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Facts from the Jordanian Badia



The Jordanian Badia extends to the east of the western mountain range adjacent to the Jordan Valley, which is characterized by its presence at altitudes ranging between (700 - 1100) meters from the sea. Badia is also characterized by high temperatures during the day and low nights at night, and the difference in rainfall amounts between seasons and during one season.

- It constitutes 82% of the total area of Jordan, with an area of (73,133) km².

It includes (90%) of the rangelands area in Jordan. The Southern Badia represents 51% of the Badia area, the Central 13.5% and the Northern Badia 35.5%.

It is a source of 60% of red meat production.

It contains 70% of the groundwater reserves within the Jordanian Badia regions.

- The total area of waterfalls in the Badia is about 67,000 km²

- 939,120 population of the Jordanian Badia.

- 9.6% of the total population of Jordan.

- 5.4 Average household size in the Jordanian Badia.

1. Study background

1.1 Introduction:

Jordan is located in the dry and semi-arid regions package, where the dry lands in which the rates of rain fluctuate to less than 200 mm annually, represented by the Jordanian Badia region (82)% of the area of Jordan, which in turn includes (90)% of the area of rangelands in Jordan¹, providing most of the natural pasture lands in Jordan, whose area is estimated at about (80) million dunums, and thus constitutes what it produces from everything an important source to cover the free food needs of the Bedouin and pastoral breeders of livestock despite the deterioration experienced in the pasture areas Over the past five decades, when the natural pasture lands provide the nutritional needs of fodder between (3-2) months during the year without supplementary feeding or the equivalent of (30)% of the nutritional needs of livestock².

For long periods that lasted until the middle of the last century, i.e .before the year (1950) AD, the pastoral areas in the Jordanian Badia were characterized by effective systems of land tenure and grazing rights that were associated with the tribal establishment that in turn preserved the natural resources within its lands and organized its exploitation in a way that helped protect and sustain its production³. whereby the prevailing economic and social lifestyle in the Jordanian Badia at that time was based on nomadic life during the seasons of the year in order to feed and water, which limited the process of unfair exploitation of the pasture lands and gave them sufficient opportunity to regenerate, recover and restore their productive capacity and plant diversity before exploiting them. Once again, in light of the fact that the land uses in the Jordanian desert were then restricted to grazing and livestock .

However, after the different lifestyle in the Jordanian Badia, and the limited range of rangelands available for grazing due to border demarcation operations, the extension of the state's influence over pasture lands and its declaration that they are state-affiliated areas and available to all, and the subsequent resettlement operations, both planned and spontaneous, the emergence of population concentrations in the Jordanian Badia, and the decrease in the importance of pasture lands for the population As a result of the majority of the inhabitants of the Badia regions, as a result of alternative options for making a living from agriculture and jobs in the public and private sectors, new patterns of overgrazing pasture have emerged without regard to their needs for

¹ The Hashemite Fund for Jordan Badia Development database

² Ministry of Environment, the State of the Environment in Jordan Report (Second Report), Chapter Two : Environmental Issues .Amman, 2016 pp.(216-220)

³ Ministry of Agriculture, the National Program for the rehabilitation and development of pasture : pasture management in Jordan, Amman, 2005 m

sustainability and restoration of their Productive in terms of the emergence of many negative human practices, such as overgrazing, depletion of groundwater, soil, vegetation, logging and overfishing that contributed to the further degradation of rangelands.

In addition to the succession of drought years to which the Jordanian Badia regions were affected by climate change processes and the fluctuation of rainfall during the past decades, the deterioration of rangelands in this way is increasingly considered a serious threat to the livelihood of a large segment of families who depend on natural resources due to the lack of alternative options for earning a living. The absence of the catalyst that encourages nomads and pastoralists to rationalize the use of their pasture resources, as well as the forms of biological diversity that have been greatly affected by environmental factors, urban activity and the overexploitation of natural resources. Which consequently led to the slow deterioration of the natural resources of pastoral and farming over the past decades that it was the results bring a significant change in soil properties and characteristics of the plant collections and density which case t in turn, without the benefit of natural resources and pasture areas for the benefit of the community s local of .

Accordingly, and as a result of the deterioration of the environmental systems in Jordan and the Jordanian Badia region in particular , the project (**Sound Environmental Systems for rangeland development: sustainable rangeland management practices and strategies**) emerged within the series of projects of the United Nations Environment Program funded by the Global Environment Facility with goals and activities that seek to reduce this deterioration in all Jordan and Egypt , with a focus on the issue of desertification , which primarily affects the pastures in the two countries, so that this project aims to promote rangeland rehabilitation and management in a sustainable manner in partnership with the community s local of in order to provide ecosystem services and annexation Protect biodiversity , so that this project is a catalyst for regional and international expansion .

And given the importance of knowing the social and economic environment of the project's targeted sites, which constitute a focal point for understanding the local communities in the project sites and knowing their needs and requirements for their development and the extent of success of the development projects in them or their failure, in addition to the need for a method to assess the extent to which the project will contribute to making a remarkable development on the aspects Environmental, social and economic areas targeted in the project , this study came with the aim of providing the project management and all concerned with details of the social, economic and environmental facts of the project sites in its current reality through variables and

sensors indicators A measurable foundation for comparison with the conditions that will prevail in the targeted areas in the future in various social, economic, and environmental fields etc.

Specifically, this study aims to:

1. Learn the natural environment of the project sites and determine the most important phenomena and features of the surface of the earth, climate, water resources and land uses that are useful in understanding human practices and activities.
2. Determining the social, economic, educational and health facts in an attempt to diagnose and analyze them to highlight the impact of rangeland and forest degradation on the characteristics of local communities in the project sites, in addition to identifying socio-economic and demographic indicators that reflect the living reality of these societies in order to measure the variables that will result from the project's activities in the future.
3. Learn the reality of the sectors of social development (education, health and infrastructure) and the extent to which the local community depends on ecosystem services .
4. Evaluating the development needs of the project areas by coming up with recommendations that will necessarily benefit the reality and requirements for project success.

1.2 Scope of the study:

The project work areas in Jordan include the scope of three administrative regions (Ma'an Governorate, Mafraq Governorate, Zarqa Governorate) .For the purposes of identifying specific sites as a model experimental retractable expansion and dissemination of the experience of the project activities, has been selected three sites within the areas of project management scope and within the administrative boundaries of the area Badia North (Central, South) with an area of (73.133) km² located within the dry land dry and semi The area represents the pastoral societies (Bedouins) in Jordan, based on several criteria summarized the most important of them are as follows:

- A centralized site and representative of other sites within the overall geographical scope of the region in a way that makes it as a comparable region that other societies can visit

and learn from, in terms of the nature of the geographical terrain, climate, soil, water, plants and living organisms etc.

- A site where communities can be identified and jointly restored rangeland management activities undertaken.
- The nature of rangelands and the challenges of degradation by being the habitat of many plant species necessary for the continuous flow of ecosystem services, especially pastoral plants, in addition to the site's ability to restore healthy pastures in terms of their high indicators for the potential for measuring vegetation changes.

Accordingly, three main sites were identified as sites representative of the total geographical scope of the project's work areas in each of the three Jordanian valleys (North, Central, and Southern) as follows:

1.2.1 The Surra Reserve site:

The Western Northern Badia region's area (669.4) km² representing (0.9%) of the Jordanian Badia area and (2.5%) of the Northern Badia area, and includes (39) combines a population divided into four administrative units (eliminate monsters, spend Sarhan, Brigade Northwestern Badia, Khalidiya District) has a total population of (133,912) people.

And due to the necessity of identifying a centralized site representative of other sites within the overall geographical scope of the region, during which local communities can be identified and involved in the activities of the sound management of rangelands, as well as the nature of the topography of the geographical area that the target naval reserve site can represent as an experimental model, the geographical area and the target population in The northwestern Badia region in the areas located on the Yarmouk surface basin as an area representative of the total geographical range of the site of the protected navel targeted in the project, as shown in the following figure No. (1):

Figure (1):Details of the geographical area and the target population (Sura Reserve site)							
Site	Governorate	Badia		The targeted area in the overall	The Targeted Population Centers Within the Overall Geographical Scope of The Site		
Sura Reserve	Al-Mafraq	Northwestern		(260) Km²	District/ Sub- District	Number of Population centers	Population
					Hawshah	11 (All of Population centers)	25,530
					Northwestern Badia	2 The following regions: (Surra, Mansoura)	5,809
					Sarhan	9 All of Population centers)	26,305
Total					22	57,644	

1.2.2 Location of the Defeat / Blue Zone:

It constitutes Al-Hazeem area located on the border between Jordan site and Saudi Arabia , the northern part of the basin and Wadi Al – Sarhan water surface and geographical extension of the natural and administrative region Blue , which lies in turn on the water blue surface basin, representing the lowlands east of the Central Badia area administrative up to (3953) Km² represent (41%) of the area of the Central Badia and (5.4%) of the area of the Jordanian Badia.

The importance of Al-Azraq and the Al-Hazeem area, as an extension of the northern part of the Al-Sarhan Valley, shows that since ancient times they represented the pastoral winter areas of the nomadic nomads that they intended to spend the winter season coming from their summer pasture areas in the western highlands of the Azraq depression, which is still ongoing

until now, but on a large scale .Narrowing after nearly five decades have passed since most of the nomadic pastoral societies settled in population centers in the Jordanian Badia, so that the total geographical range of the Al–Hazeem site (the low–blue area) constitutes the geographical areas it provides in which the rangelands are the most important areas Z Jordanian desert where Bedouin practiced nomadic Bedouin from the north and pastoralists of the population of the blue area of pastoral especially in their activities , winter and spring season .This distinguishes the total geographical range of the Al–Hazeem area site from the overall scope of the other project sites (the site of the Surra Reserve and the location of the Mansheya Reserve) that were ancient and still represent the geographical areas that the nomadic nomads intended to spend the summer season only .

Within this description, the overall scope of the Al–Hazeem area can be determined within the administrative region of Azraq district, which the site can represent as an experimental model due to the nature of the terrain and as a geographical extension of the Azraq area to the south, as well as the local communities of nomads who move in the overall geographical range of the site and population groups within Azraq district, for the purpose of its participation in the activities of the sound management of rangelands, as shown in the following figure (2):

Figure (2): Details of the geographical area and the target population (Al–Hazeem Site)												
Site	Governorate	Badia		The targeted area in the overall geographical scope of the site	The Targeted Local Communities Within the Overall Geographical Scope of The Site							
Al–Hazeem Site	Zarqa	Central Badia		(3,953) Km²	Communities		Population					
										Azraq		17,051
										(All of Population centers)		
										Bedouin nomads		103
					(15) nomadic families traveling on the site during the month of April2018							
					Total		17,154					

1.2.3 The Mansheya Reserve site:

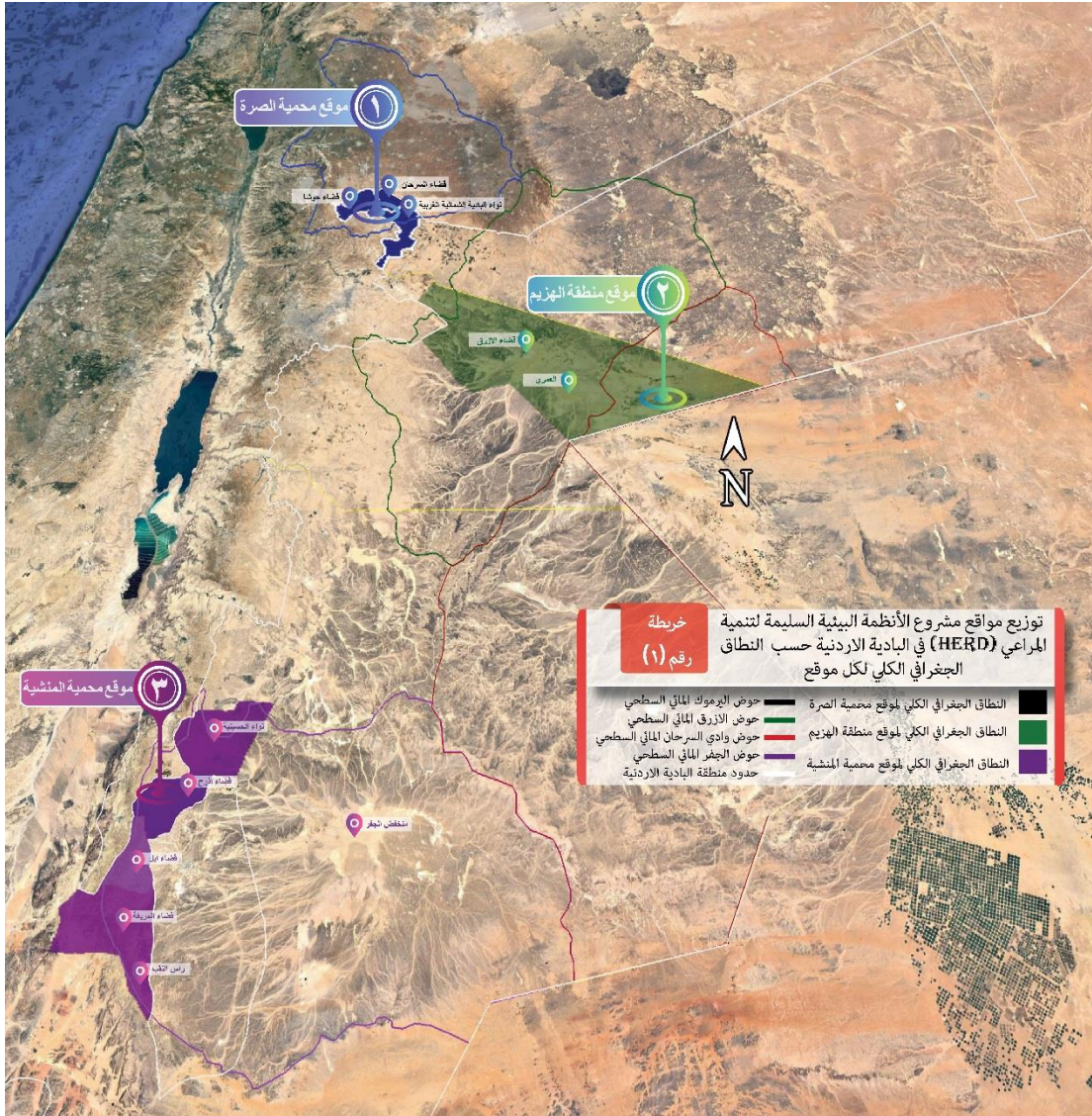
Representing Mansheya protected site southern desert region ,which is characterized by geographical breadth with an area of up to (37,569) km² and represent 51% of the Jordanian Badia area, in addition to the diversity of topography and geographical areas of the Hammad (low Jafr, the land of flint), and dunes and mountain areas Ramlieh (Badia Hisma, Al-Mudawara, Wadi Araba) and Al-Sharaa Heights area.

The Southern Badia region has provided various terrain areas suitable for the transportation of nomadic tribes between their winter and summer pasture areas and as it used to in the past before the stage of settling most nomads in population centers, so that the Al-Sharaa Heights region along its length from Tafila in the north to the Ras Negev cliffs in the south with a distance (105) How many permanent summer areas are for the nomadic Bedouins due to their mild climate in the summer, and they are similar to the forum for the various nomadic clans coming from their summer pasture areas in Wadi Araba in the west and Al-Hammad areas in the east (low Al-Jafr, Ard Al-Sawan), and Badia H Mei in the south.

Within this description, the site of Al Manshia Reserve is located within the chain of the eastern Sharaa heights located within the surface water basin of Al-Jafr, and these highlands that extend from the area of Al-Husayniyyah in the north to the area of Al - Mureigha and Ras Al- Naqab in the south – which are almost mediated by the site of Al-Manshia Reserve within the region of Adhrah – The western area of Al-Jafr is fed by rain water through several valleys descending from it to the east .And therefore can determine the area of geographical representative geographical scope of the total site are protected Mansheya areas of the heights of purchasers that fall within the basin water Jafr surface and within the administrative boundaries of the southern region of geographic area of up to (1679) km² form (4.4%) of the southern desert area and (2.2) From the area of the Jordanian Badia.

It is also possible to define the targeted communities for the purposes of the proper management of rangelands in a joint manner with all the population centers within the geographical area of the number of (8) Adrah districts , with a population of (8,374) people, as shown in the following figure No. (3):

Figure (3): Details of the geographical area and the target population (Al-Mansheya Reserve Site)							
Site	Governorate	Badia	The Target Area of the Site	The targeted area in the overall geographical scope of	The Targeted Population Centers Within the Overall Geographical Scope of The Site		
Al-Mansheya Reserve	Ma'an	Southern Badia	() Km ²	(294) Km ²	District/ Sub-District	Number of Population centers	Population
					Adhruh	Adhruh	1,700
						Mansheya	3,956
						الجرباء الكبيرة	1,068
						Al Mohamdy	969
						الظميعة	152
						الجرباء الصغيرة	311
						Bear Abu Al-Alaq	42
					Al-Ash'ari	176	
Total		8,374					



For the purposes of accurately describing the living conditions of the families of the targeted areas in the project and expressing it quantitatively in the form of digital data in the various demographic, social, economic, educational and health sectors, a random sample was chosen from all the target groups in the project with regard to the representation of the women and youth sector, livestock breeders, farmers and those with a relationship Directly in Al-Marai, where data () was collected for a family and for a group of individuals reached () as shown in the following figure No. (4):

Systematic construction of a study:

The methodology of this study was built based on the descriptive analytical approach and its tools for collecting anthropological and demographic field information , which in turn is one of the most prominent approaches adopted in modern anthropological studies especially for the relatively homogeneous nomadic pastoral societies , so that anthropological studies mean when studying any phenomenon with geographical, environmental and historical characteristics in addition to Social and economic characteristics ... etc.⁴ ,which thus serves the interest of society through the availability of basic information for those working in the development sector on the nature of the targeted communities in various sectors, especially if these societies have special circumstances both in terms of the geographical environment and their socio-economic reality , and knowing the extent to which the nature of development plans and programs is appropriate to the nature of these characteristics And not inconsistent with the inclinations and trends of the target communities.

The methods and tools for collecting data related to the anthropological approach are also the most important effective tools in the field work from "interviews and observation with

⁴ See :

- Deacon, Isa, Introduction to Anthropology (Anthropology (, a reference earlier, p.38 .
- Morsi, Mohamed Abdel-Maaboud . General anthropology :an introduction to research in the anthropological field in terms of subject and method .Knowledge House University, Alexandria, 1987 m .

participation", which is the basis of field anthropological studies to record all evidence and live descriptive facts to provide accurate results on the studied community as it is in reality, as well as the use of "news" And developing" statistical forms "to collect quantitative data in order to obtain more accurate, objective and reliable quantitative information and indicators to represent the study community⁵.

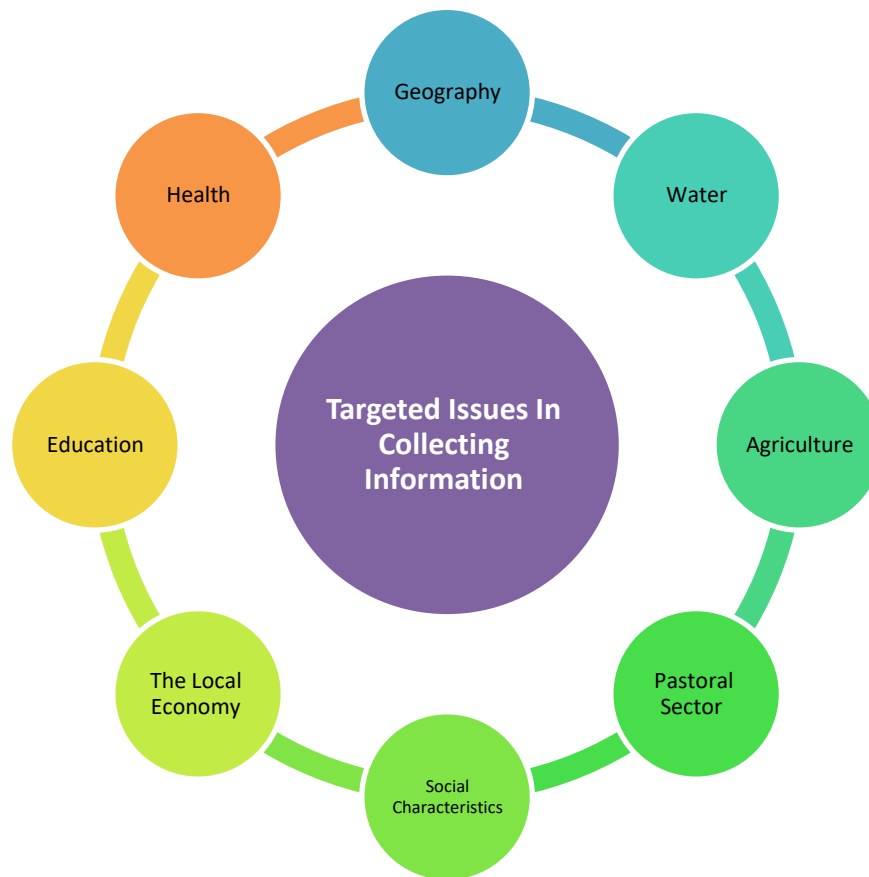
And based on this approach, which will be based on the study in the construction of its work methodology, you can study through several stages of achieving operational requirements of a data qualitative and quantitative trending then to characterize, analyze, discuss and output the results of the come into existence:

First: the preparatory stage (reference review) :This stage includes the formation of the objective framework of the study and its objectives, the design of the study tools and procedures, in addition to collecting initial data on the targeted sites in the project and examining the available information and studies in the available office references and data of the official authorities from various sectors .

Second: the field work stage : This stage included the collection of field data through a specialized work team of males and females during the period from) m , (during which everything related to aspects of life was recorded in the project work areas, with the aim of showing the true dimension of the environmental and water reality and agricultural pastoral, in addition to the reality of living for the families of the project sites and demographic characteristics of the social, economic and education of the health of .

⁵ See :

- Deacon, Isa, Introduction to Anthropology) Anthropology , (the Union of Arab writers, Damascus, , 2004 pp.133-130 .
- Ismail, Farouk Mustafa, Change and Development in the Sahrawi Society,2 nd Floor , Dar Al-Maarefa Al-Jamiia, Alexandria, , 1983 pp.33-32 , 22-21 .
- Abu Zaid, Ahmad, The Social Construction : An Introduction to Community Study, Part , 1The National Printing and Publishing House, Cairo, , 1965 p.58 .
- Muhammad, Muhammad Ali, Sociology and the Scientific Method : A Study in Research Methods and Techniques,2 nd edition, University Knowledge House, Alexandria, , 1981 p.301 .



The field work also aimed at enhancing cooperation and coordination frameworks between local communities and official local institutions on the one hand and with project management on the other hand for the purposes of implementing project activities to restore pastures, through the application of the principle of sound participatory management of rangelands towards defining societal priorities for investment in ecosystem services in line with With its sustainability and with with the developmental tendencies and aspirations of the local communities.

The study data was collected based on the following field tools:

•Interviews and panel discussions:

The aim of the interviews was to know the views of the local communities and their way of looking at things and the change they are looking for in a way that is consistent with their preferences and needs, especially related to environmental aspects and frameworks of work in a joint manner in the activities and plans for restoring pastures. In addition, the aim of the interviews was to collect demographic statistical information Social and economic families .

Accordingly, interviews and discussion sessions were conducted in all areas of the project that included families of the project work areas, especially

livestock breeders, farmers and the women sector, in addition to employees of government departments and institutions, in a way that ensures the participation of all parties concerned with the problem of pasture degradation and joint planning towards restoring rangelands and sustaining ecosystem services For the benefit of future communities.

- **Statistical form:**

A statistical form has been developed to suit the requirements and objectives of the study⁶, which was used to collect data for the study sample from the families of the targeted population in the project in the form of digital data in various demographic, social, economic, educational and health sectors, so that () a statistical form was distributed in all areas of the project that included obtaining accurate information depicting the living reality of the communities Local characterization and analysis of phenomena on which the theoretical perception is based, as is the case.

Third: the result of the study:

2. Geographical characteristics of the project work areas

The project work areas within the region pastoral in Jordan represented by the Jordanian Badia region, which includes 90 % of the pasture area in Jordan constitute 82% of the total area of Jordan with an area of (73.133) km.²

And extends the Jordanian Badia region to the east of a series of mountains West adjacent to the Valley Jordan, and characterized by its presence at altitudes ranging between (1100 – 700) meters from the surface of the sea, and high degrees of heat during the day and low at night, and the variation in the amounts of precipitation rainfall between seasons and during the season one .

And although the desert areas of ecologically considered areas of dry and semi – dry , with less precipitation rate of about 200 mm per year, but they contain a lot of natural resources , mineral, agricultural: plant and animal, and available groundwater, so It accounts for 70% of the groundwater reserves in Jordan, and the total area of waterfalls in the Badia is about (67) thousand square kilometers , in addition to the Badia regions containing promising developmental elements such as oil shale , renewable energy and uranium , in addition to its contribution to (60%) From the production of red meat .

⁶ Appendix containing the form of the statistical form

The three project work areas are distributed within the administrative boundaries of the three Jordanian Badia regions (North, Central, and Southern), so that they were chosen as centralized sites and representative of other sites comparable within the overall geographical range of each of the three valleys, which the following paragraphs will address in terms of their natural and geographical characteristics:

2.1 Geographical characteristics of Al - Manshia protected area site - Southern Badia :

Protected site Mansheya is located in the southern desert area that stretches south of Jordan with an area of up to (37.569) Km² equivalent to 51% of the Jordanian Badia area .The distribution of the southern desert areas administratively four administrative provinces is the governorate of Aqaba spend Alqoirh , spend Disi, spend Wadi Araba, and the Governorate of Ma'an: spend Odhirh, spend deer, spend Jafr, spend Marri g of , Brigade Husseiniya, Governorate Tafilah: Brigade Al – Hasa, and the province Karak: Qatraneh Brigade.

The southern Badia region is characterized by its geographical expansion due to the diversity of its geographical topography ,from the lands of Al–Hammad represented by the low–al–Jafr regions, the areas of Ard al–Sawan, and the dunes and sandy mountains represented by the areas of the Badia Hisma, Al–Mudawara, Wadi Araba, in addition to the highland areas represented by the Shariah heights.

Within this description, the site of the Mansheya Reserve is located from the administrative point of view in the Adrah region, located to the northwest of Ma'an Governorate, with an air distance of (15) km .And geographically located within purchasers Heights , which is the longest Heights chain in Jordan chain stretching from the area north Tafeileh until Grove Ras Negev in the south , a distance of 105 km, which constitutes Bartvaatha overlooking of the lowland areas in the east and the west boundary of the streams of the valleys sloping eastward towards the basin Jafr Surface waterfalls and valleys sloping to the west towards the northern Wadi Araba basin, where the terrain of elevated slopes to the east towards the low –cliff valley is easily characterized by its slopes, clear of rocks and cliffs , and its long valleys as valleys of “Abu Hammam, Abu Jarzan and Ruwaida ” that feed on rainy waters from the high At the areas Adhirh Weill and Amartigh trundling slowly towards the east , as characterized by the topography of the heights of purchasers sloping west towards Wadi Araba Banhaddarat Behold the narrow and the sharp and what can I get short as Wadi "Ghuwair" in the north "and valleys "Dlagh and good and Wadi Musa "in the southern part .

Accordingly, the limited geographical scope of the overall site is protected Mansheya target in the project in accordance with management to spend Adhirh of the province of Ma'an border, which is part of the East of purchasers Heights ,which is located within the basin water Jafr surface, which thus represents a wide geographical area amounted to about (294) km² forms (% 0.7)of the southern Badia area, and at elevations whose levels ranged between (1200–1500 m) above sea level.

2.2 Geographical characteristics of the area of Al–Hazeem / Azraq - Central Badia :

Hazeem area site is located in the eastern part of the central Badia ,which is located in the center of the Kingdom between the Northern Badia, South Badia a geographical area of up to (9634) km² equivalent (13%) of the Jordanian Badia area, groupings administratively and distributed in the capital Amman Governorate: Al–Muwaqqar, Giza, and Zarqa Governorate: Al–Azraq District, Al–Dhlail District.

The geography is a site Hazeem area located on the border between Jordan and Saudi Arabia , the northern part of the basin and Wadi Al – Sarhan water surface and geographical extension of the natural and administrative area blue in the eastern part of the Central Badia representing the eastern lowlands of the Central Badia, located on the water blue surface, basin of y j is In turn, it is one of the twelve most important basins in Jordan and the five most important basins that lie wholly or partly in Jordan .The low–blue area is also characterized by the abundance of water in the winter and spring, with a sub–humid sub–climate, especially the oases in the depression, which is one of the most important wetlands in the world and contains many types of animals, plants and birds, whether migratory or settlement⁷.

Also the area of Hazeem site represents as an extension of normal for a low blue western lowlands of South for the free basaltic Jordanian , which is characterized by easy territory and the spread of groups of marabat and bottoms dry clay that are formed along the valleys sloping from the free basaltic for ending in blue bottom and the bottom of the Hazeem , forming the land that provides pastures in the sewage canals and ranches in which some clans practice pastoral and agricultural activities .

Within this description, the overall scale of the site Hazeem area actually confined to the basin and Wadi Al – Sarhan water surface as an extension of a natural low area blue within the

⁷ Fariz, Ghaith and others, Azraq Basin – Land Resources Toward Optimal Use, The Third Jordanian International Week, Volume VI (Scientific Papers – Multiple Knowledge Cases), Royal Cultural Center, Amman, Jordan.8–6 ,1995 ,

administrative boundaries of the Blue to spend that follow the blue of the province, thus forming an area of up to (3953) K m² representing 41 % of the area The Central Badia and (5.4)% of the area of the Jordanian Badia, whose proportions range between (500–600 m) above sea level.

2.3 Geographical characteristics of the area of the Surra - Northern Badia protected area :

Protected site Sarra is located in the western part of the Northern Badia , which occupies in turn , the greater part of Mafraq governorate with an area of up to (25.930) Km² equivalent to %35 of the Jordanian Badia area, and divided the Northern Badia administratively to three brigades, namely: Northeastern Badia Brigade : It includes the Salhiya District, the Sobha District, Umm Al Jamal District, Umm Al Qutin District, Deir Al Kahf District, and the Northwestern Badia District : it includes the Northwestern Badia District, the Sky Sarhan District, the Hasha District , the Khalidiya District , and the Ruwaishid Brigade .

For the long geographical extension of the northern Badia region along the border with Syria, the northern Badia regions varied in terms of geographical topography and surface water basins, as follows:

- The flat lands of al–Hammad, which are covered with gravel and stones located on the surface water basin of Hammad, as is the case of the Ruwaishid district.
- Basalt free lands that are characterized by the presence of volcanic mountains, plateau hills and flat lands that are covered with basaltic stones. These lands represent the northeastern Badia brigade areas that are located on the surface blue water basin, and the lands of the eastern part of the northwestern Badia brigade that are located on the Zarqa water surface basin.
- The lands located in the northwestern part of the northwestern Badia brigade, which represents the transitional zone between the northern Badia regions in the east and the highlands in the west and form the southeastern part of the Yarmouk surface water basin.

Within this description, the site of the protected area of Sarrah is located in the northwestern part of the Northwestern Badia Brigade, which represents the areas located on the Yarmouk surface water basin and part of the plains north and east of Ajloun Mountains that are characterized by the level of its surface, and represents the beginning of the lands of the Jordanian Hamad in the northern Badia from the side Al–Gharbiyya, just like the Mansheya Reserve site, in the Southern Badia.

Accordingly, it limited overall scope of the site hub of a protected area within the areas of the Yarmouk Basin water surface of areas to spend monsters, spend Sarhan, the area of Mansoura, a problem that an area of up to (260) K m² represents (1%) of the Northern Badia area, and heights Her levels ranged between (600– 700 m) above the sea .

3. Climatic characteristics of the project work areas

The Jordanian desert region prevails in the arid and semi–arid climate, high temperatures during the day and their decrease at night, and the variation in the amounts of rain and its fluctuation, which led to successive waves of drought that reflected negatively on the economic activities of the inhabitants of the Jordanian Badia that were mainly dependent on pastoral activities and the availability of pasture lands so that climate changes have led to reduced amounts of rainfall and high annual temperatures to high evaporation rates , and low moisture in the soil and air to provide adequate moisture during the season to complete the cycle of plant growth, thus resulting in a Z natural vegetation areas decrease in pasture and desertification and decreasing area of rain – fed land, increasing the use of limited sources of water sources.

Accordingly, the following paragraphs will address the climatic characteristics of the project work areas by analyzing trends of change in climatic elements such as airport precipitation rates, temperatures, humidity and solar brightness rates, as follows:

3.1 Rain statistical distribution:

The Alhto' s rain of the most important climatic elements that affected the productivity of natural pastures in the project sites, so as to their importance in providing moisture to the soil, plants and water storage support groundwater.

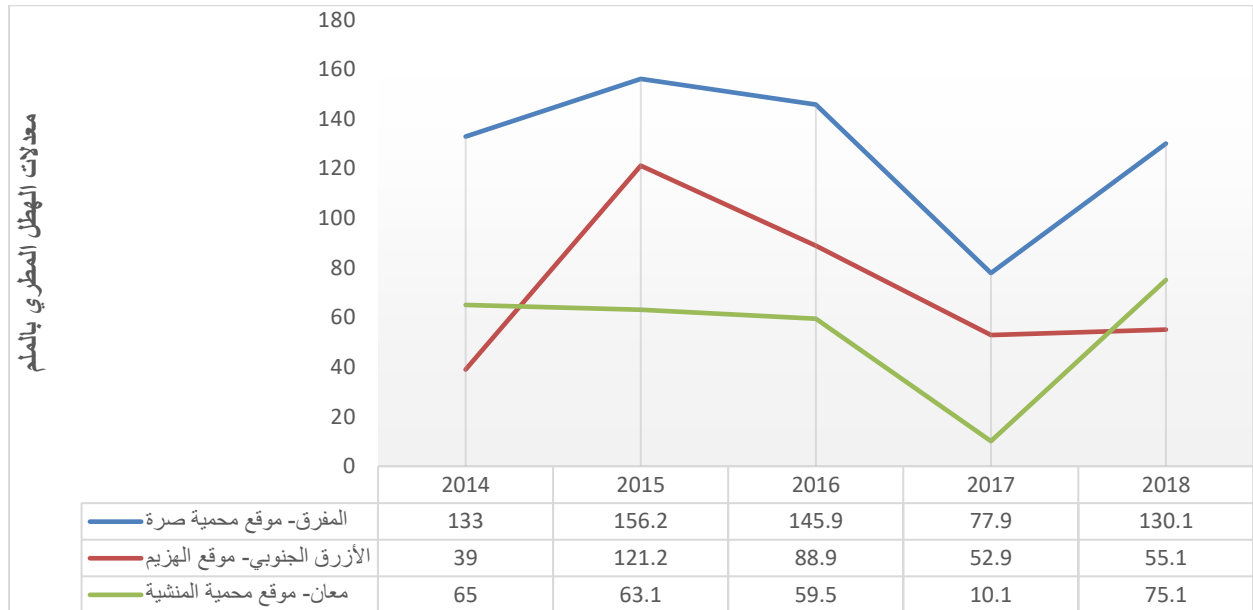
Figure No. (5) shows the variation in the annual rainfall rates in which the periods of moisture and drought balance, while the highest rainfall rates recorded in the project work areas in (2014) reached (133) mm in the Mafraq Governorate Station – Surra Reserve and (39) Mm in Azraq station – Al –Hazeem site and (65) mm in Ma'an station – Al–Manshia reserve. Rainfall rates increased significantly in the following year (2015) to reach 156.2, 121.2 and 63.1 mm in Project work areas respectively.

In the years (2016–2017), the rainfall rates decreased very significantly, while the rain rates recorded in the water year (2015) at the Mafraq station – the Surra Reserve at (156.2) mm, returned to end at (77.9) mm in the water year. (2017) CE, and the same applies to both the Azraq station – the location of the defeat, where the rainfall rates ended at (52.9) mm and the

Ma'an station – the Mansheyah Reserve at (10.1) mm in the water year (2017) and as shown in Figure No. (5), thus indicating that the water cycle of the water years (2015–2017) was heading towards drought, which affected the productivity of the rangelands in terms of providing the appropriate humidity for the completion of the growth of water .Ataat and breed.

It is also clear from Figure No. (5) That the rainfall rates started to rise in the water year (2018) to return and the rainfall rates close to the water year (2015) M.

Figure No. (5) Shows the variation in the annual rainfall rates:



3.2 Temperatures:

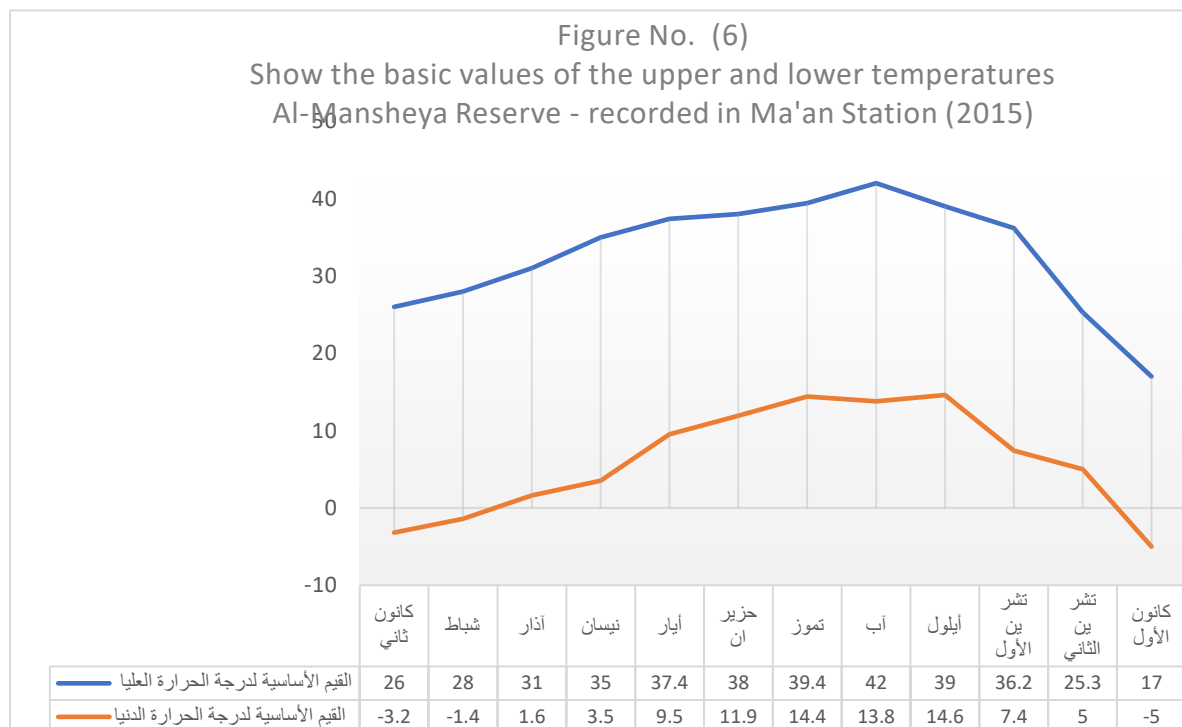
Temperature levels are no less important than rain, as they directly affect the efficiency of rains on the one hand, and the diversity and intensity of vegetation on the other hand, due to the increased amount of moisture losses resulting in gradual and varied types of vegetation groups.

As important to show degrees rates of heat in determining the changes process by changes in vegetation by the thermal changes that help to determine the appropriate periods for the cultivation of each type of plant or show crop or support and relevance of the growth of knowledge of the adverse times that lead to stop the plants or growth Zbolha and kill her , Thus reducing the economic productivity of farmers and pastoralists.

The following figures No. (6), (7), and (8) show the basic values of the upper and lower temperatures recorded in (2015) at monitoring stations within the project work areas⁸, whose main indicators we will show as follows:

3.2.1 rates of upper and lower temperatures at the site of a protected area Mansheya:

Despite the location of the Mansheya Protected Area site within the chain of the Badges heights, which is characterized by a mild climate in summer and very cold in winter , and high precipitation rates , its location which represents the beginning of the southern Badia borders to the east and its relatively low surface levels compared to the rest of the Sharia heights and its relative height from the rest of the areas The Southern Badia, distinguished by a mountainous and flat geographical nature, the levels of which ranged – as we have shown previously – between (1200 – 1500 m) from the sea level, with a semi-desert climate that is relatively hot in summer and cold in winter, so that temperatures rise in summer to reach (42) degrees Celsius and fall in winter to below zero percent to (-5) degrees Celsius.



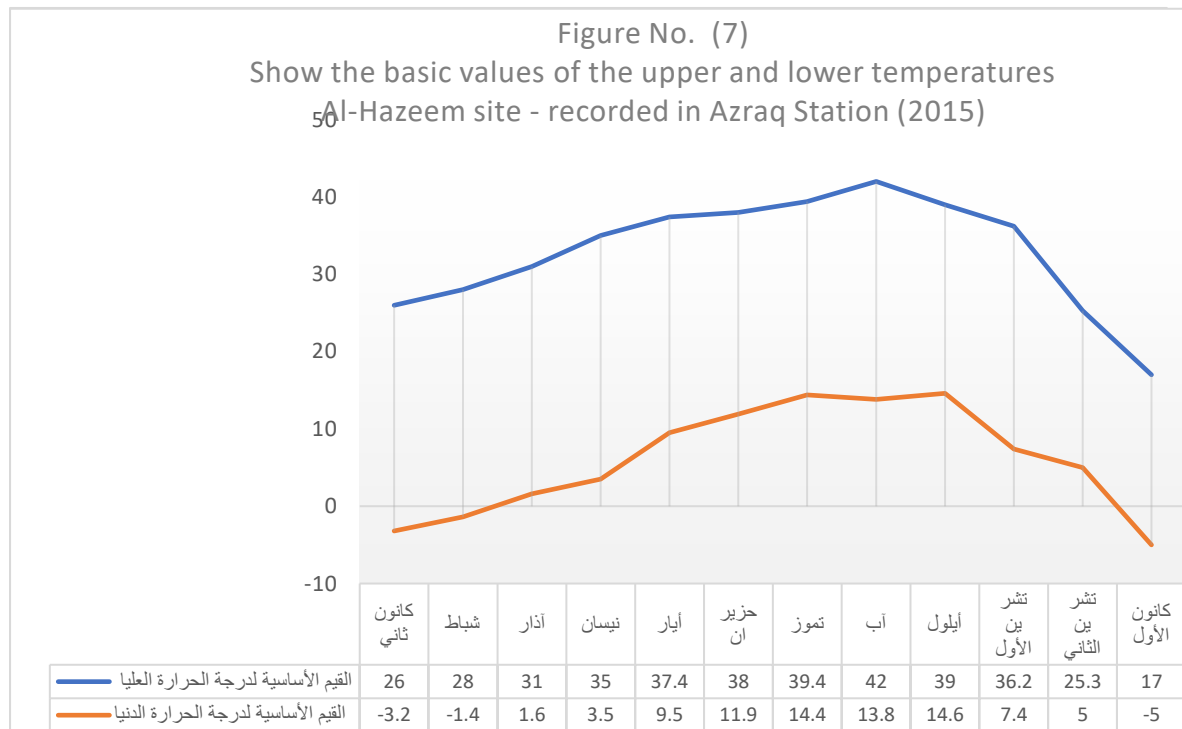
⁸ Jordanian Annual Statistical Book, N.,69 Department of Statistics.,2018

⁹ Bulletin of Environmental Statistics , 2015-2014 the Department of Statistics

3.2.2 rates of upper and lower temperatures in the Hazeem site area / Blue:

Climatic indicators in Figure (7) show that the highest average summer temperature in the Al-Hazeem site – Low Blue has reached (45.5) degrees Celsius to record the highest temperature levels at the level of the legislator's work areas, as well as lower temperatures in a season. The winter records rates ranging between (-3.1) (4.5 – degrees Celsius, and these rates indicate the relative warmth of the Blue Low area from the rest of the project's work areas in the winter, which was distinguished by the most important areas in which pastoralists and nomadic people practice their pastoral activities in the winter.

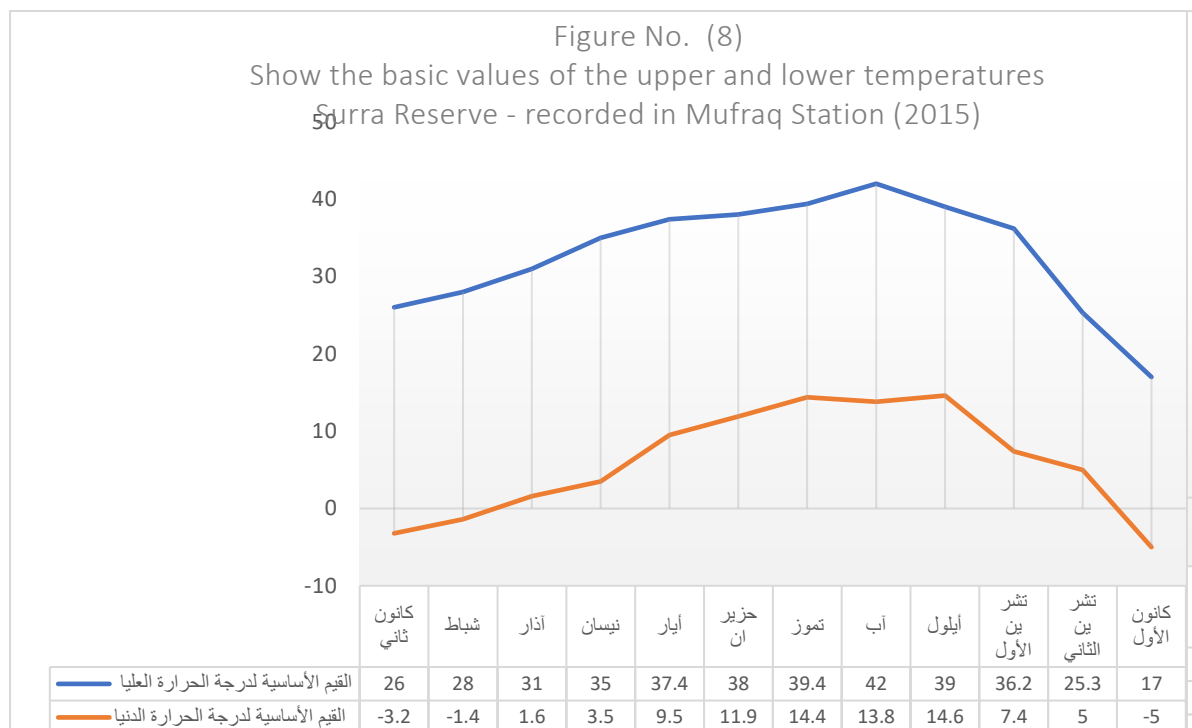
Despite the climatic indicators of the Azraq low area – the location of al-Hazeem indicates the semi-dry desert climate, high temperatures in the summer, and fluctuations in rainfall rates – as we have shown in the previous part – the low-blue area was distinguished in winter and spring by the sub-humid sub-climate. This is due to the abundance of water that collects in the depression through many valleys, especially in the oases in the depression, which is one of the most important wetlands in the world.



High and low temperatures in the Surra protected area:

As in the case of Al Manshia Reserve and Al Hazeem Site, climatic indicators indicate the upper and lower temperatures recorded in Al Mafraq Station – Surra Reserve, that the climate is characterized by a semi-dry desert climate, where temperatures rise in the summer to reach (44) degrees Celsius And it drops in the winter to less than zero percentile, where it reached the lowest degree (-7) degrees Celsius, and thus constituted the lowest temperatures recorded in the project work areas.

Accordingly, the climatic indicators about the temperature levels in the project work areas, whose heights reached between (42–44) degrees Celsius, reflect important challenges over the efficiency of the annual rains in the production of the annual biomass of the rangelands and the degradation of pastoral lands in the project areas, where the rise in Temperatures in this way increased the amounts of losses of moisture, which led to the gradual and diversity of the types of vegetation groups and the drying of large areas of pastoral lands.



3.3 Solar brightness:

The importance of solar brightness appears in terms of the calorific value per square meter in each dunum, which is a value that has its benefits and harms on natural pastures as it contributes to increasing the growth of plants and herbs on the one hand and increases the evaporation rates from the soil and plants on the other hand, which loses them a large percentage of moisture required for plant growth.

Thus, as shown by the following figure No. (9), the highest annual rates of solar brightness hours at the project sites amounted to about (9.1) hours in the Mansheya Reserve, where they rise in the summer season by about (11.8) hours while they decrease in the winter season to about (6.4) An hour, and the matter also applies to each of the project's work sites, but with lower brightness rates, which led to an increase in the calorific value per acre, which increases the temperature rates , and with a decrease in the amount of rain and the percentage of moisture remaining in the soil and air, this led to low growth of plants In the project work areas.

Figure No. (9)

Rates Hours of Solar brightness in project areas of 2015¹⁰.

	Al-Mansheya Reserve	Al-Hazeem Site	Surra Reserve
Annual Rates for Hours of Solar Brightness	9.1	8.1	7.9
Max. Hours of Solar brightness / July	11.8	10.3	10.7
Min. Hours of Solar brightness / July	6.4	5.5	4.7

3.4Relative Humidity Rates:

The annual humidity rates are affected mainly by the amounts of rain and temperature levels, as the amount of relative humidity available in the soil and air is inversely proportional to the temperatures and the decrease in rainfall amounts due to the high evaporation processes, where we find that the low amounts of rain precipitation and high temperature rates at project sites during the year (2015) As it was shown previously, it has led to a decrease in the quantities of available moisture and the extent of their stay on or in the soil and plants due to the effect of tractor degrees on raising evaporation rates, for example, as shown in the following figure No. (10), while the annual rates of Heat in the Mansheya Reserve site is about (42) degrees Celsius In the month of August, the relative humidity percentage decreased to about (37.6)%. Consequently, the effect of negative temperatures appears on the productivity of rangelands in terms of raising evaporation rates and low amounts of available moisture and their extent of remaining on or in the soil. Which negatively affects the biomass and its density in the pastoral areas in terms of providing the required humidity for the times required for plant growth

Figure No. (10)

A comparison of temperature and relative humidity in the project work areas in year 2015⁹

<i>Projet Site</i>	Basic values for higher temperatures (° C)			Relative Humidity Rates		
	July	Aug	Sep	July	Aug	Sep
<i>Al-Mansheya Reserve</i>	39.4	42	39	35.7	37.6	37.5
<i>Al-Hazeem Site</i>	43.1	45.5	42.5	38.1	41.9	38.5
<i>Sura Reserve</i>	38.6	44	41.2	60.8	64.2	57.2

4. Water resources for the project work areas

The project areas and the Jordanian desert are generally considered among the poorest areas in their water resources, whether surface or groundwater, like the rest of Jordan, which suffers from a scarcity of this vital resource, which in turn negatively affected the decline in agricultural and pastoral activities and low levels of living for the population.

On the other hand, the Jordanian Badia containing groundwater basins and surface major in Jordan , as shown in Figure (11), and the most important basin Blue basin Disi, which is pumping water for agriculture and drinking to the major cities in the capital , Amman , Zarqa Governorate, and in addition to water basins Others, such as Al-Jafr Basin, Al-Hammad Basin, and Al-Sirhan Basin, the Jordanian Badia contains (70)% of the groundwater reserves in Jordan, which are exploited by more than (3133) an underground well¹⁰ ,which appears extensively in the Azraq Basin and the Amman Zarqa Basin , where this percentage reached (49)% of the total underground wells in Jordan, and these wells are used for the purposes of supplying the main cities with drinking water, and are also used for irrigation of crops in the irrigated areas in the Badia.

¹⁰ Environmental Statistics Bulletin , 2015-2014 Department of Statistics,2018

Dependent sources of water basins renewable in the whole desert of Jordan on rain water, which most due quantities to evaporation and the rest is distributed to the flood water form and feeding ground water , for example During the rainy season (2014–2015) amounted to amounts of rain (8884.0) million m³ was including due to evaporation (8154.0) million m³ ie 91.8%) of the size of the amounts of rain, and the rest of the amount of rain distributed between the floods that reached its size (245.0) million m³ and (485.0) million m³ of the amount of rain I went to the groundwater recharge so that The percentage of groundwater recharge from rain water reached (505%)¹¹

Accordingly, and in lost low amounts of water recharge from rain water during the previous seasons, the over pumping of water basins has led to a decline in the level of water and low quality , reaching quantities of drain water from subterranean basins in (2017) (-223.36) million which poses a threat to water),and (12)As shown in the following figures No. (11)¹² security in Jordan in the long term.

((الشكل رقم (11): خريطة تبين الاحواض المائية في البادية الأردنية، المصدر: وزارة المياه والري، 2017

Figure 11: Water Basins map in the Jordan Badia, MOWI (2017)

¹¹ Environmental Statistics Bulletin , 2015-2014 Department of Statistics, 2018

¹²Environmental Statistics Bulletin , 2015-2014 Department of Statistics, 2018.

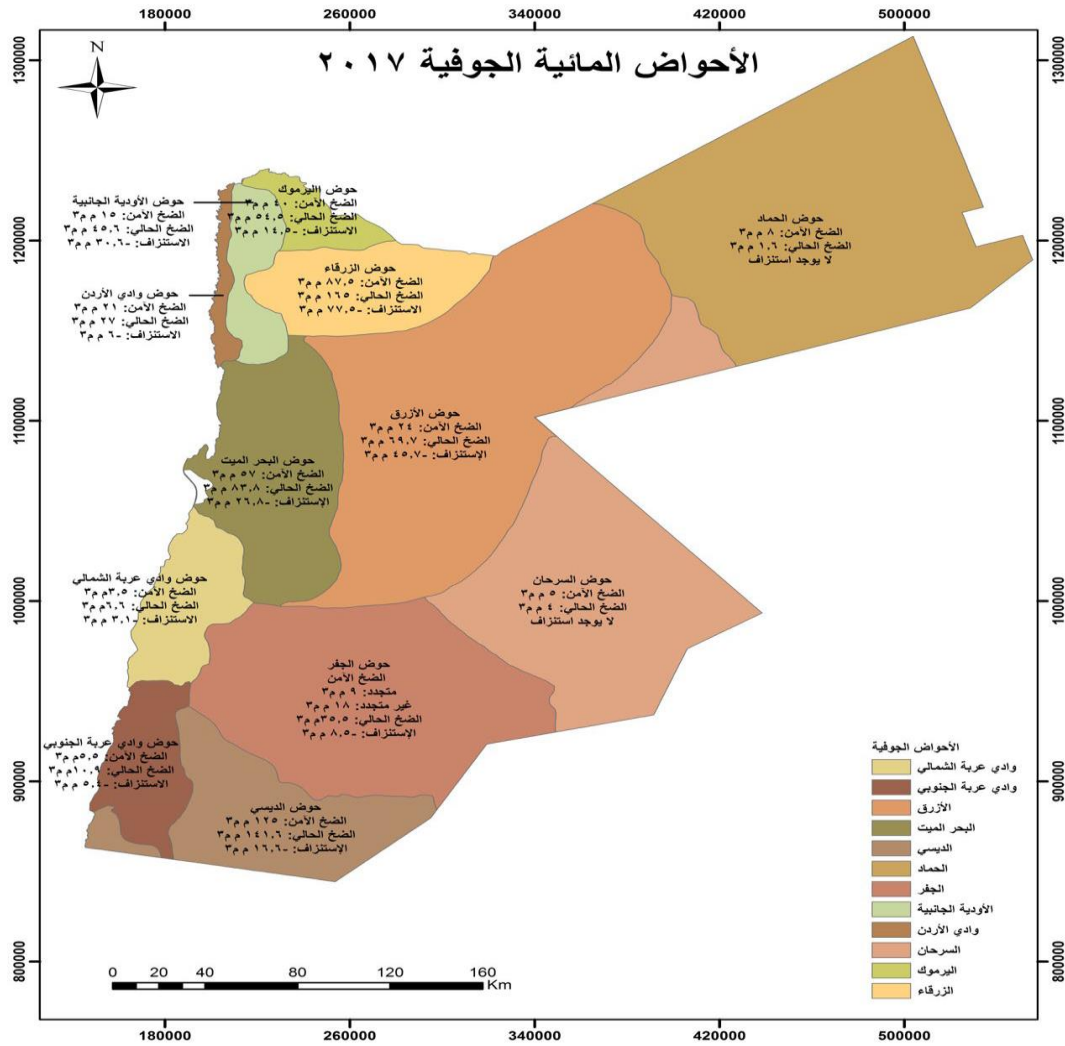


Figure No. (12): A table showing the groundwater basins, Safe pumping form it, the Quantities of extraction for the year (2017), and The amounts of attrition

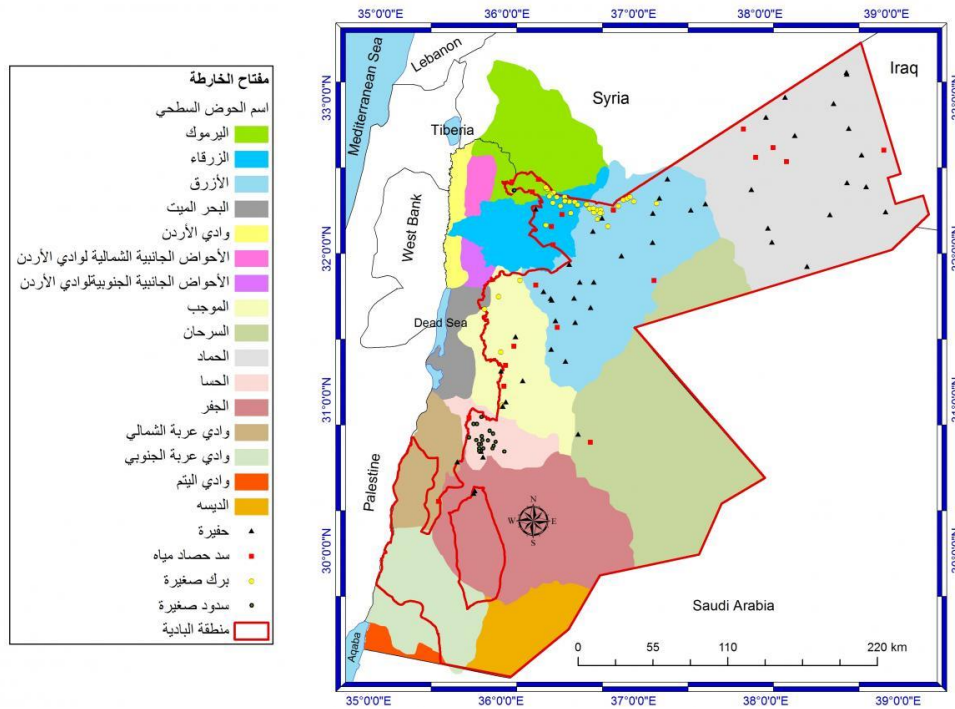
Name of Underground Water Basin	Safe Pumping (M M ³)	Quantities of Extraction (M M ³)	The Amounts of Attrition (M M ³)
Al Diysi and Al-Mudawira	125	141.58	16.58-
Amman Zarqa	87.5	164.98	77.48-
Yarmouk	40	54.53	14.53-
Side valleys	15	45.64	30.64-
Azraq	24	69.66	45.66-
Al-Jafr	27	35.53	8.53-
Jordan Valley	21	27.04	6.04-
The Dead Sea	57	83.85	26.85-

Southern Wadi Araba	5.5	10.90	5.40-
Hammad	8	1.59	6.41
Al-Surhan	5	00.0	5.00
Northern Wadi Araba	3.5	6.56	3.06-
Total	418.5	641.86	223.36-

With regard to surface water , the total area of the watershed in the Badia is about (67) thousand square kilometers , which makes the subject of surface water exploitation in the Jordanian Badia a top priority, especially with the recurrence of drought years in the last two decades . Water harvesting techniques are an important means that efforts must be made to expand their geographical reach and spread them in the various Badia regions in order to benefit from rain water .It is also worth noting that the Jordanian Badia contains dozens of archaeological ponds , and Figure (13) shows the most important water harvesting sites in the Jordanian Badia, as these sites include dams, excavations, and ancient ponds¹³.

Figure (13): A map showing the water basins in the Jordanian Badia. Source: The Hashemite Fund for Badia Development database

¹³ Environmental Statistics Bulletin , 2015-2014 Department of Statistics,2018



Based on the above, the following paragraphs will address the characterization of the study site areas in terms of their water resources, as follows:

4.1 Al-Manshia protected area site - Southern Badia:

Includes the southern desert area of the total area of the basin water Jafr surface of an area (12,067) km², in addition to a large portion of the basins Disi, Al – Sarhan, the Valley of the South cart, Wadi Al – Hasa, in addition to part of the basins and the valley of the southern cart and Wadi Mujib.

Within this description, the area of the Mansheya reserve site constitutes the western highlands of the surface water basin of Al–Jafr, which separates the streams of the valleys feeding the Al–Jafr Basin from the streams of the valleys sloping west towards the Wadi Araba basin and the valleys of the slopes southward towards the southern Wadi Araba basin.

And due to the location of the Al–Manshiyya site in the eastern part of Al–Sharah heights, it represented the pastoral areas of the pastoral nomads in the summer for its mild climate and the availability of springs and collecting wells, where the demand for water was low in relation to the available sources, which were mainly dependent on the spring water whose numbers reached to (120) A spring in the Al–Sharaa Heights area in general, which includes the areas of Al–Shoubak and Petra, its water pouring ranged between 0.002–2.5 million m³ per year¹⁴. In addition to a number of collection wells that numbered (4) wells, the most important of which are the “Abu Al–Alaq” well and the “Abu Makhtoub” well in the areas adjacent to the area of the

¹⁴ water sector in Jordan : Facts and Figures, the Ministry of Water and Irrigation, 2017

Al-Mansheya Reserve site, which were used for drinking, agriculture and watering livestock without compromising the groundwater reserves. Thus weakening the discharge capacity of the springs. However, as a result of changing climatic conditions, fluctuation in rainfall rates and the unjust use of groundwater from drilling wells in the region in general, especially wells of apple farms in the area adjacent to the Mansheya Reserve, which numbered (34) underground wells, the drainage capacity of the springs decreased after it had reached (94) m³ in the region since (1965) A.D., most of them are dehydrated, and the rest of the discharge quantities of the rest threatened with drought have also decreased due to the unfair consumption and increase of pumping from the underground wells in a manner that does not correspond to the storage capacity of the underground basins of rain water, where the quantities of feeding the Al-Jafr water basin reached In the year A .For Water (2014-2015) (10) million m³ only¹⁵, which led to a decrease in the groundwater level and consequently lower levels of the water bearing layer than the spring exits. This is shown by the previous forms No. (11) and (12), which show the quantities of pumping from the underground wells in (2017) AD, where it was found that the quantities of depletion of groundwater in the total geographical range of the Manshiyya protected area located on the Al-Jafr Basin (- 8.53) million m³, and reached amounts drain groundwater from the basin and the valley of the northern vehicle adjacent to the area Mansheya from the west (-3.06) million m³, and (-5.40) million m³ amounts drain groundwater from the basin and the valley of the southern vehicle adjacent to the protected area Manshia from the south¹⁶.

As for the surface runoff water, the directions of the wadis in the area of the Mansheya Reserve site fall within the range of the wadis heading east towards the Al-Jafr Basin, which are characterized by its tree-type, elongation and simple slopes, as well as wide and low-depth valleys that run over dry areas where the rainfall rates do not exceed 150 mm/ Years, causing a large part of the water to evaporate¹⁷, reaching quantities of feed basin Jafr water during the season of water (2014-2015) accounted for 2.2 % of the volume of rainfall, which amounted to 481 million m³, while the rest were distributed among quantities of rain constituting (97.8%) Lost due to evaporation and flooding.

4.2 Location of Al-Hazeem / Azraq - Central Badia:

The area of Al-Hazeem site is located on two water basins, where the southern part of the Al-Hazeem area adjacent to the Saudi-Jordanian borders, known as the Al-Nakheel area, is the

¹⁵ The Hashemite Fund for Jordan Badia Development database.2018 .

¹⁶ Al- Shabatat , Ali . Environmental degradation and land management in Petra - Shoubak (Jordan) , PhD thesis , University of Jordan, 2004

¹⁷ Environmental Statistics Bulletin , 2015-2014 Department of Statistics,2018

northern part of the Al-Sarhan water basin, while the northern part of the Al-Hazeem area, which is known as the bottom of Al-Hazeem or Al-Omari, is located within the Low Blue Region which is the lowest spot in the northern region of the Jordanian Badia, located on a closed water basin is located 95 % of it in Jordanian territory with an area of (11205) km^{18 2} It extends from the Jabal al-Arab region in Syria in the north to the Jordanian-Saudi border in the south. While the height of the Azraq depression reaches (500) m above the sea level, the height of Jabal al-Arab, the main feeder of the Azraq depression with surface runoff water, has reached (1500) m above sea level, meaning that the difference between the two elevations has reached (1000) m, which made rain water The fall on Mount Arabia descends directly through several valleys to the Azraq depression, the most important of which is the Rajel Valley.

The Azraq depression also feeds from the streams of valleys descending from the highlands in southern and eastern Amman, in addition to the valleys coming from the southern part of the Jordanian Badia, thus forming the valleys of the valleys that surround the Azraq depression in a semi-circular manner, gathering in the depressions and filling the blue bottom and many small bottoms with water during the winter the problem of a series of lakes, reaching amounts of rain water during the rainy season (2014-2015) m (938) million m³ and fed at a rate of groundwater is about 53 million m³ per feed amounted to.¹⁹%(5.6)

Therefore, and multiple streams sadis feeder for low blue, it was the region a year ago (1989) is characterized because of the abundance of water Balanabe p permanent flow and the extension of green oases and ponds of water, making it one of the most important wetland land in the world and contain many species of animals, plants and birds ,both migratory Or the settlement²⁰. However, after the springs dried up since 1989 due to over-pumping of

¹⁸ Ministry of Water

¹⁹ Al- Shabatat , Ali . Environmental degradation and land management in Petra - Shoubak (Jordan) , PhD thesis , University of Jordan, 2004,2018

²⁰ Environmental Statistics Bulletin , 2015-2014 Department of Statistics,2018

underground wells and climatic changes from successive seasons of droughts, the Azraq Depression region became drought-affected²¹. as the effect of over pumping of groundwater wells in quantities ranging in previous years between (50–47) million m³ per year and reached a year (2017 m) to (69.66) million m³ on falling water levels in the groundwater that lost water feed rate groundwater amounted to 53 million m³ per year, and therefore the deficit between the extracted water and the rate of groundwater recharge amounts of water has reached (–16.66) million m^{22 3} also reached the quantities drain underground water over the pumping line security of water blue basin resulting from the over pumping of groundwater wells (–45.66) million m³ year (2017 m) as shown in the previous forms number (11), (12) , suggesting high attrition indicators , especially if added amounts of attrition from the basin Amman blue water amounting to (77.48) million mZarqa –as it is clear that the Azraq Basin and the Amman^{23 3} Basin are among the most abundant underground water basins that are exposed to depletion at high quantities amounting to (123.14) million m³ ,³ and thus the safe pumping quantities exceeded by (50)%, which is due Directly, the density of underground wells located on both the Zarqa Basin and the Azraq Basin, which reached in 2015 (1535) wells, is mainly used to pump water to major cities in addition to agricultural and industrial work.

The following are the most notable developments in the unjust pumping in the Azraq district:

1. The pumping of the Azraq water into the city of Irbid began in the 1960s, which lasted until the early 1970s, after which the water will be pumped to the capital, Amman, and Zarqa Governorate.
2. The drought began in Azraq after approximately 1975 AD, that is, after the construction of a water line from Azraq to the capital, Amman, and digging wells in 1980,

²¹ Environmental Statistics Bulletin , 2015–2014 Department of Statistics,2018

²² See:

- Freeze, Ghaith et al., Azraq Basin – Earth Resources toward Optimal Use, The Third Jordan International Week, Sixth Volume (Scientific Papers – Multiple Knowledge Cases), Royal Cultural Center, Amman, Jordan 1995, 6–8.
- Abu Ajamiyeh, Iris, population shifts and changes in environmental oasis Blue, Master, Supervisor) a . Dr .Qais Al – Nouri , (Yarmouk University,1999)

²³ Abu Ajamiyeh, Iris, population shifts and changes in environmental oasis Blue, Master, Supervisor) a . Dr .Qais Al - Nouri , (Yarmouk University, 1999)

but after the interception of several international organizations at that time considering that Azraq is a natural reserve and its features may not be changed. Alternative sources of water were searched and the government excavated (27) wells and it turned out to be located on the same water basin, then (14) wells were drilled until 1989 AD in Al-Anqiya area, north of Azraq, and water continued to be pumped to Amman and Zarqa cities .The number of wells located on the Azraq basin increased with successive years to reach (547) wells in (2014) and (580) wells in (2015).

Accordingly, this pumping of groundwater in the Azraq region caused the water level to decrease and the springs dried up gradually until drought started in the main water pools in Azraq, where the ponds dried up in the northern part of Azraq in 1987 AD and then the pond dried out the southern part of Azraq in general. 1990 AD.

4.3 Site area of the Surra - Northern Badia protected area:

Protected site area is located within the south – eastern regions of the Yarmouk Basin water surface, of the total area (1438) km²⁴ ² The region also constitutes the plain lands located north and east of the highlands and mountains of Ajloun, which in turn are located in the southern part of the Yarmouk Basin, and together they form the highlands that separate the Yarmouk water basin from the Zarqa basin surface water.

As for water runoff, and on the contrary , from the mountains of Ajloun Heights , which is characterized by streams Oaudettha quickly supplied the main neighbors and the Yarmouk River Basin and fed at a rate of 39 million m³ The nature of the flat terrain of the Surra ²⁵ ³ protected area site has limited the flow of water in it, in addition to the rainfall rates compared to the rest of the areas located on the Yarmouk surface water basin.

On the other hand, like the Azraq Basin and the Al-Jafr Basin in the project's work areas that are exposed to depletion from the over pumping of the underground wells, the quantities of depletion from the Yarmouk water basin, as shown in figures No. (11), (12), (-14.53) million m²⁶³ and given the amount of water extracted from groundwater wells amounting to (54.53) million m³ per year and the quantities of water recharge amounting to 39 million m³ We find ²⁷ ³

²⁴ Environmental Statistics Bulletin , 2015-2014 Department of Statistics, .2018

²⁵ Ministry of Water, Water Sector in Jordan : Facts and Figures, 2017

²⁶ Environmental Statistics Bulletin , 2015-2014 Department of Statistics, .2018

that the deficit between the quantities of water abstracted and the rate of groundwater recharge in the Yarmouk Basin has reached (-15.53) million m³, but at lower rates than the deficit amounts in the Blue Aquifer and the Amman Basin – the underground water directly adjacent to the Yarmouk Basin, which The deficit rate reached (-92.98) million m³, which is mainly due to the limited density of underground wells compared to the Azraq and Amman–Zarqa basins, where the number of underground wells located in the Yarmouk Basin in 2015 reached (203) an underground well used (70.4% of them are for agricultural purposes, and (29)% are for human consumption, while the number of underground wells located on the Amman Basin Meet (955) an underground well²⁸.

5 .The pastoral agricultural dimension of the project work areas

Terre T CZ activities Agricultural in the Jordanian desert areas almost entirely on crops irrigated by groundwater wells, where the active cultivation of vegetables and fruit , especially in the areas of the Northern Badia, in addition to some field crops of rainfed wheat and barley that depend on rain water.

As for livestock, the Jordanian Badia is an important source for the production of livestock and their products from milk, red meat and wool, as it constitutes a source of (60)% of red meat production at the level of Jordan, especially Awassi sheep, which are characterized by their adaptation to the environment of the Jordanian Badia.

This section will address characteristics of characteristics related to agricultural activities and livestock in the project work areas, as follows:

5.1 Agriculture:

The Bedouin tribes and clans in the Jordanian Badia until the late period after the establishment of the Emirate of Transjordan in (1923) A.D., were characterized by pure Bedouin values and joint economic activities based on livestock raising which the permanent movement required in search of pasture and water, but at the beginning of the first half of the last century The interruption phase began in the nomadic pattern based on permanent migration and the pursuit of food gradually, to define the life of the Bedouins after that ascending change in terms of stability and meeting the requirements of development and change, as a result of the

²⁷ Ibid

²⁸ Ministry of Water, Water Sector in Jordan : Facts and Figures, 2017

²⁹ Bulletin of Environmental Statistics , 2015-2014 the Department of Statistics

³⁰ Bulletin of Environmental Statistics , 2015-2014 the Department of Statistics, .2018 and the Ministry of Water, Water Sector in Jordan : Facts and Figures, 2017

developmental approach adopted by the Jordanian governments to encourage the tribes and nomadic clans at He left the life of deportation and urged them to settle down, which was through encouraging agricultural settlement in terms of establishing agricultural projects, digging artesian wells and building roads to link the Jordanian Badia regions with cities and villages, so that projects with a dual purpose were included that included agriculture and settlement in the southern region as was done in the northern part From the Jordanian Badia, digging artesian wells to encourage agricultural settlement of the Bedouins by granting the necessary licenses and land ownership .This encouraged the Bedouins to settle in light of the successive years of droughts, fluctuations in rainfall rates, and the limited availability of grazing areas due to border demarcation operations²⁹.

Accordingly, the agricultural activity has become one of the local supportive productive activities in the project work areas, where agriculture has emerged as an organized activity that attracts a number of stable and semi-settled local families beginning the establishment of agricultural projects to settle the Bedouins, so that the Bedouin families in the Jordanian Badia regions witness a new production pattern in the transition from dependence The pastoral production mainly depends on entering agriculture as a new production pattern, and although the agricultural activity is not the main activity, in recent years there has been a clear growth of agriculture in the Jordanian Badia regions and has become a magnet for investors in agricultural projects and Zt turn into productive activity is marketed vegetables and fruit trees that have become the Jordanian desert areas of the most important agricultural areas in Jordan, especially in the summer cultivation.

Based on the above, the following paragraphs will address the most important characteristics of agricultural activity in each of the project's work areas in terms of areas, agricultural land and the nature of crops that characterize each region, as follows:

5.1.2 Area of Al-Hazeem / Azraq - Central Badia:

The cultivation process actually began in Azraq in the 1950s on a small scale in terms of gardening, tree planting, and vegetables. At the end of the sixties and seventies of the last century, the Azraq region witnessed the largest transformation in agriculture in terms of drilling deep artesian wells and the establishment of modern large farms in the "Al Daghailia" area east of the Azraq region, then large farms appeared in the "Al Ain Al Bayda" area north of the Azraq region in the seventies of the last century That led to a significant qualitative and quantitative development in agricultural products and began import and export operations to local and

³¹ Database of the Hashemite Fund for Jordanian Badia Development

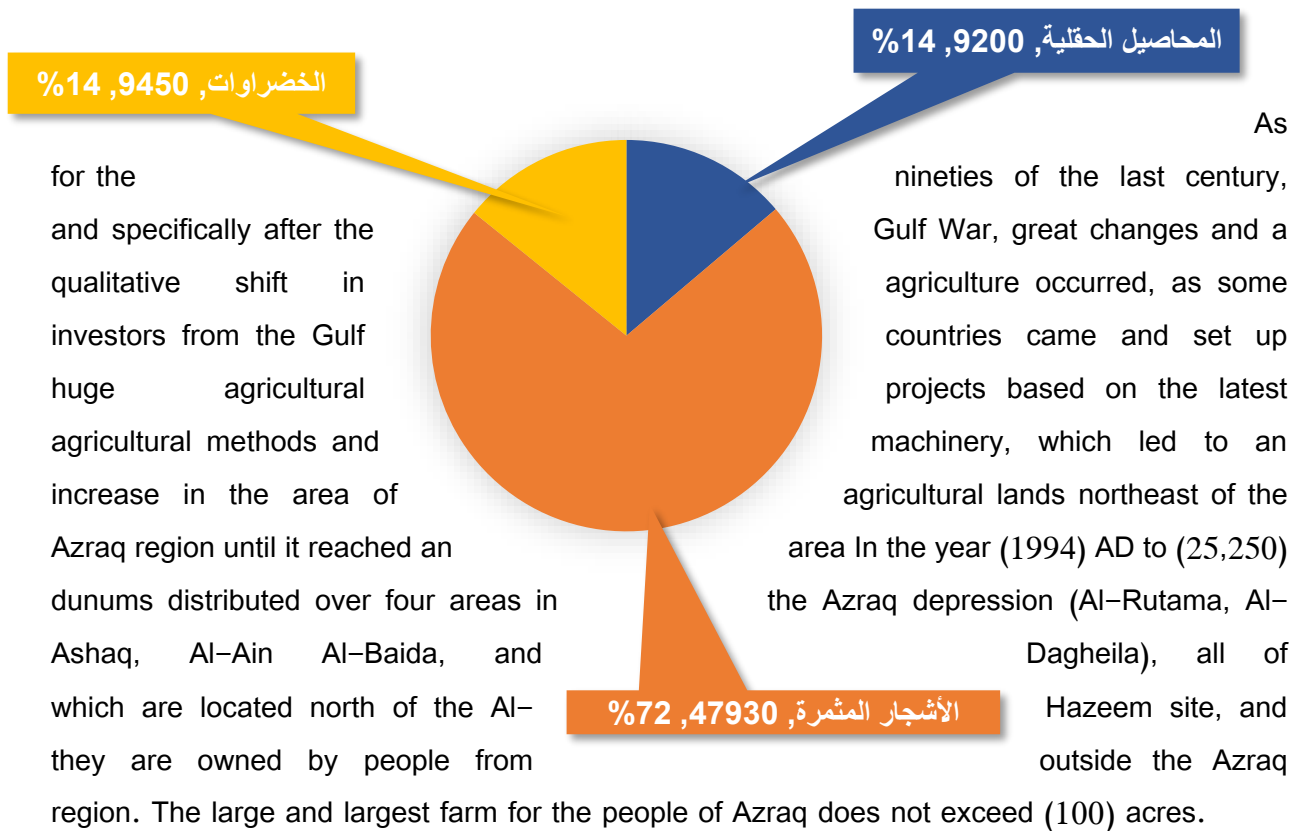
international markets. The "melons" product was one of the most important crops exported to Europe.

In the eighties of the last century, farms appeared in the south of Azraq, and the increase in drilling of artesian wells led to the progress of agriculture in the Azraq region and its development, but agriculture began to deteriorate after the pumping of Azraq water to the city of Amman and Zarqa, where the level of groundwater decreased and the salinity level increased

الشكل رقم (14): توزيع المساحات الزراعية في منطقة منخفض الأزرق حسب نوع المحصول البالغة (66580) دونم

in surface and deep well

water.

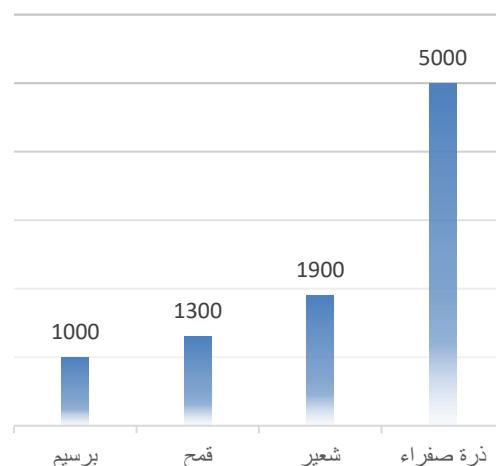
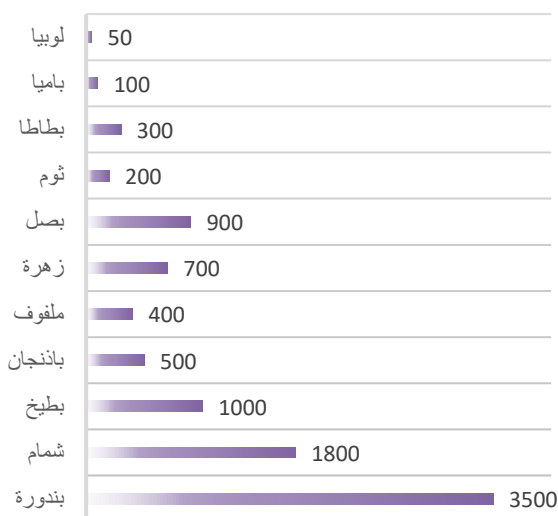


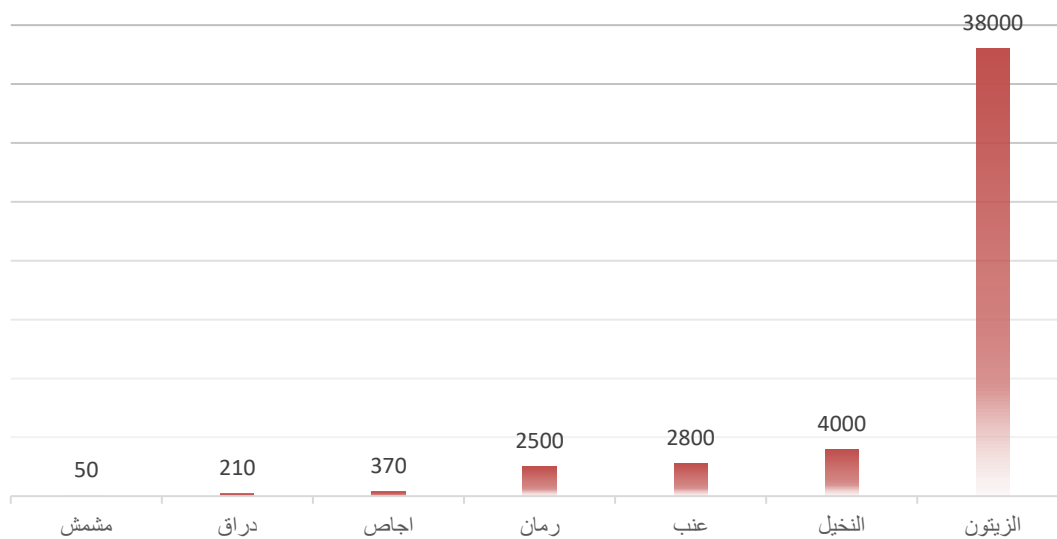
The agricultural pattern used in the agricultural areas in the Low Azraq includes trees and vegetables, the most important of which are melons, onions, garlic, and grain crops from wheat and barley. The number of wells feeding farms in the Azraq region in the mid-nineties of the last century (281) wells that represented the only source of irrigation water, including (133) surface wells with a depth of (12) m and (148) groundwater wells with a depth of (68) m.

Today, the agricultural areas in the Azraq Low area amounted to (66580) acres distributed between the lands planted with field crops by (14)%, in addition to the lands planted with fruit trees by (72)%, and the lands planted with vegetables by (14)%, as it appears In the following figure No. (14). It is noted that farmers are interested in tree plantations, especially olive trees, as the area of land planted with olive trees reached 57% of the total cultivated area in Azraq. It is also noted that the crops in Azraq are distinguished by their quality in terms of the presence of (6) varieties of fruit trees and (11) vegetables, as well as field crops, the most important of which are yellow corn.

On the other hand, the Azraq region is considered an exceptional case, where there are approximately 450 farms, of which more than half are owned by their owners under the arguments of owning and they exist and are productive at the same time and their owners are not allowed to officially own the land or even license existing wells, in addition to not delivering services from In terms of electricity, official agricultural services and expatriate workforce recruitment, the region also lacks a local market to market agricultural products as most of the production costs go as transportation wages due to the region's distance from the nearest central market with distances ranging from (100–150) km.

Accordingly, it has been revealed through the foregoing that the Azraq oases as a distinct economic and environmental unit were not the only losers due to the unjust pumping of groundwater to the cities of Amman and Zarqa as a main reason, but rather investors in the agricultural sector as their crops face clear threats due to the low level of groundwater that Impact on increasing the costs of extracting it and declining its quality in terms of increasing salinity in water, in light of the fact that the soil is sandy and salty.





5.1.3 Site area of the Surra-Northern Badia protected area

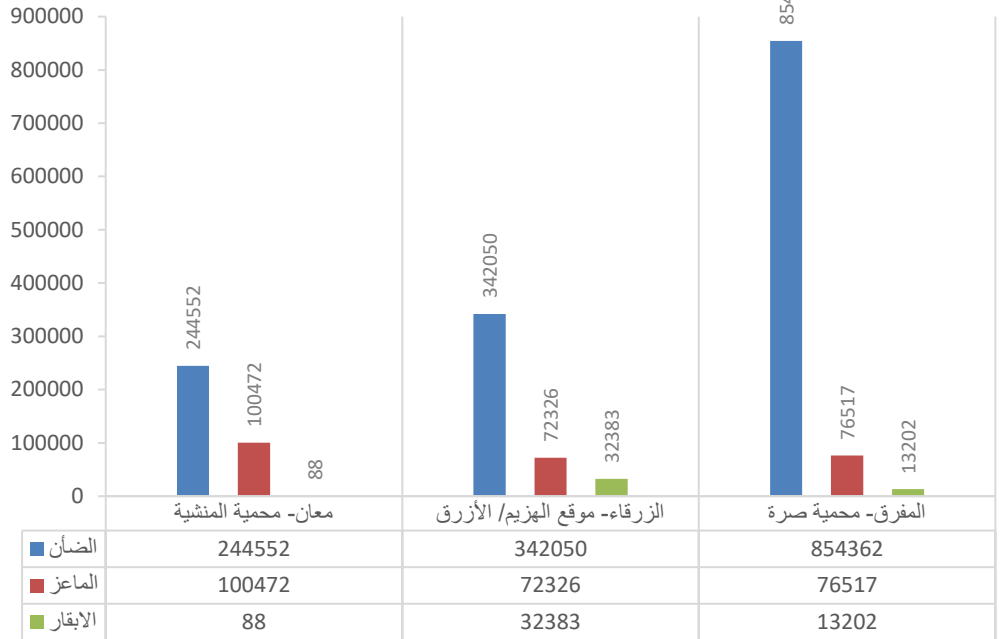
5.2 Livestock:

Pastoral activity was previously the dominant activity distinguished for the residents of the project work areas and the Jordanian desert in general, but due to changing climatic conditions and the consequent fluctuation of rainfall rates and the succession of droughts and the decline of pasture productivity in addition to high feed prices – as the residents of the project work areas emphasized through discussion seminars – The rates of dependence of the population of the project's targeted areas on these activities decreased as a basic activity for income, and some have abandoned it, and therefore signs of orientation have appeared for other productive activities and government and military jobs, which has thus resulted in the diversification of economic activities for the population of the areas .Target project as will be seen later in part on the demographic characteristics of the population of the economic work of the project areas, while this section will address the discussion of numbers of livestock during the last ten years ,the provincial level administrative areas of the project according to the census of agricultural Jordanian for the year 2017³⁰and the agricultural statistical bulletins issued by the Department of Statistics, as shown in the following forms No. (15), (16), (17), (18):

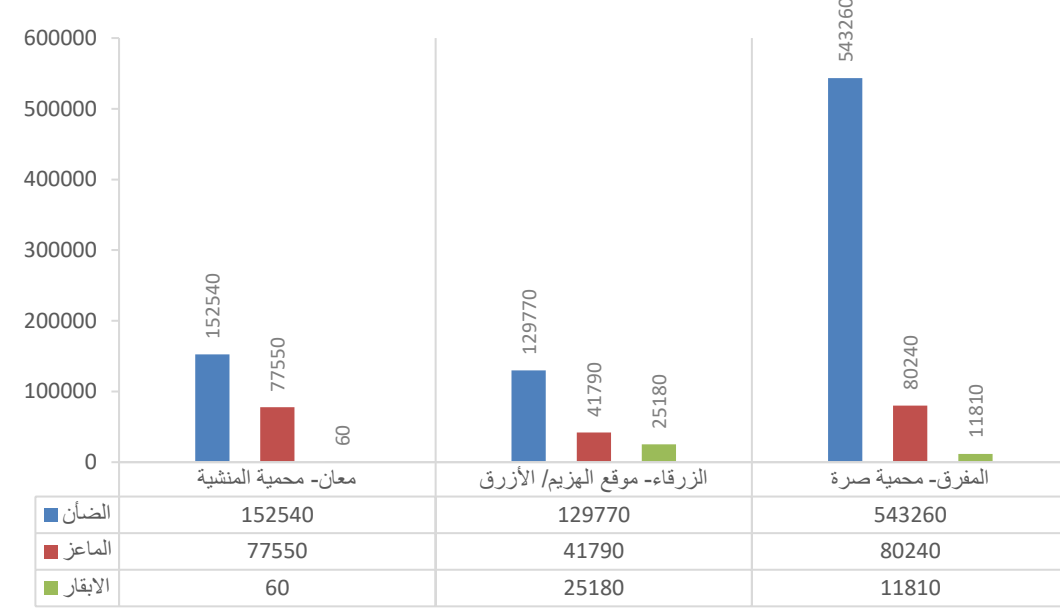
³² Abu Ajamiyeh, Iris, population shifts and changes in environmental oasis Blue, Master, Supervisor) a . Dr .Qais Al - Nouri , (Yarmouk University, 1999)

³³ Abu Ajamiyeh, Iris, population shifts and changes in environmental oasis Blue, Master, Supervisor) a . Dr .Qais Al -Nouri , (Yarmouk University, 1999)

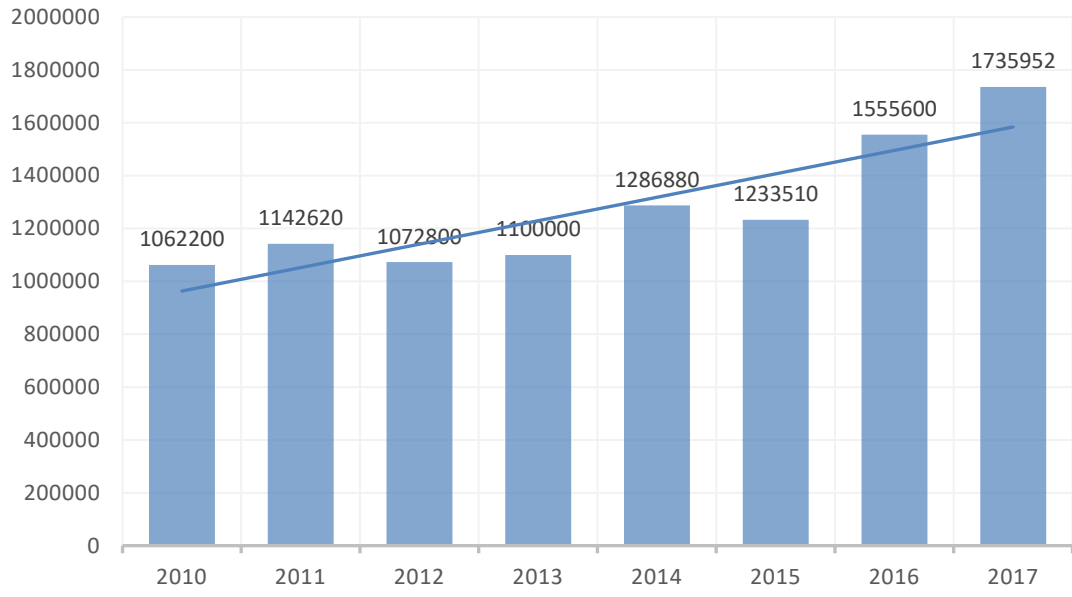
الشكل رقم (15): تعداد الثروة الحيوانية عام
2017/11/1



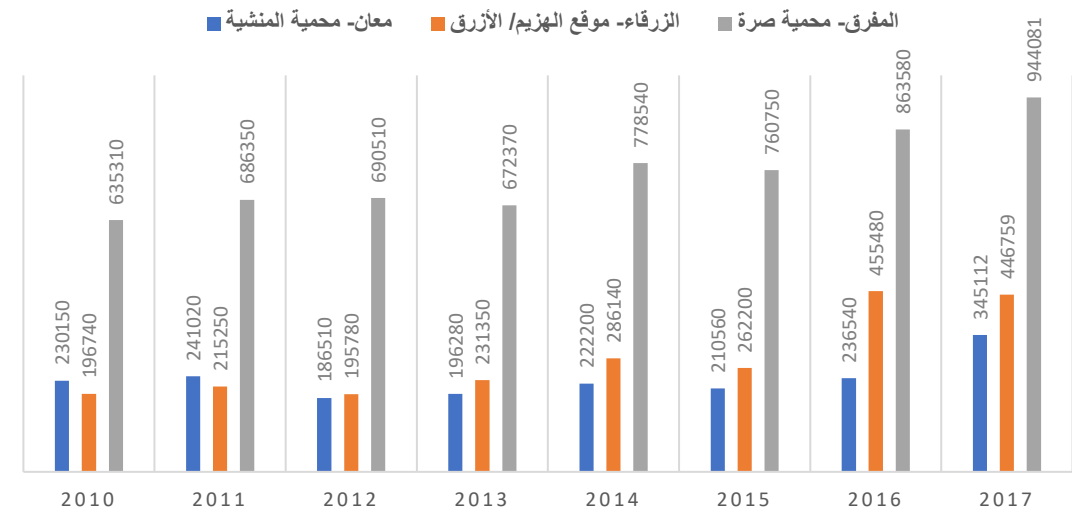
الشكل رقم (16): تعداد الثروة الحيوانية عام
2010/11/1



الشكل رقم (17): تطور أعداد الثروة الحيوانية في المحافظات الإدارية لمناطق عمل المشروع خلال السنوات 2010-2017



الشكل رقم (18): تطور أعداد الثروة الحيوانية في المحافظات الإدارية لمناطق عمل المشروع خلال السنوات 2010-2017 حسب كل منطقة



5.2.1 Numbers of livestock at the level of project sites work:

The number of livestock in the administrative governorates of the project work areas reached (1,735,952) at the head of a problem of (44.3%) of the numbers of livestock at the level of Jordan, which number (3,911,289) from sheep, goats and cows .It is noticed that the number of livestock from sheep increased by (83 %) of the total number of livestock in the administrative governorates of the project work areas.

When comparing the preparation of livestock during the years (2010– 2017) m as shown in Figure (), we find that the numbers of livestock in the administrative provinces of the regions of the project work has increased over seven years (673,752) , the head of a rate (96,250) Ras / year.

5.2.2 Preparing Animal Resources for Ma'an Governorate - Al Manshia Protected Area website:

It is clear from the previous figure (), that the number of livestock in the administrative governorate of the Mansheya Reserve site has reached (345,112) head at the end of the year 2017 AD, forming a percentage of (%20) of the number of livestock at the level of administrative governorates for the project work areas and (9%)) on the level of Jordan.

Also, during the years (2010–2017), the number of livestock in Ma'an Governorate increased at a rate of (16,423) head / year, with a total increase of (114,961) head.

5.2.3 Preparing Livestock for Zarqa Governorate - Hazeem Site Area / Azraq:

The administrative governorate of the Al-Hazeem site / Azraq is the least administrative governorate of the project work areas in possession of livestock, as the percentage of livestock numbers reached (%) of the total number of livestock in the administrative governorates of the project work areas and (%) at the level of Jordan.

In spite of the low number of livestock, it is noted that the administrative governorate of the Al-Hazeem / Azraq site area is characterized by an increase in the number of holdings of cows from the other administrative governorates of the project work areas, where the number of cows reached () Ras, which constitutes (%) of the total number Cows in the administrative provinces of the project work areas.

On the other hand, it is worth noting here that the area of the Low Blue in particular was distinguished from ancient times as representing the most important pastoral areas for the pastoral Bedouins that the nomadic tribes meant in the winter and spring, which is still continuing until now and is concentrated in the part extending south of the "Southern Blue" area Along the border strip with Saudi Arabia, these areas are characterized by the most important inhabited areas in which pastoralists and nomadic Bedouins carry out their pastoral activities, the most important of which are "immersion" including the site of Al-Hazeem, "Al-Qasha ,"Hassidat , and "Al-Ghadaf", up to the Al-Jafr region of the governorate Maan in the south³¹

³⁴ Jordan Agricultural Census 2017: Detailed Results, Volume One, Department of Statistics, 2018.

³⁵Study of nomads

5.2.4 Preparing Livestock for Al-Mafraq Governorate - Surra Protected Area Site Area:

The administrative governorate of the Surra (Mafraq) Reserve site is distinguished by having the highest percentage of livestock numbers at the level of Jordan, followed directly by the capital region of Amman, where the number of livestock in Mafraq Governorate reached (944,08)Ras, and thus constitutes (24.1)% of the wealth numbers The animal population in Jordan, and will account for more than half of the livestock population in the administrative governorates of the project work areas, at a rate of (54.3.%)

It is also noticed through the previous figure (), the evolution of the numbers of livestock in the administrative governorate of the Surra Reserve during the years (2010–2017), where it maintained a rate of acquisition of the highest proportion of the numbers of livestock on the one hand, and on the other hand the high numbers of livestock During the seven years until I approached a million head at a rate of (44110)head / year and with a total increase of (308,771) head, especially for the livestock from lamb that accounted for (90.4)% of the numbers of livestock in the administrative governorate of the Surra Reserve and %(49.2) of Preparing livestock in the administrative governorates of the project work areas, as shown in the previous figure Download ().

5.3 Pastoral sector challenges in the project work areas:

After discussing the facts of the agricultural pastoral dimension of the project work areas, and despite the development that revealed agricultural and pastoral statistical numbers, now this sector suffers from many problems and challenges in the project work areas that the study extracted through discussion seminars with the people of local communities and representatives of institutions and bodies The governmental sector concerned with the agricultural pastoral sector, foremost of which is the decline in pasture productivity and drought that has affected the project work areas and led to many problems that can be identified as follows:

1. The size of natural pastures has decreased, and a large dependence on fodder for feeding livestock in addition to grazing, which has reduced the feasibility of pastoral activity in the project work areas and the economic returns and income of families, especially those who have a small number, where the deterioration of rangelands in the project work areas led to the following:
 - High feed prices and insufficient availability, and the scarcity and scarcity of water sources, especially in the summer, forcing pedestrian farmers to purchase them at high prices.

- The sovereignty of the sale of a number of the herd of livestock breeders holdings small to secure supplies remaining numbers of feed and water.

Also, livestock farmers suffer from the difficulty of marketing their products of meat, milk and dairy.

2. High costs of agricultural production requirements and energy costs for the purpose of pumping water, which reduced the financial return for agriculture.
3. The lack of capital for those wishing to set up agricultural projects because of the lack of donors or lending to agricultural projects.
4. Lack of private water wells or water harvesting projects for agricultural and animal husbandry uses.
5. The problem of overgrazing and the failure to organize the grazing process by the Ministry of Agriculture and the estimation of pastoral load, due to the lack of activation of legal controls to prevent human assault on rangelands, whether by overgrazing or logging.
6. Lack of private holdings of agricultural lands in the project work areas in general.
7. The high rate of expatriate labor in the agricultural sector, especially in the fruit farms adjacent to the Mansheya Reserve site and the Azraq region farms, in addition to the weak tendency of the male local population to work on the farms due to low wages, and the lack of job security for women working in agricultural projects, especially in the Manshia protected area and the Azraq area For example, the women from the local community in the Al Manshia Reserve site, who work on apple farms and whose number is estimated at more than (150) women, work at a rate of (9) hours per day for a low wage of (5) Jordanian dinars per day.
8. The problem of marketing the products that farmers suffer due to the lack of local or near central markets, which reduces the economic return to agricultural production in light of the large part of production going as wages of transportation, and also stressed that this problem is one of the most important problems facing them in the areas of agricultural and pastoral production.