples of each of the sites between the sample 3-5 for each site, whether a sample or sample dunes untapped agricultural soil and close to the dunes site was conducted the necessary tests her in the laboratories of the Faculty of Agriculture / University denominator green and these analyzes are the values of pH, tissues and soil salinity of the soil and other tests have been immobilization as shown in table 1.

laboratory work:-
Used in the study range of programs for the purpose of display, storage and processing of digital data and satellite images from remote sensing, which are used in environmental studies and drawing Applied maps and these programs are :

- Arcgis / INFO and includes a range of programs is the most important program of the Arc Map and Arc Catalog program, - If the program Arcmap 10.2.1 adopted to deal with satellite images of the moon Landsat years (2001.2006 and 2014) in a manner Category Observer (super classification) , The program adopted Arc Catalog 10.2.1, Sort Alboleikonat own Btaos dunes Satellite images taken in 2014 , Then the program adopted Arc Map 10.2.1 Once again relegated to the province on the map.

- ERDAS Imagine 9.2 : This program supports the work of the mosaic of satellite images .

data that have been adopted in the study:-
-Satellite images of the satellite Landsat 7 Taken during 2001 and 2006 Where it was used for the movement of sand dunes Within the study area through the comparison between years (2001 - 2006 - 2014).
-Satellite pictures of the satellite quickbird taken in the world in 2012.
-Satellite images of the satellite Landsat 8 taken in 2014.

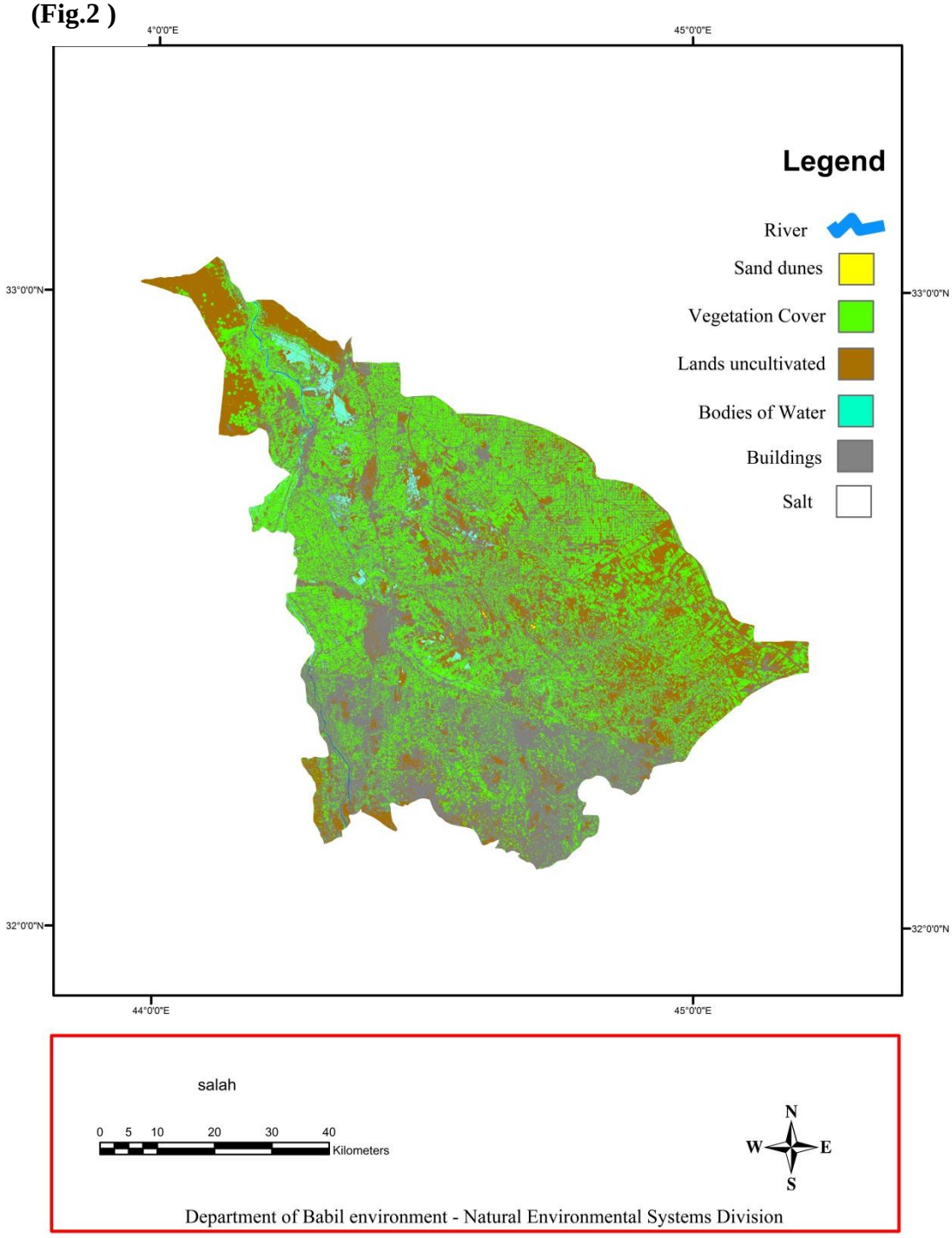
. It was then a comparison between the desertified areas of sites that have been marked in the satellite images of the satellite Landsat captured in 2014 With satellite images of the satellite quickbird 2012 with a high-precision surveying Through the comparison between the two types of images (Directorate of Babylon environment data 2015) The distinction eleven locations desertified areas of condition (sand dunes) within the province of Babylon, Seven places them within hand Midhtah and three within the Nile hand the site atheist As the total area (913 Donem) (Agriculture Department data Babel 2014) As it is shown in Figure 2 .

Table (1):- Data for samples

Sequence	samples	Region (province)	PH	Ec Ds/m	Texture
1	1	11 Khamisah	7.22	5.29	Loamy Sand
2	2	11 Khamisah	7.03	4.22	Loamy Sand
3	3	3 Biermanh	6.99	6.01	Loamy Sand
4	4	3 Biermanh	7.25	5.37	Loamy Sand
5	5	42 Shahe	6.94	3.21	Silty Mix
6	6	42 Shahe	7.12	4.77	Loamy Sand
7	7	42 Shahe	6.56	3.04	Silty Mix
8	8	42 Shahe	7.56	5.89	Loamy Sand
9	9	7 Allaq	7.78	4.89	Loamy Sand
10	10	7 Allaq	7.01	3.33	Silty Mix
11	11	7 Allaq	7.66	4.66	Loamy Sand
12	12	7 Allaq	7.89	5.10	Loamy Sand
13	13	7 Allaq	7.45	6.88	Loamy Sand
14	14	Hlbh and Zarijh	7.23	4.78	Silty Sound
15	15	Hlbh and Zarijh	7.05	6.42	Loamy Sand
16	16	Hlbh and Zarijh	7.22	4.55	Loamy Sand
17	17	Hlbh and Zarijh	7.08	5.22	Loamy Sand

Babil Governorate visible satellite Landsat8 taken in 2014

(Fig.2)



Results and discussion:-

Sand dunes have been identified sites by satellite images Identifying areas of these sites, a body Taos or hills with different heights , It can be described shaped dunes two of these sites under the terms of MidhtahBalrasah , What dunes form in the rest of the other sites are eleven crescent number locations within the province of Babylon, Seven places them within hand Midhtah and three within the Nile hand, he site is located ten atheist in the region between

the Nile hand and spend Center ,Where the total area (913 Donem) , And that the section of this land agrarian reform and other private properties sectionformat format, It is land reclaimed water scarcity factor has led to the left by the peasants for many years without cultivation, Which led to its transformation into a state of desertification, Note that observed during the visit, the presence of adjacent agricultural land available with a water quota planted crops (wheat, barley and water melon) , In light of the results obtained from the analysis of samples can say that the region's soil (Agleculture soil), It is loamy alluvial type With PH neutral and values of Ecsmall to medium The tissues soil sandy dunes are loamy and values PH neutral With values (Ec) Medium, With the rise in the region above sea level between the (28-44) m (Figure 3) .

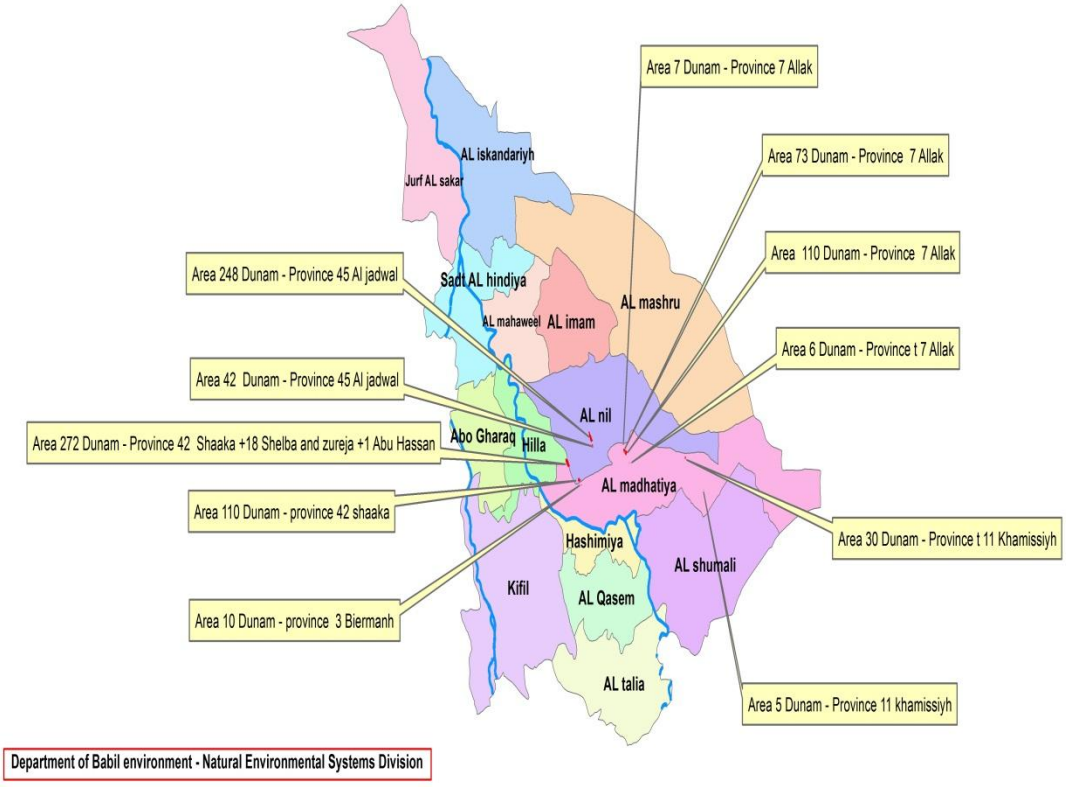


Fig .3)(Map sand dunes of the Governorate of Babylon, (Iraq)

According to the United Nations classification of desertification, there are four degrees or classes of cases of desertification, namely: -

- desertification light: a case of damage or destruction of the very light in vegetation and soils do not result in a significant impact on the ability of biological environment.

- desertification moderate: a case of the average damage to vegetation resulting be small dunes or small grooves in the soil as well as soil salinization, which reduces the production rate of 10-15% has been up to 25%.

-- desertification severe: a proliferation of shrubs and grasses is desirable in the pasture at the expense of the desired species and undesirable results in increased activity of erosion which affects the vegetation and reduce production by up to 50%.

- desertification very severe: a build up huge sand dunes naked active and configure many of the canyons and valleys and salinization of the soil and results in soil degradation which is the most dangerous in the types of desertification.

In light of the above values of global rating can say where the region that are studied within Category II (moderate desertification), as the dunes of the region, whether small dunes were intermediate or an effect one way or another crept through and cover crops planted near wheat and barley crops, with some salinity in the region and the output of both ground water which rises in the winter, or through the abandoned land unused and that the lack of water, especially in the spring and summer, So we must take appropriate action in a timely manner before you escalate this phenomenon and take other areas difficult to control in the future as well as measures to increase with the cost over time, and actions to be taken for the purpose of treatment according to what is included in the disclosure of speculative, table 3 below are as follows:

1. Conducting settlement processes and modification, especially sand dunes below an altitude about 1:00 m.,if it mixed with soil and use to grow and it is phased out, the dunes, which increases the height of 1m. can be transferred to low or low-altitude areas, and thus it will also be phased out.
2. The provision of water to share these spaces through an incision sub-tables For the purpose of delivering water to irrigation and modern irrigation which will be installed for watering of these spaces and to spray the axial and fixed irrigation systems.
3. Cultivation of land mentioned in the first paragraph, some important strategic crops like wheat, barley and maize a period of not less than ten years, especially since there is a section of sprinkler irrigation systems used by some farmers in the regionProclaimed before a period of five years or less (Figure 3).
4. Planting trees (winds battering ram) next to the sand dunes site wizard by three parallel lines and the length of the line depends on the light dune movement within the region (Table 2), so this line leads into effect in stopping the advance of the dunes, the distance between the line and another line 10 m.,the distance between the seedling and the another seedling within the same line (2-3) meters by species to be selected from that (*Casuarinaequisetifoli*a, *Tamarix articulate*, *Azaclirachtaindica* , *Salix matsuda*, *AcciacycolopsOther*), So grown toward perpendicular to the direction of the prevailing winds (north-west) These types have benefits is to stop sand encroachment, Sand also contribute to improving the environmental conditions and climate zones such as reducing pollutants and reduce temperatures,It is also a national treasure in the future in terms of utilization of timber in various fields, and the following tracks proposed the coordinates for the first line of the fenders, to be taken after every line and at a distance 10 m., among other lines and last, according to the distances and dimensions dunes and undeveloped areas beyond the line.

Figure (2):- a neighboring irrigation systems for the sand dune A neighboring irrigation systems for the sand dune) 4Fig. (

Table (2):- lengths windbreaks of the site with its coordinates

T	windbreaks site	lengths windbreaks/km	coordinates
1	1.415	Hilla, District 18 Shalaby and Zraga	N 32 28 19.0 E 044 33 2.8 N 32 27 42.8 E 044 32 29.4
2	1.22	Between the Nile and 42 ShaheMidhtah, District 3Biermanh	N 32 26 25.5 E 044 35 17.7 N 32 25 58.0 E 044 34 55.8
3	1.130	Nile , 42 Shahe	N 32 26 15.3 E 044 34 30.8 N 32 26 45.0 E 044 34 56.1
4	1.338	Nile District Algadwal 45	N 32 30 18.5 E 044 36 36.6 N 32 29 43.7 E 044 36 6.0
5	0.647	Nile District Algadwal 45	N 32 29 14.3 E 044 37 1.7 N 32 28 59.6 E 044 36 44.0
6	0.252	Midhtah,District 7 Alalaq	N 32 29 9.7 E 044 41 52.0 N 32 29 3.8 E 044 41 45.3
7	1.130	Midhtah,District 7 Alalaq	N 32 28 34.2 E 044 41 39.1 N 32 29 0.2 E 044 42 9.8
8	0.288	Midhtah,District 7 Alalaq	N 32 27 37.3 E 044 42 44.8 N 32 27 45.0 E 044 42 51.0
9	0.500	Midhtah, District 11 Khamisah	N 32 28 14.3 E 044 51 38.8 N32 28 1.4 E 044 51 27.3
10	0.326	Midhtah, District 11 Khamisah	N 32 25 37.4 E 044 54 23.0 N 32 25 44.9 E 044 54 31.8

Note / Coordinates taken from your GPSEtrex type by the researchers during the fieldwork

Table (3):- disclosure of the private speculative area search

	the details	unit rate/ Dinar /Donim	the number
1	A settlement , adjustment and transfers	2000000	641 Donim
2	Apartments tributaries subset of the nearest water source	1500000	6Km.
3	Sprinkler irrigation systems pivotal area of 80Donim	100000000	2
4	prinkler irrigation systems pivotal area of 68 Donim	100000000	1
5	Sprinkler irrigation systems fixed area 73Donim	95000000	1
6	Sprinkler irrigation systems fixed to the area of 42Donim	40000000	3
7	Sprinkler irrigation systems fixed to the area of 42	55000000	1

	Donim		
8	Sprinkler irrigation systems fixed to an area of 21Donim	55000000	1
9	Sprinkler irrigation systems fixed area of 10Donim	20000000	1
10	Sprinkler irrigation systems fixed to the area of 7 Donim	10000000	1
11	Sprinkler irrigation systems fixed to an area of 5 Donim	10000000	1
12	Planting trees (windbreaks) by three lines and the distance between the line and another line 5m. And the distance between the seedlings and other (3) m.by species to be selected Grown toward perpendicular to the direction of the prevailing winds (north-west , a length of 24 km Number (9000) seedlings, ,3000 dinars per seedlings (processing, transport, and agricultur).	3000	9000
13	Pump 20 horsepower Ghattas.	7000000	10
14	Generators with a capacity of 30 KV	15000000	10
15	Buying a car pick-up truck Double Qmarp	38000000	1
16	Buy fuel	35000000	
17	Other	100000000	
	Total	2376000000	

Note / Iraq Donim = 2500 m2) (

Recommendations:-

1. must achieve a meeting of peasants who will adopt the projectthat for the peasants on the project altendr ensure that consent is given by referral as this has a great importance is in the success of the project through the peasants cooperation with the implementing agency.
2. vowed peasants within the project area to continue the cultivation of agricultural land that will be addressedthrough the project, a period of not less than ten years in order to ensure that the desertification of the land again after the success of the treatment process.
3. vowed peasants within the project area perpetuation windbreaks which is cultivated through the project and in the stage after the completion of the project.
4. accelerate the completion of land reclamation projects of others Reclaimed and the completion of land reclamation almost reclaimedConsidering that personal dune sites in this study is basically the land is reclaimedIt has been turned into this advanced stage of desertification Because left by the peasants without cultivation because of the scarcity of irrigation water.
6. search for alternative sources of irrigation water in areas agricultural that the water quota were not available by surface water through the use of competent companies to dig wells with the support and awareness of the importance of farmers and the acquisition of modern irrigation Instead of the old means of irrigation in areas where water quota available to them.
7. Activating the role of remote sensing and geographic information systems whether in monitoring the movement of dunes of the region and other areas or follow the modern techniques of this information In the treatment of dunes and stop the movement of desertification, which is as juvenile has to be stopped.

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