



RESEARCH ARTICLE

THE IMPORTANCE OF ESTABLISHING A NATURAL RESERVE IN THE SAHEL AL-GHARBI VALLEY, AL-BATNAN PLATEAU, MARMARICA, NORTHEASTERN LIBYA

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ABSTRACT

This study was conducted in the Wadi Al-Sahl Al-Gharbi area of the Butnan Plateau, northeast of Libya During the period between 2020-2023, the importance and goal of this study was to evaluate the environmental conditions and the possibility of establishing a nature reserve in this region with important environmental and human potential, and the most important of these potentials is biodiversity (plant and animal) in addition to its content of archaeological sites and distinctive geomorphological sites, The study included a review of studies and research related to the subject of nature reserves and environmental degradation, as well as a comprehensive survey of plants and animals. The area was divided into 6 sites from south to north. The area of each site was 500 m². Two squares were taken in each site with a tolerance of (5 x 5 m)(Where the soil properties were studied, as well as List the most important water sources in the region and take samples from them for chemical analysis in addition to distributing 100 questionnaires On residents and visitors to the area, with extensive field monitoring throughout the study period, After the field study, analysis and geographical distribution of natural resources and knowledge of the nature of the region, the study reached a number of results, the most important of which is that the region is exposed to a significant deterioration in the vegetation cover and Check it out Soil degradation and It is salty as this region witnesses to decrease in the numbers of animals and birds that were previously abundant in the area, although the area has been severely degraded due to the dry climate, human activities and mismanagement of the region's resources for decades, this area still has many remarkable environmental and human potentials, and there is a feasible possibility of transforming it into a protected area to preserve biodiversity with the sustainable use of its natural resources by the local population, accordingly the study recommended the need for proper planning to establish a natural reserve in the Western Wadi Al-Sahel area and to develop development programs that provide development for current and future generations. However, the remaining obstacles that must be solved are the lack of environmental awareness among residents and visitors of the area in their dealings with such fragile and sensitive areas, as well as the lack of interest of government agencies, which is represented in the lack of continuous funding and the failure to implement strict legislation and procedures to preserve these environmentally important areas.

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INTRODUCTION

The world's population is increasing day by day significantly and as an inevitable result of this increase, the population's demand for natural resources is increasing. If human pressure on resources continues, the matter will reach the stage of depletion of these resources. Thinking about ways to protect nature has become a natural matter and requires human society to make an attempt to protect these resources, whether plant or

animal, because their extinction will disturb the ecological balance. The methods of protection are represented in the establishment of natural reserves, which have become necessary to preserve natural resources around the world as a means of preserving nature and preserving the components of the natural environment., where Natural habitats in most parts of the world are being degraded and. It faces great pressures on the integrity of biodiversity, including (climate change, overexploitation, pollution, alien and invasive species, and urban growth).

These pressures are either constant in intensity or increasing. It gets worse over time, Therefore no Continued loss of this diversity has serious consequences for current and future human well-being, the provision of food, tissues, medicines, fresh water, crop pollination, pollutant filtration, and protection from natural disasters. Which It is among the services provided by this Systems Ecosystem threatened by degradation and change in biodiversity (Saaed et al., 2022),The existence of the goal of protecting biodiversity for the year (2010) has helped stimulate important measures to ensure biodiversity, such as establishing more natural reserves, preserving rare and endangered species, and addressing pollution and the invasion of alien species, which have direct harm to ecosystems. If the opportunities for establishing natural reserves are not seized at the present time, many of the ecosystems on the globe will turn into new, unprecedented states in which their ability to on providing human life support systems in a highly uncertain situation.(Butchartetal.,2010) The idea of establishing natural reserves emerged clearly in the modern era, as a result of the environmental balance and biodiversity being damaged. Accordingly, protected areas now occupy about 10% of the Earth's surface, distributed over 130 countries, including Libya. The environment did not receive sufficient attention and care until after the United Nations World Conference was held in Stockholm in 1972 (Al-Hadith and others, 2014),Libya is among the countries of the world that have adopted a policy of establishing natural reserves of all kinds as one of the most important means of preserving plant and animal life and their ecosystems, as they are linked to the survival of human life on the surface of this planet, as it is characterized by great geographical, climatic and environmental diversity. Although Libya is considered the third largest Arab country in terms of total area, it is the least country in terms of proposing natural reserves, as the percentage of lands used for natural reserves is estimated at about 0.01% of the total area of Libya, although it abounds in many areas of biodiversity. The first of these reserves was Wadi Al-Kuf Park in (1978), The number of reserves and parks has reached 11 reserves and a park (Al-Zawam,1989).

For this reason, the Libyan authorities took the initiative to issue many laws, legislations and regulations that aim to protect the environment and not disturb its balance. These efforts are made in order to catch up with the countries that preceded us in the field of establishing reserves for the purpose of preserving wild plant and animal life and in order to maintain the environmental balance and protect the environment (Hassan *et al.*, 2008)..Although data on conservation programmes are still scarce, there are no national guidelines for the establishment and management of protected areas to assist agencies Government, Ngos and local community in developing the nature reserves system (NRS) and Providing assistance to interested individuals to understand these processes, this general lack of clarification of ecosystems in Libyan protected areas, this in particular represents a major concern and adds to the growing body of evidence that indicates that biodiversity and national biodiversity are not clearly conserved (Saaed *et al.*, 2022)In addition to its dry climate and semi-desert nature. Restoring the ecological balance in dry areas is not an easy process due to the nature of biodiversity and the scarcity of natural resources in these areas, as well as the influential climatic factors, especially rainfall, which made them where Do not exceed Rainfall rates are about200 mm/year, despite its extension on the Mediterranean coast, which imposes

Relatively poor vegetation and a fragile ecosystem (Branietal., 2009),The importance of this study lies in the fact that it aims to evaluate the environmental status of one of the areas in the Butnan region, or as it was called in the past, the Marmarica region, which is the Western Plain Valley region, as an important area from a biodiversity point of view that deserves to be preserved and to demonstrate the role of protected areas as the last line of defense for wildlife habitats and plant diversity. There is much evidence that environmental degradation is not new to this region. Human activities play a major role in increasing degradation and pollution. This region is a good example of the degradation of biodiversity, as this region was and still is a destination for many beneficiaries whose purposes varied between grazing, agriculture, firewood collection, picnics, and collecting some medicinal plant species.

MATERIALS AND METHODS

Study area: The Wadi Al-Sahl Al-Gharbi basin is geographically located west of the city of Tobruk in the Butnan Plateau in the northeast of the Libyan state. It extends from south to north, and its basin flows into the Mediterranean Sea. It is bordered to the south by the RasMadour region, to the west by Wadi Al-Karath, Wadi Buhtisha, and Wadi Shabraq in Saqifah Musa, and to the east by Wadi Al-Maqrin and Wadi Buqaml. According to this definition, the study area is located astronomically, as shown in (Figure 1), between the two latitudes north of "30'1°32".N 32°10'30 N and longitudes east "0'42°23E and"30'55°23E, the area of the study area is about 54.75 km², its length is 17.67 km and its width is 9.12 km, its highest point above sea level is approximately 209 m and its lowest point is less than 1 m.

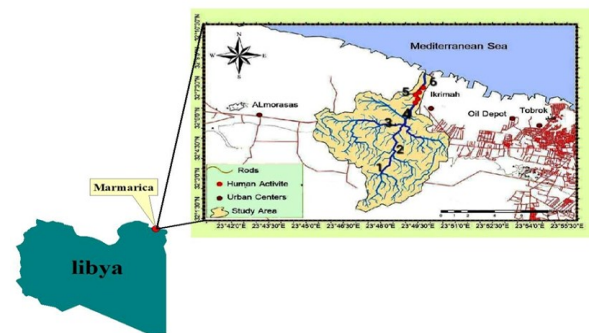


Figure 1. Region boundaries

The study area is located on the coastal plain of the Butnan Plateau, where the coast is winding due to the presence of elevations directly on the beach. These are low elevations with an average height of approximately 185 meters. The soil of the study area is dry carbonate soils formed from resources brought by water drifts. They appear in multiple varieties, but they are similar in their basic physical and chemical properties. They are generally light, sandy, and weakly clayey (People's Committee for Agriculture, Animal Wealth and Water, 1974). They are characterized by the accumulation of calcium carbonate and are classified as alkaline, saline, to highly saline, relatively weak in their organic matter content, and low in fertility. This is mostly due to the nature of the chemical composition of the soil and to the factor of aridity and the scarcity of vegetation cover. The prevailing color ranges between brown, brown, and yellow (Bin Mahmoud *et al.*, 1984). The area is more subject to the influences of the

Mediterranean Sea in terms of high humidity, moderate temperatures, and a relatively low evaporation rate due to its

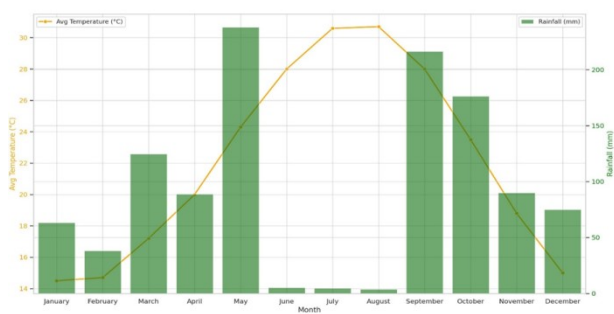


Figure 2. Climate data of the meteorological station of Tobruk city from 1984-2016

proximity to The sea where these factors led to the spread of a vegetation cover consisting of shrubs and sub-shrubs, and herbs and grasses, which are part of the scattered vegetation cover (Sparse) which characterizes the vegetation cover of the dry regions of North Africa in general (El-Barasi & Barrani, 2013), Climate elements such as temperature and rainfall affect the characteristics and distribution of vegetation cover, and therefore this study focused on studying some of the elements Climate your Rainfall obtained by the National Center for Meteorology (Tripoli) for the city of Tobruk since the year (1984-2016), as climate elements such as temperature and rainfall affect the characteristics and distribution of vegetation and wildlife, so this study focused on studying the climate elements obtained by the National Center for Meteorology (Tripoli) for the city of Tobruk since the year (1984-2016)(Figure 2)Records show that the highest average maximum temperature during the month of August was (26.5°) While the lowest average minimum temperature was during the month of January at a rate of (13.7°) Where temperatures reach their highest levels during the summer, while they drop to their lowest levels. For the winter season, as for the rainy periods in the study area, they are characterized by a great disparity in their distribution over the months of the year, as they are concentrated during the fall and winter seasons, as about (67%) of them fall during the months of December and January, which represent the very wet season, and the highest monthly average of rainfall was in January at a rate of (45.6 mm), while the lowest average was at a rate of (0.0 mm) in July and August, which represent the very dry season, while the general average of rainfall amounted to about (176.2 mm / year), and through the information obtained from the National Center for Meteorology, it became clear that the average amount of rainfall recorded in the region during the period between (1984 - 2016) rainfall rates are higher in the northern regions than in the southern regions, as they gradually decrease as we move south.

Data collection

Collecting water and soil samples: Ten water samples were randomly collected from different sources used by the local population in the area, including groundwater wells, Roman wells and waterwheels. The water samples were transported to the laboratory in one-and-a-half liter plastic bottles, and the following experiments were conducted on them, including measuring the degree of acidity, salinity, electrical conductivity and turbidity based on what was reported have (Black *et al.*, 1965), and was divided into six main sites where soil samples were collected from these sites using an auger

with a diameter of 8 cm, and soil samples were taken at a depth of (10-30 cm) where 4 individual samples were collected from each site and then mixed well to form one composite sample and 6 composite soil samples were collected covering most parts of the study area, and were placed in tightly sealed plastic bags and numbered and transferred to the laboratory, where the samples were dried for 72 hours and then sieved using a sieve with holes with a diameter of 2 mm and the soil part larger than 2 mm was excluded and the analyses were conducted on the fine part that passed through the sieve, Measured PH Using a PH Meter 3305 type (Science Touch) Based on the method (Rayment and Higginson,1992),Total salt content was estimated using a device Electric Conductivity Meter (Rayment and Higginson, 1992), while The moisture content of soil samples was estimated using the gravimetric method Water content Determination(Mohammed, 2009),and To detectrate Nitrogen The Caldahl method was followed (Kjeldahl) While the percentage of phosphorus was knowns reported in (Ryan and George, 2003). The organic matter was estimated As statedin (Walkleyand Black,1934) andMogdoffetal.,1996)The soil composition was also determined by mechanical analysis of the samples based on what it is mentioned in the method (Bashour and Sayegh, 2007).

To survey Plant and animal species: Through field visits, the current reality of living organisms (plants and animals) was identified, as these visits took about two and a half years, starting from 8/3/2020 to 4/25/2023. Through these trips, plant samples were collected, identified, and annual and perennial species were identified, and then the samples were defined using Libyan flora books.(Ali, El-Gadi, eds, 1976-1989, (Al-Shaari, 2002), photographs of the vegetation cover were also taken and the signs of deterioration were documented, with a good observation of the bee grazing activity in the area and the movement of wild animals and birds, with inquiries from the residents of the area to know the most important species that are exposed to hunting and decline and to define their scientific names according to what was mentioned in (Al-Awami, 1997) and (Al-Hariri, 2014).

Social, economic and environmental survey: Since the cooperation, persuasion and involvement of local people in planning, establishing and managing the reserve is of utmost importance, Designed by form pollTitIt contains a set of questions covering most aspects related to order Environmental in the region, There is also a part of theQuestions it aims to identify the reality of the study area and the impact of human activities on it.,100 copies were distributed, Formby comprehensive scanning method Most of it was distributed to the residents of the area, taking into account that the distribution should include all residents. Area and the owners of agricultural lands and visitors to the area and the local community were targeted because it is The most interactive and active human being in this region and the first beneficiary of environmental treatmenttiha and rehabilitate it Based on data collected from meteorological stations, field monitoring, a comprehensive survey of wild plants and animals, a study of soil and water, and the distribution of a questionnaire, the main challenges facing biodiversity, natural resources, and the potential of the region were identified, in addition to referring to the history of human activities in it and reviewing studies that addressed the topics of land degradation and human activities, such as the study (El-Barasi *et al.*, 2003), (EL-Barasi&Barani, 2013), and (Saeed *et al.*, 2022).

RESULTS AND DISCUSSION

Land degradation and deforestation caused by external stresses affect biodiversity, ecosystems and the many services they provide. Environmental degradation, climate and habitat changes, inappropriate management and deforestation modify both living and non-living components, causing changes in ecological processes such as biodynamics Vegetation cover, where overgrazing, the establishment of quarries and crushers, the increase in farms, pollution, soil salinization and logging are the main human activities that lead to changes and transformation of ecosystems and the loss of natural habitats in arid and semi-arid environments. Therefore, there is an urgent need to save biodiversity, especially endangered and endemic species, by converting these areas into protected areas. In fact, despite the frustrating difficulty in determining the number of these areas, especially in light of climate change, the number is modest in reality. From an environmental point of view, it is logical to attribute to protected areas the ability to provide a mechanism for preserving the greatest possible amount of biodiversity in the future. This is still missing from the management of Libyan protected areas in many areas in Libya, where the focus is currently on preserving rare, endemic and endangered species ((El-Barasi & Saaed, 2015)

Natural potential: Located Western Plain Valley Area Within the Butnan region, whose climate varies from semi-Mediterranean, hot and dry in summer to warm and rainy in winter, and due to its location within the semi-desert zone, whose characteristics reflect the type of soil and the prevailing vegetation cover, the region is characterized by the poverty of its natural vegetation. Despite this, the study area is considered one of the most dense and diverse areas in the regions of the region and you area Vital in its resources and considered a region of prosperous spectra and the diversity of its natural environments from beaches, highlands, plateaus and different forms of extension, and despite the many potentials in the region, they have not been exploited well until now, and these potentials such as the distinguished geographical location close to the city of Tobruk and the picturesque features of the earth's surface and the suitable climate and plant diversity, and with all these potentials that have been mentioned and that the study area enjoys from plants of high value including medicinal and endemic plants, as well as water resources and not benefiting from them during the rainy season, this region lacks protection and attention in addition to the mismanagement of its resources represented by the failure to build sufficient dams to hold surface runoff water and early and continuous grazing and irrigated and rainfed agriculture and logging and paving roads and collecting and picking medicinal and economic plants and overhunting that led to the decrease in the appearance of wild animals in the region, and therefore the establishment of a reserve has become an inevitable necessity that contributes to maintaining the environmental balance and optimal exploitation of these resources, and among the potentials that help to establish a natural reserve in the region are water resources, the most important of which are water canals, as the water canal is considered The inhabitants of the region, in the Italian tongue, are among the most important permanent sources of fresh water in the region, which were established by the Australian army and maintained and the number of wells increased by the Italian army in 1934 (Figure 3). In addition to surface water, rainwater harvesting technology is used.



Figure 3. Italian water tank



Figure 4. Ancient Roman wells

Ancient Roman wells (Figure 4) can be found underground and stone dams in various places in the region, in addition to deep wells that use groundwater. These water resources maintain natural wildlife and are also the main supply for the inhabitants of the region to this day. The results of the physical and chemical analysis of water samples from different sources showed acceptable water quality for most samples, as the pH value ranged from 7.2 to 8.6 (Table 1). Most samples are considered within the permissible limit, while the salinity values ranged from 78 to 6633.PPM (Table 1) where some groundwater wells showed relatively high salinity, while the electrical conductivity value was from (116 micromosh/cm3 to 9900 micromohs/cm3), (Table 1) and some groundwater wells exceeded the permissible limit, while the turbidity value ranged from 14 to 20 units (Table 1) where the samples did not exceed the permissible limit, and as expected, the water of the Roman wells showed the lowest values of salinity and electrical conductivity, and the reason is mostly due to the fact that the fresh water in the Roman wells is collected from rainwater, and with regard to the groundwater tanks, they gave the highest percentage of salinity and electrical conductivity, and the reason is mostly due to the interference of seawater with the groundwater, as withdrawing water in many cases leads to significant changes in the quality of the water, in addition to the presence of most groundwater wells near the saline area.

Table 1. Results of water samples in the region

Roman well5	Roman Well4	Roman well3	Joufi well4	Joufi well3	Roman well2	Joufi well2	Italian water2	Joufi water1	Roman water1	Source name
8.2	7.2	7.8	8.2	7.7	7.9	8.1	8.6	7.8	7.9	PH
230	102	1324	3396	4014	788	116	238	9900	190	Ec/msms/
120	510	662	1700	2750	528	78	160	6633	175	T.D.S
15	14	16	16	15	15	14	14	20	16	N.T.U

The soil of the region is considered to have a weak sandy clay texture estimated at about (30-35%) of the area of the region and about (60-65%) rocky. The prevailing soil color ranges from brown to yellow, as the soil of most dry regions is characterized by this color. The results showed an increase in the value of the hydrogen number PH ranged from (7.59-8.28) and it is clear that the soil of the region is light basic soil. This increase may be due to the nature of the chemical composition of the soil in addition to the drought factor, while the electrical conductivity rate was E_{cu} . The soil salinity TDS ranged between (690.22- 2285.72) while the soil salinity TDS was (482- 1600(ppm)). These results indicate that the soil falls within the range of saline soils. The reason may be due mostly to the high percentage of rocks of various types in the region, as the weathering of rocks of various types is considered a basic and renewable source of salts in the soil, as well as to the proximity of the region to the sea surface, where the winds carry seawater spray and work to deposit it in the region, especially the coastal region. As for the organic matter, the values ranged from (2.095- 7.59). Most of the samples are considered weak in their content of organic matter, except for the samples found in agricultural areas are due to the fact that the percentage of natural plants is higher in these areas as well as the presence of dams that prevent the erosion of nutrients in the soil, while the value of the phosphorus element was from (10.53-15.62) and the increase in the percentage of phosphorus in the soil is considered evidence of its alkalinity, while the percentage of nitrogen element ranged from (0.11-0.16) and these results indicate a general decrease in the soil nitrogen content and this may be attributed to the limited content of organic matter added to the soil, especially with the length of the summer season where the temperature rises and works to decompose the organic matter, as for the moisture content, the values ranged between (0.38-1.47) and these values reflect the nature of the prevailing climate in the region And.

Natural vegetation is a reflection of the type of soil, climate and topography of the place, but climate and soil are the main factors in determining the type of natural vegetation in the area, Because the region is located in the semi-arid zone, it is characterized by the loss of its natural vegetation, as the amount of rainfall, which amounts to about 190.2 mm, is only sufficient for the growth of poor desert continental steppe grasses, most of which are annual plants that quickly disappear and are found in scattered groups, There are also some shrubs, especially dwarf ones, in many locations. They are evergreen and adapted to the semi-arid climate, which makes them distinguished by their spaced growth. Annual plants dominate this area, as they constitute the largest part, where types of grasses and herbs grow that appear with the rainy season and then disappear in the dry season. Therefore, the amount of vegetation cover increases in the spring, as the land is covered with some annual plants after the rains fall, and they disappear with the beginning of the summer season, leaving behind what they produce of seeds, waiting for the next rainy season to repeat their life cycle, Despite the plant diversity in the region, the vegetation cover is considered deteriorating, as a result of climatic conditions and environmental exploitation by humans, The results of the field survey showed the identification of 228 plant species belonging to 173 genera, which include 53 plant families. Gymnosperms were represented by one plant species belonging to one genus and one family, while angiosperms were represented by monocots in 9 plant families, 23 genera, and 27 plant species, while dicots belonged to 43 families, 149 genera, and 200 plant species (Table 3).

The study area was also characterized by 6 endemic plant species Endemic Species distributed over 5 plant families (4.2%) Of the total plants in the study area Including plants *Arum cyrenaicum* Hruby belongs to the Araceae family and *Echinops Cyrenaicus* Durand & Barrett From the complex family Asteraceae, *Romulea Cyrenaica* Beguine from the Iridaceae family, *Petrorhagiacyrenaica* Durand & Barratte from the Caryophyllaceous family, *Silenemarmarica* Beg from the Caryophyllaceous family, and *Ranunculus cyclocapus* Pamp from the Ranunculaceae family. Through the results of the comprehensive survey of plant species, 62 species of medicinal plants were identified (42.6%), 7 species at risk of deterioration and extinction (4.9%), 61 species of pastoral plants (41.9%), as well as 35 species of honey plants (23.7%), 10 species of poisonous and invasive plants (6.9%), and 29 species of economic plants (20.2%). Figure (5) Despite this diversity, it was noted that there are large areas devoid of vegetation cover due to the ongoing human activities, where the vegetation cover is exposed to great pressures as a result of these activities, especially for medicinal plant species and endangered species.

Local culture and interest in the region: By studying the historical background of the region, part of its ancient past was identified, as it is an introduction that determines the period of its emergence and the development of human activities in it, starting with the exploitation of the resources and location of this region agriculturally and commercially. Many sources indicate that the region was densely populated and rich in agriculture and biodiversity. Evidence of this is the presence of some civilizational monuments and remains of agricultural dams that regulated human activities and the accompanying negative and indirect impact processes on the environment of the region. This effect appeared clearly at the present time. Through field visits and interviews with residents of the region, it was noted that there was a disturbance in the natural environment, deterioration of the vegetation cover and soil erosion.

The reason is often due to the abundance of human activities in it, in addition to climatic factors, as these factors combined, from overgrazing and irregular grazing, logging, road construction and collection of medicinal plant species, led to the deterioration of the environment of the region and the migration of wildlife. Through the results of the questionnaire, it became clear that despite the state of environmental deterioration, there is a lack of awareness among residents of the causes of this deterioration and the extent of its future consequences, whether on the region or on themselves, as 37% of the respondents confirmed the lack of preservation of Natural resources in the region, as 70% reported the presence of medicinal plant species in the region, but these species are subject to random collection and overgrazing, and that they have a desire to increase their animals, Pastoralism:

It was found that most of the pastoral animals in the region in terms of numbers are sheep, followed by goats and then cows, which are the pastoral animals that cause the most damage to the vegetation cover. The results of the questionnaire showed that more than 45 species of wildlife and birds are present in the region, but are exposed to random hunting, as 75% reported that they practice illegal hunting, especially during heavy hunting seasons. The numbers of these animals have decreased compared to the past, as it was full of many types of

Table 2. Chemical and physical analysis of soil samples from the area

Clay%	Silt%	Sand%	Ww	N	P	TOM	TDS	Ec _q	PH	N
20	2	78	0.65	0.11	11.95	2.95	540	690.22	7.59	1
20.2	1.8	78	0.59	0.11	12.32	2.201	507	724.29	8.13	2
21	2	77.7	0.38	0.11	16.19	3.22	602.5	860.73	8.07	3
22.5	1.5	76	0.62	0.14	10.53	4.11	544.5	777.86	8.3	4
22	1	79	0.53	0.16	15.62	7.52	482.5	689.29	8.28	5
20	2	76	1.47	0.13	13.62	3.1	1600	2285.7	8.04	6

Table 3. Plant groups in the region

Plant groups		No. of species	No. of genera	No. of families
1. Gymnosperms		1	1	1
2. Angiosperms	Monocotyledons	27	23	9
	Dicotyledons	200	149	43
Total		228	173	53

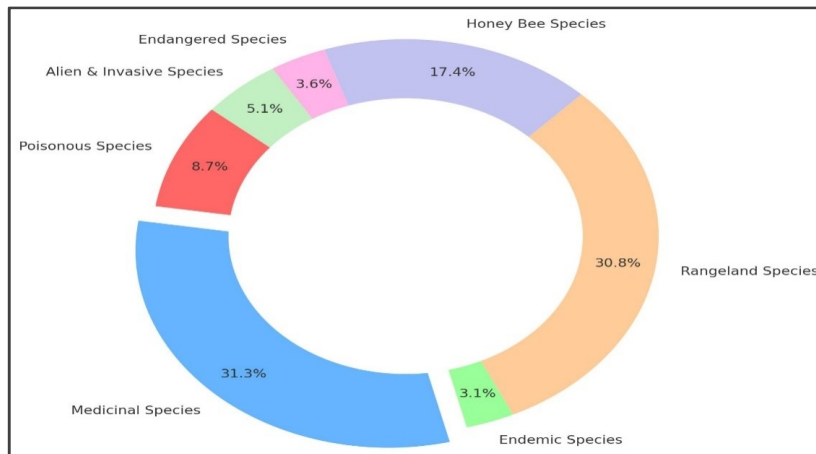


Figure 5. Important plant species



Figure 7. Beehives in the area



Figure 6. Stone retaining dams



Figure 9. *Vulpes vulpe L.*



Figure 8. Flamingo hunting *phoenicopterus roseus*

mammals, most of which appear at night and are rarely seen during the day, including the striped hyena, *Hyaenahyaena* L., the wild cat *Felislybica* F, the jackal *Canis aureus lapaster* L., as well as the Dorcas gazelle *Gazelladorcos*, the wild rabbit *Lepuscapensis* L., and the red fox *Vulpesvulpes* L. Some of them are now rare animals and threatened with extinction, if not already extinct in the region, such as the Dorcas gazelle, which was last recorded in the region in the sixties. Among the mammals are also the night hunter *Hystrixcristata*, the jerboa *Jaculusjaculus* L, the eared hedgehog *Erimaceusaurtusgmelin*, the Algerian hedgehog, the sand rat *Psammomysobesus*, and the field mouse *Merionescrassu*. Through the questionnaire, the results express the extent of the danger facing birds and animals in the region, which is a serious indicator of the decline of certain species and includes them among the endangered species, which requires accelerating the necessary measures to provide their protection from decline and extinction. The most negative activities that the region suffers from are the establishment of quarries and crushers that sweep away the vegetation and soil. 62% of landowners confirmed that they have a desire to expand agricultural areas in the region at the expense of the natural vegetation. Field visits revealed the presence of archaeological landmarks, some of which may date back to the Roman era, as 62% reported that these landmarks are being destroyed and vandalized. It is one of the important cultural monuments that gave the region an important tourist character that led to attracting visitors locally and internationally. Among the most important archaeological landmarks in the region, which date back to different eras and civilizations, is the mosqueto.

The Indian Cavalry Brigade, which is located at the eastern end of the region. As a result of the deterioration in the region, 67% confirmed that they have the desire to establish a nature reserve in the region, as they emphasized responding to the change and environmental awareness, as environmental values are absorbed from the cultural environment and through the social interaction of the individual with others and with his environment. As for the human activities that have a positive impact in the region, they were represented in the establishment of barrier dams, as they are considered one of the important and necessary methods in the processes of preserving the soil and enriching the seed stock (Figure6), in addition to the beekeeping stimulant, as it was shown that 60% confirm that the region has a suitable nature that makes it a good pasture for bees, but it suffers from the deterioration of pastoral plant species (Figure7). The study area is characterized by the best flowering plant species that can be used to produce...honey. For local consumption and external export, these types include. The production of honey cells usually ranges between 400-500 kg and For 50 cells during the rainy season and dense annual vegetation, In semi-dry seasons, production does not exceed 250 kg per season, In addition to the importance of the bee in producing honey, which is known for its therapeutic properties, it is an integral part of maintaining ecological balance and biodiversity and enhancing environmental sustainability. It provides a large proportion of food by pollinating plants and transferring seeds and ensures the survival and reproduction of many species. Plants, and through the results of the study, it is necessary to propose a balance in protection between wild animals and vegetation and to establish laws and legislation that limit hunting operations and human activities to enrich the biodiversity in the region, restore the environmental balance and establish the concept of environmental sustainability. It may take many years before

the local population is convinced of the benefits of protected areas. However, their role and involvement in the work of the reserve should not be neglected. It seems very useful to develop a plan to invest in the human workforce for their experience and knowledge of the nature of the region and its conditions.

Obstacles to establishing a nature reserve in the region: To protect biodiversity, it is necessary to eliminate the threats facing protected areas if these areas want to achieve their goals and contribute to preserving biodiversity, despite climate change and long periods of drought that have affected living organisms (The biggest threat to this region is human activities, the most important of which is overgrazing, which is one of the most influential factors in causing the problem of vegetation cover deterioration, as the plant is exposed to a great degree of animal pressure, which leads to a rapid and decreasing biological capacity of the environment to compensate and renew. It is clear that the region is exposed to intensive pastoral activity, and this is due to the fact that animal grazing is one of the most important activities that are widespread among the residents of the region, as most of the residents tend to invest in raising sheep as an economic activity instead of other economic activities, as well as collecting and picking medicinal and aromatic plants, despite. Although other sources of medicine are available, the process of collecting medicinal plants is still ongoing and their trade has become more popular, as these important plants are exposed to overgrazing and excessive harvesting by residents and visitors of the region. Logging and cutting plants are activities that were practiced intensively and selectively in the past, as certain species were targeted in logging operations, especially shrubs with stems and woody parts, This has led to significant damage to the natural vegetation cover, represented by the elimination of large areas of shrubs and the creation of large areas between them, which has made logging operations one of the human activities affecting the deterioration of the vegetation cover and soil in the study area. Although logging operations in the region have decreased significantly at the present time due to the availability of alternative energy sources other than firewood, logging operations are still ongoing until now, but to a lesser extent that does not actually pose a real danger to the vegetation cover in the region compared to the previous time. It is considered. Population growth is the main reason for agricultural expansion in all regions of the world and the evacuation of natural lands is one of the most severe and dangerous factors threatening wild plant and animal life and I followed the. Since ancient times, humans have used many methods and techniques to remove vegetation and replace it with agriculture, including cutting, burning, and deep plowing of the soil, which leads to uprooting the roots of plants.

The prevailing agricultural system in the region is the rained agricultural system, which is based on removing the natural vegetation cover in order to grow grains, as agricultural activity is considered intensive in the region. This expansion in agricultural land reclamation was at the expense of natural pasture lands, which in turn leads to the removal of the natural vegetation cover and. Through the study. It becomes clear for us. Agricultural operations were not limited to expanding farms by plowing only, but they also. Mostly by changing the use of the land from natural lands to agricultural and pastoral lands or keeping it as it is and not exploiting it due to. Due to lack of funding or lack of awareness of using modern methods of land

development and reclamation, like that Quarries and crushers are considered economic activities. In the area Which is based on exploiting natural resources from rock layers. As a result of not following scientific methods in exploiting these natural resources from rock layers and the process of extracting them, it appears The negative impact of the storm is clearly evident through its sweeping of the vegetation and soil together, in addition to the effects of dust and dirt that extend over long distances, leading to the pollution of the surrounding environment., like that Wild animals and birds in the study area are exposed to deterioration and extinction, due to excessive hunting on the one hand and the deterioration of the vegetation cover on the other hand. Wild animals and birds are closely linked in their diversity and distribution to the natural factors of the environment, including climate, soil and natural plants. The area was Valley of the Plain Like other parts of the country, it is rich in various types of animals and birds. Wild, but it was exposed to decline and extinction, and with the progress of civilized man, his need to use animals and their products increased, so he invented advanced means and methods to hunt larger numbers of wild animals and hunting, in addition to being a basic profession for a number of people, especially fishing, a large number of people practice it as a hobby to spend their free time and during outings and recreation There fore, the hunting process must be regulated by finding a balance between hunting, reproduction and the natural increase of wild animals, it is also necessary to prevent the hunting of some species that al of Extinction One of the reasons that led to the decline and extinction of wild animals and birds is, first and foremost, the decline in vegetation cover, which is one of the most important factors for the survival of wildlife anywhere in the world, as it is their source of food, their place of shelter, and their main refuge.

Focus on biodiversity conservation: The local population is a very important element in the design and management of the reserve, and their participation in determining the objectives and programs of the reserve has a positive impact on the success of the idea of reserves. Perhaps one of the most important reasons that led to the delay in establishing reserves is the customs and behavior of the local population and their actions towards the environment and their view of reserves. Lack of awareness and media failure to spread awareness among citizens can thwart protection plans and efforts made to establish reserves. The lack of environmental awareness in the region is represented by fires to get rid of the vegetation cover, as well as throwing solid waste and construction and building waste in many places, especially on the sides of roads. As a result of the region being frequented by many visitors for the purpose of recreation and entertainment, it has been polluted with many food wastes, paper, glass, plastic and empty metal cans. If this ignorance of the environment continues, it portends a serious deterioration in environmental resources, because the population is the main driver and direct influencer on the environment in which they live, One of the most important problems facing the establishment of reserves in this region and in the entire Libyan state is that they do not follow scientific foundations and do not have administrative plans and strategies due to the lack of experience and qualified cadres. The absence of laws and legislation specific to nature reserves has encouraged disrespect for their environmental components, as valley areas are considered the most diverse and most affected by various human activities. These areas have a high density of plants and other living organisms, which qualifies many of them to establish nature reserves, especially since

they contain historical and military monuments and ancient religious areas. However, these areas have been transformed into uses dominated by humans, which makes the need to declare new protected areas more urgent (Saeedet al, 2022), it should also be emphasized that preserving all components of wildlife in the region is extremely important, and each has a fundamental role in the ecosystem cycle, and all components are closely linked to each other, as the life and continuity of a plant or animal species is linked to the presence of other species of living organisms, as well as to the presence of other environmental components such as location, climate, soil, topography, and other environmental components (El-Barasi and Saeed, 2015), also mentioned that the most important step in protection is to develop a general plan for all components of the region, with a special focus on the soil and biodiversity (plants and animals) that are rare and threatened.) This area contains a high percentage of medicinal species and endemic species as well as pastoral species of livestock and bees, not to mention the presence of other economic species and some endangered wild animals as well as the natural landscape and convincing the local population to establish this reserve because what the local population usually wants to preserve is always a matter of personal preference at the expense of the environment and biodiversity and increasing awareness at the local and governmental levels to preserve these habitats, and ending with declaring the studied area a nature reserve to which all necessary legal regulations apply. In general, the study highlighted the need for a greater understanding of the ecosystems in the region and to exert more effort in establishing new protected areas and managing them more appropriately on scientific bases with the application of conservation programs that are appropriate to the location and environment of the region, as the Wadi Al-Sahel region suffers from a very critical environmental situation, which is reflected in the disappearance of ecosystems or their rapid deterioration. Among all the factors that threaten biodiversity in this region, climate change and human activities remain the largest, as mentioned previously. Therefore, the current study proposed based on the classification IUCN for the management of protected areas to establish a biosphere reserve in this region as it is considered the most suitable reserve for the environmental status of such areas and supports the sustainable use of natural resources while preserving natural habitats as well as allowing local people to practice their traditional activities but in a more directed and organized way and with sustainable management.

CONCLUSION

In conclusion, it can be said that the establishment of nature reserves in Libya facing Many challenges have led to the delay in their implementation so far, the most prominent of which is the lack of qualified and trained technical personnel to manage the reserves, and the lack of necessary planning to establish and manage them. The weak development of existing reserves is also attributed to the customs and behaviors of citizens and their views towards them, in addition to the absence of a clear policy from the state that includes setting clear goals and tangible results for establishing reserves. In light of the rapid climate changes and pressures resulting from human activities, it has become necessary to give priority to establishing natural reserves and national parks. To ensure that this is achieved effectively, the subject of reserves must be included in natural resource conservation strategies, with a focus on providing

specialized expertise in designing and managing reserves, and enacting appropriate legislation and laws that ensure the success of environmental protection efforts.

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