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Abstract

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This investigation was carried out on EL-Harouge mountain located within the Libyan desert. A very important area from the Naturalistic point of view tha t should be preserved. The natural vegetation in this region is very poor, scattered and concentrated mainly in Vallies, but consisted of special species which have adapted significantly to survive in such arid conditions. The flora is constituted of about 64 species (about 3% of the total number of Libyan flora) belonging to 55 genera and 21 families, with the presence of one endemic species *Fagonia arabica* var. *membranacea*. *Zygophylaceae* and *Chenopodiaceae* are the most common species on the study area.
In addition to the effect of climate in this fragile ecosystem, the accumulation and increased frequency of human activities have a great negative impact on the plant environment. The most important activity in this area is agriculture, grazing has caused the removal of the natural vegetation in depressions and valleys. The most destructive activity is oil exploration and extraction in different oil concessions, resulting in hydrocarbon pollution, solid waste disposal, and spilling of waste water mixed with oil, which causes a great soil pollution, in addition to soil trampling due to vehicles and machinery activities around oil wells and camps.

Introduction

The world's deserts represent unique ecosystems which support significant plant and animal biodiversity, particularly with respect to adaptations for survival in hyperarid conditions. Various human societies have also been established in deserts throughout history, and today deserts are an important part of the world's natural and cultural heritage.

To the untrained eye deserts look barren, especially during dry periods. However, because of their evolution in relative geographic isolation, most deserts of the world are rich in rare and endemic species, and are hence highly vulnerable to biological extinction and environmental degradation. In spite of their remarkable convergence in adaptation, deserts are different in their origin and their evolutionary history. The incredible variation of the world's deserts in rainfall patterns, continentality, temperature regime, and evolutionary history have all contributed not only to their biological uniqueness but also to their wondrous wealth of life-forms and adaptations, from some of the shortest-lived ephemer-

al plants, to some of the longest-lived giant cacti. From seed-eating rodents that do not need water to survive and depend on their burrows to regulate their metabolism almost as if the burrow was an extended part of their body, to amazing pollinators like nectar-feeding bats that migrate thousands of miles following the flowering seasons (Davis 1998).

The unique and fragile desert ecosystems are now severely threatened by human activities in these areas which have been isolated for long periods of time. There are several types of human activities threatening the fragile ecosystems on the study zone, so all movements in this region must be carefully thoughtout as, the destruction and devastation would be great, particularly in the oil concession areas.

The dry desert climate on the study zone played a key role in imposing the fragile ecosystems, given the high temperatures and little rainfall, this make the effects of human activities on biodiversity in this region much more dangerous. The most important process in this area is agriculture in the Oases, which has resulted in the uprooting of vegetation, depletion of groundwater and the high proportion of soil salinity, as the grazing causes the removal of the vegetation founded in some depressions and valleys. But the most destructive activity is the exploration and extraction of oil by different companies, which has resulted in Hydrocarbon pollution, solid waste disposal, and exit of the brine water associated with oil, which caused very large salinization of soil, in some oil fields they appear as very big lacks of brine water. What's more is ground sweeping for paths and routes constructed around the wells, which are too large for the region. Floristically the area was studied generally by the Flora of Libya (Ali & al. 1976-1989).

The study zone

The study area belongs to the Sirte basin which is a complex block faulted and downarped structure located in the northern central Libyan desert (Sahara). This region has an historic and geographical importance as it consists of five main Oases (Zalla, Waddan, Hun, Sawknah and EL-Fugha). In the past the prosperity of the region rose because it was the shortest path for caravans linking the Mediterranean coastal area with interior Africa. The abundance of ground water near the surface also played a significant role in the settlement of this region and facilitated the irrigation of large areas of vegetables and Palm trees that typically grow in such a climate.

Study area Coordinates 26:00 - 29:00 north and 16:20 - 18:30 east, away from the coast at a distance of about 300 kilometers, the geographical location means the region is impacted by the extremes of the desert, in terms of drought intensification, high temperatures and severe erosion, especially by wind. The geological formations consisted of sandstones, carbonates and clays of lower and middle Miocene and Pleistocene and Holocene sediments.

In general, the surface of the study zone is not flat, there are some canyons and dry watercourses especially on the northern parts, and stones and gravel are abundant in most depressions, as some areas are saline (Sabkha). The northern regions are characterized by the presence of large depressions and valleys, and the presence of Gypsum and Calcium carbonate deposits, in addition to some Sand dunes, rocky hills interspersed in many places, and some areas covered with mobile sand dunes.

The southern regions are represented by EL-Harouge mountain, which are characterized by alluvial mud, under a layer of volcanic rocks which vary in thickness from one region to another. Where on some areas they consist of a few centimeters, on others it is beyond one meter and this covered layer plays a key role in sediment erosion prevention, thus protecting the soil layers beneath.

In fact, EL-Harouge mountain consists of a huge number of hills that spread over a vast area, among them there are many low-lying areas that receives larger quantities of water through runoff after rainfall and therefore they have a special sort of wildlife (flora and fauna).

The region mainly consist of sedimentary rocks from the Upper cretaceous period to the Tertiary period, as igneous rocks cover the southern parts of the area. There are also various Quaternary rocks deposited in the continental environment (Shakoor & Shagroni 1984).

Because rain is rare in this desert area, chemical weathering of parent material and leaching of weathering products such as clay, lime and soluble salts hardly takes place, rather evaporation drives the upward movement of water and dissolved salts which accumulate at, or close to the surface.

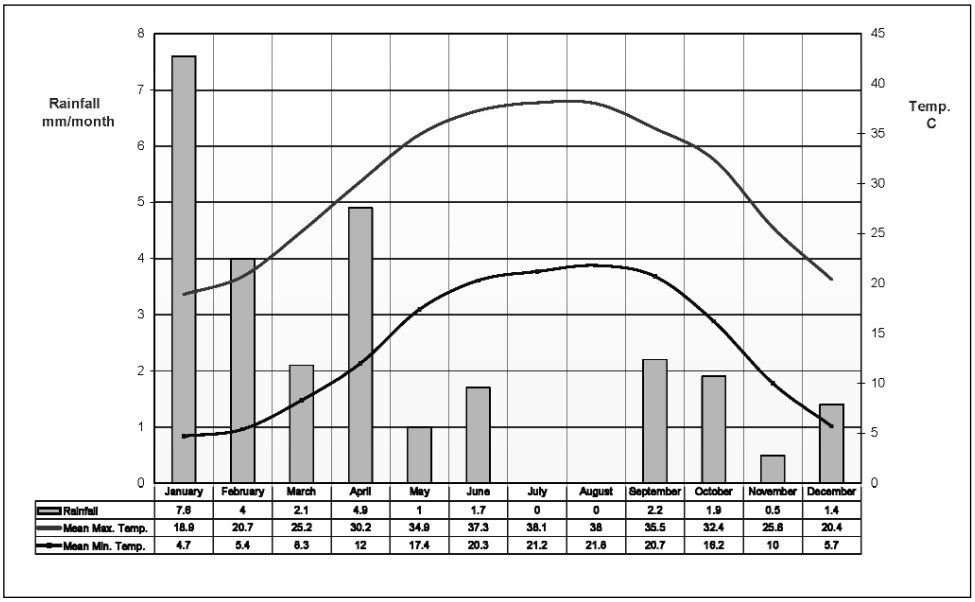
Desert terrain determines the distribution of soil and water. In steep lands, erratic rains and erosion restrict the soil to a thin, patchy cover; light showers merely wet the surface and the water evaporates where it falls whereas rare torrents produce flash floods that carry water, mud and dissolved salts to foot-slopes and depressions.

As in the north of the study zone the most characteristic soils are those that exhibit significant accumulations of soluble salts: Gypsum, Calcium carbonate, or Silica. These include Solonchaks (salty area), characterized by high levels of soluble salts which accumulate naturally in closed depressions; Solonetz (salt), highly alkaline, sodium rich soils which are very slippery when wet; Gypsisols, or gypsum soils; Calcisols (chalky or limy), characterized by accumulation of Calcium carbonate, and Durisols, showing a hard pan cemented by silica.

In this desert area, rainfall events trigger short periods of high resource abundance which, despite the overall scarcity of rain, can saturate the resource demand of many biological processes for a short time. Rainfall events may vary significantly from one pulse to the next. Some spells may occur in winter, others in summer, some events may bring very little precipitation, others may bring intense showers , and the period between pulses may also vary substantially. Rainfall also varies from one year to another; this can easily be confirmed by looking at rainfall statistics over time for a particular place. The difference between the lowest and highest rainfall recorded in different years can be substantial, although it is usually within a range of ± 50 per cent of the mean annual rainfall. The variation in monthly rainfall is even greater.

All the characteristics of deserts are seen in the study zone, due to its geographic location being in the center of the Libyan desert which is a big part of the Great Sahara and therefore it is subject to the extreme desert changes, such as lack of rainfall (ranged between 2.5–45 mm/year) and reaches its peak in January then decrease as Summer approaches (EL-Jufra meteorological station, 1993-2005 unpublished data)

The study zone has a wide range of temperatures between 0 C^O in winter at night to 50 C^O in summer at noon, the maximum and minimum temperatures occur during June, July and August, it ranged between 38 C^O and 21.8 C^O respectively, January and February with



	January	February	March	April	May	June	July	August	September	October	November	December
Rainfall	7.6	4	2.1	4.9	1	1.7	0	0	2.2	1.9	0.5	1.4
Mean Max. Temp.	18.9	20.7	25.2	30.2	34.9	37.3	38.1	38	35.5	32.4	25.8	20.4
Mean Min. Temp.	4.7	5.4	8.3	12	17.4	20.3	21.2	21.8	20.7	16.2	10	5.7

Fig. 1. Rainfall and Temperature on the study zone.

maximum and minimum temperatures which ranged between 21.8 C^O and 4.7 C^O respectively (EL-Jufra meteorological station, 1993-2005) (Fig. 1).

The mean relative humidity in the region is low within 48%, but it becomes high at times, at in nights and supplies plants with very important amount of water.

Materials and Methods

The samples were taken from the depths of (0–10 cm) packed in plastic bags with labels of the weight and number then transferred to the Laboratory where they were air dried. The tests included soil texture, CaCO3 %, pH and Total dissolved salts (T.D.S.). All tests were performed after Black & al (1965).

All the zones were surveyed and plants were sampled. All samples were pressed, dried and poisoned then fixed on Herbarium sheets. Plant samples were identified using the Englar method according to (Ali & al. 1976-1989) and deposited in botany department's Cyrene Herbarium of Garyounis University, Benghazi, Libya (CHGU).

Results and Discussion

Soil within the study zone, is classified as dry soil and the most important characteristic is that it contains a small percentage of organic material often less than 1% and a high proportion of calcium carbonate affected by widespread limestone rocks (Ben-Mahmoud

Table.1. Soil analysis.

No.	Coordinates	Humidity %	pH	Electrical conductivity Us/cm	Texture	Remarks
1.	28:37:793 N 017:19:204 E	0.72	8.00	2147	Loamy sand	
2.	28:39:113 N 017:20:060 E	3.71	8.15	43400	Sand	Salt marsh
3.	28:49:283 N 017:23:068 E	5.05	-	-	-	12 % oil
4.	28:49:283 N 017:23:068 E	2.24	-	-	-	16.4 % oil
5.	28:49:283 N 017:23:068 E	2.15	8.10	112100	Loamy sand	
6.	28:59:086 N 017:10:695 E	0.75	8.25	1234	Sand	
7.	28:59:086 N 017:10:695 E	1.67	7.90	3110	Sand	
8.	28:42:089 N 017:06:336 E	1.29	7.85	1587	Loamy sand	
9.	28:32:422 N 017:41:140 E	2.18	8.05	2381	Sand	
10.	28:40:566 N 017:43:835 E	4.99	7.35	143800	Sand	Salt marsh
11.	28:22:839 N 017:10:368 E	0.69	9.25	102.2	Clay loam	
12.	27:53:462 N 017:42:508 E	2.75	8.80	167.8	Clay loam	
13.	27:55:469 N 017:23:712 E	2.22	8.45	266.9	Clay loam	
14.	27:59:771 N 017:47:474 E	2.09	7.70	21090	Sand	

1995). In addition to the presence of gypsum deposits and also the simplicity of the soil profile development, it contains high concentrations of salts that are soluble, especially in depressions and salt marshes (Sabkha). The activity of microorganisms in the soil is very simple or close to be zero due to the low moisture content and lack of vegetation.

Due to lack of humidity and the drought situation prevailing the region and the natural composition of mother rocks (calcareous rocks) the pH of the soil tends to be alkaline. The values of soil pH range from 7:35 to 9:25 with an overall average of 8.15.

Due to a high degree of drought conditions and high evaporation rates the total dissolved salts in soil samples ranged between 102.2-3110 uS/cm, In some salt marsh areas

(Sabkha) salinity reached 143,800 uS/cm, the salinity in these areas causes an excess of salt-plant species (Halophytes).

Through the mechanical analysis of the soil there is a considerable variation in soil texture, with a high proportion of sand in excess of 90% in some samples. Almost all the top layer of soil consisted of coarse particles due to intensive erosion especially by wind. Soil texture is mainly sandy and loamy sand on the northern regions, on the south where the EL-Harouge mountains are, soil texture is mainly clay loam under a layer of igneous rocks that differ in depth from one site to another.

Vegetation

The survival strategies of desert plant species, as on the study zone, are classifiable along a gradient ranging between two extreme categories: (a) adaptation for quick use of ephemerally abundant resources, or (b) adaptation for the efficient use of poor but more permanent resources (Shmida 1985). The first category, typically exhibited by desert ephemerals, represents a maximum variant behaviour that consists essentially in tracking environmental variation, while the second category, exhibited by true xerophytes and cacti, is a minimum variant behaviour that consists in adapting to the worst possible conditions. Drought-deciduous perennials and grasses represent a compromise between these two extreme behaviors.

Attributes necessary for the quick use of water include rapid growth (often at the cost of low water-use efficiency) and abundant seed production. Attributes for survival with little water include high water-use efficiency, slow growth, and passive cooling. Drought deciduousness, as an intermediate strategy, requires the capacity to shed leaves and to quickly recover them when moisture conditions improve.

Beside the environmental significance of the natural vegetation in the region, it also has several other advantages, including its involvement in the presence of several types of wild animals, insects and birds. Natural vegetation on the study zone perform many other functions, some of which are described below:

- They can act as a soil stabilizer and prevent water and soil erosion. Woody vegetation such as: *Panicum turgidum*, *Fagonia sp*. and *Atriplex sp*. , protects the soil better and lasts longer than annual plants. Its roots deepen and improve the soil, and the shade it provides facilitates the ecosystem metabolism. These functions are essential for ensuring the soil stability.
- Species such as: *Acacia tortilis*, *Retama raetam, Rhanterium suaveolens* and *Atrilex halimus* provide an important source of forage for livestock and wildlife at a time when herbaceous fodder is not available. A number of multi-purpose trees and shrubs are ideal for protecting and improving the soil, while providing a high fodder yield in the dry months.
- Trees and shrubs are a source of wood products such as: *Acacia tortilis*, *Maerua crassifolia* and *Anabasis articulata* including fuelwood, and lumber. Fuelwood is almost the only domestic fuel, not only in the rural areas but in some urbanized areas as well such Oases. Wood is also used as a construction material.

Plants are sources of non-woody products. Many trees and shrubs yield products which are important for everyday use by the inhabitants, may be for industry, and at times, for export. Other trees and shrubs yield fibres, dyes, and pharmaceuticals such as:

Cymbopogon schoenanthus, *Citrullus colocynthis*, *Pergularia tomentosa, Fagonia sp., Nitraria retusa, Hyscamus muticus* and *Alhagi graecorum*.

In the area, mainly vegetation grows in wadiis and low-lying areas which are characterized by having access to larger quantities of runoff water following rainfall, this water supports several species such as: *Acacia tortilis*, *Tamarix aphylla*, *Pergularia tomentosa*, *Retama raetam*, *Zygophyllum album* and *Panicum turgidum*.

Generally the wadiis and depressions contain a greater number of plant species compared to other open areas, due to the fact that the open areas, cover most of the study zone and are more affected by climatic and topographic factors, while valleys have better environmental conditions in terms of soil moisture and also greater protection from wind effects, and they have more plant diversity and density. The valleys are havens for many plant species that have receded from the high open areas, and this is consistent with AL-Juhary (2002) that natural vegetation is concentrated in valleys because of the availability of appropriate factors for the growth of intensive plants.

Some species grow on the surface of the rocky heights such as: *Anabasis articulate* and *Andrachne telephioides,* they get a very important amount of water mainly from fog and dew especially during the nights.

The percentage of plant coverage on the open area almost reached zero, meanwhile it varies between 15-40 % in some depressions and valley beds, but these areas remain isolated in the beds of the valleys and low-lying areas. *Acacia tortilis* trees dominate many depressions particularly in EL-Harouge mountains, it showed a ratio of 1 tree/300 m^2 in some places.

The salt marshes (Sabkha) are characterized by many salt-loving plants (Halophytes) that can grow in such environments. Most of these plants belong to the family *Chenopodiaceae*, such as: *Nitraria retusa*, *Zygophyllum sp.*, *Tamarix sp*. and *Salsola sp*.. However, the formation of the saline is due to uncontrolled spilling of water and flooding of the plains from the EL-Harouge mountains, or the water table, which in some depressions is near the ground. Under these severe conditions, such as a lack of a drainage system and flooding of the soil with slightly saline artesian water, rapidly increases its salinity.

El-Harouge mountain contains a very special ecosystem that differs from the surrounding desert areas, where the terrain plays an important role in creating an ecological system relatively rich in comparison with the rest of the surrounding areas. these mountains are in the form of vast hills, covered with a layer of Igneous rocks, when rain falls this topography causes run-off from high areas to low-lying areas and causes floods, especially since the type of the rainfall over these areas is hurricane. This falls in the form of a barrage and these quantities of water appropriate conditions for the growth of many plant species that grow either annually after intensive rainfall, or permanent species.

In the study zone the establishment of many plant species depends on the permanent seed bank present in the soil or on seeds transported by wind, but this is sometimes restricted to micro-depressions and small catchment areas. According to Kassas (1952) he distinguishes this type of vegetation from the ephemeral annual vegetation and perennial or permanent vegetation that are met within deserts with a more regular rainfall.

64 perennial plant species were collected from the study zone, belonging to 55 genera and 21 families. *Zygophylaceae*, is the most widespread family on the study zone by 18%, *Chenopodiaceae* 16%, *Poaceae* 13%, *Fabaceae* 11%, *Euphorbiaceae* 8%, then *Tamaricaceae* and *Brassicaceae* 6%, while the rest of the families formed 24%.

Table 2. Location of endangered plant species.

No.	Elevation m a.s.l.	Coordinates	Plant species
1.	258	27.53.152 N 018.41.043 E	*Cornulaca monacantha*
2.	259	27.53.624 N 018.43.509 E	
3.	325	27.44.148 N 018.31.468 E	*Rhanterium suaveolens*
4.	313	27.42.352 N 018.32.946 E	*Rhanterium suaveolens* *Fagonia Arabica* *Fagonia indica* *Pergularia tomentosa* *Acacia tortilis* *Panicum turgidum* *Zilla spinosa*
5.	321	27.42.713 N 018.32.868 E	*Fagonia Arabica* *Fagonia indica* *Acacia tortilis* *Panicum turgidum* *Zilla spinosa* *Rhanterium suaveolens*
6.	317	27.42.049 N 018.32.509 E	*Acacia tortilis* *Panicum turgidum* *Zilla spinosa* *Rhanterium suaveolens*
7.	302	27.40.366 N 018.30.120 E	*Fagonia arabica* var. *membranacea* *Panicum turgidum* *Pergularia tomentosa* *Rhanterium suaveolens* *Zilla spinosa* *Genista microcephala*
8.	325	27.41.884 N 018.31.906 E	*Zilla spinosa* *Bromus rigidus* *Monsonia nivea*
9.	315	27.41.919 N 018.32.711 E	*Acacia tortilis* *Panicum turgidum* *Zilla spinosa* *Rhanterium suaveolens* *Fagonia arabica* *Fagonia indica*
10.	315	27.43.064 N 018.31.551 E	*Acacia tortilis* *Panicum turgidum* *Fagonia indica* *Citrullus colocynthis* *Genista fasselata*

Table 2. continued.

11.	309	27.41.488 N 018.30.995 E	*Acacia tortilis* *Zilla spinosa* *Rhanterium suaveolens* *Fagonia indica*
12.	333	27.41.272 N 018.30.634 E	*Fagonia arabica* var. *membranacea* *Fagonia indica*
13.	309	27.42.839 N 018.33.303 E	*Acacia tortilis* *Panicum turgidum* *Zilla spinosa* *Rhanterium suaveolens* *Citrullus colocynthis* *Pergularia tomentosa* *Echiochilon fruticosum*
14.	333	27.41.013 N 018.31.768 E	*Acacia tortilis* *Pergularia tomentosa* *Fagonia indica* *Bromus rigidus*
15.	325	27.38.306 N 018.30.964 E	*Acacia tortilis* *Zilla spinosa* *Rhanterium suaveolens*
16.	300	28.39.435 N 017.19.960 E	*Tamarix aphylla*
17.	273	28.20.576 N 017.24.768 E	*Retama raetam*
18.	267	28.56.199 N 017.16.280 E	*Hyoscyamus muticus* *Tamarix aphylla* *Zygophyllum album*
19.	195	28.57.523 N 017.09.030 E	*Tamarix passerinoides*
20.	299	28.47.824 N 17.03.996 E	*Traganum nudatum* *Anabasis articulata*
21.	467	28.02.181 N 017.07.186 E	*Acacia tortilis* *Maerua crassifolia* *Zilla spinosa* *Rhanterium suaveolens* *Panicum turgidum* *Genista microcephala* *Genista fasselata* *Citrullus colocynthis*
22.	500	27.54.466 N 017.26.992 E	*Cymbopogon schoenanthus*

Most of the species that have been collected (Tab.2) belong to the perennial or biennial plants, because the collection time was in the summer. ecologically these species are more important than the annual species, because they are able to offer a continuous food supply (whether The vegetative parts, roots or seeds) for grazing animals, birds and insects. Also they are more able to maintain the soil and resist erosion.

Table 3. Chemical analysis of water.

No.	Coordinate	pH	E.C. Us/cm
1.	28:39:358 N 017:19:782 E	7.45	3710
2.	28:49:283 N 017:23:068 E	7.25	5110
3.	28:49:283 N 017:23:068 E	4.0	60700
4.	28:55:478 N 017:17:368 E	7.40	4680
5.	28:54:264 N 017:15:108 E	6.90	24980
6.	28:33:619 N 017:31:636 E	7.15	4300
7.	Sewage of Zuwitina field	6.35	113800

Human activities

Very little thought has been given to threats facing wildlife in the Libyan desert. This type of environment prevails in more than 95% of the country, giving the false impression that their biodiversity must be unimportant. Nevertheless, many plant and animal domestication has been taken place in these areas, and many of the wild relatives of domesticated species still exist in their centers of origin in desert areas.

However, these plant and animal species are gradually disappearing as a result of excessive resource exploitation. There are also substantial plant communities still remaining in many refuges in the desert which are threatened with rapid destruction. Many desert plants are well known because they have medicinal properties that give them a high commercial value.

The present situation of biodiversity in this area is very critical, it is reflected by the disappearance or the degradation of certain natural ecosystems, and the rarefaction or disappearance of certain wild plant and animal species due to the uprooting of woody species, grazing (by camels) and the overexploitation and mismanagement of these ecosystems.

Many of the wild animal species that appear in the historical records in this zone (Such as: ghazal, birds, rodents, lizards . . . etc) are now extinct. The main factor that has led to this situation is natural habitat degradation due to the deterioration of the natural vegetation and overhunting.

In addition to environmental conditions, human activities in the study area (Agriculture, firewood collection, cutting of woody species, pastoralism, oil exploration and drilling activities) have a significant negative impact on the natural vegetation, the most important among them was the exploration, drilling and extraction of oil, which causes major pollution of solid waste, oil and associated brine water which come out with oil.

Stockbreeding constitutes an important activity in this zone, taking into consideration the available vast tracks and ancestral customs of a population of nomadic origin. Livestock is constituted of more than 5000 heads of camels and about 10000 heads of ovines (the majority are the heads of caprins). The herds are generally mixed ,made of ovines and caprinis of local origin. Herds are generally composed of between 30 t0 50 heads, this type of breeding is often parallel with other agricultural activities and consequently procures a complementary income for the farmers and breeders.

The most dangerous activities in the zone starts with seismic activities, with the continuous mobilization of the contractors crew, including their equipment in the area which has to be surveyed, with the location of base camps (with fuel tanks and fuel storage facilities with a danger of potential spillage) and the so called fly camps (with field catering, bottled drinking water, domestic water supplied by tankers and chemical toilet facilities). also by using bulldozers to clear access routes, which is mostly done at the expense of the already poor vegetation, trucks carrying portacabins, tents, camp equipment and generators, cable trucks, vehicles (many of these are four wheel drive) for transporting the seismic crews. Field operations cause a potential effect on land by the continuous use of equipment and vehicles on places in a desert environment with sparse vegetation, with slow growing plants and if damaged it may take several seasons for them to regenerate or die. *Zygophyllaceae* and *Chenopodiacea* are the most represented species in the zone and they are the most affected.

The use of the vibrators and all- terrain vehicles causes important perturbations on soil, which are not differentiated and form as a result of weathered products which are exposed to intense Aeolian and or fluvial action. In addition to the vehicle tracks, the operation of seismic lines will result in the creation of compacted areas of ground from the pressure exterted by the vibrating pads. These compacted areas will not recover easily and will effectively result in permanent scars on the desert crust.

Camp abandonment is one of the problems in these zones due to the debris and domestic garbage that should be removed along with the clearance of portacabins tents and other equipments, all these activities affect the natural vegetation which is already affected by the edaphoclimatic conditions and other anthropogenic factors.

The value of the vegetation in the zone lies in several existing pastoral species ,which are much sought-after by cattle and the role which these species play in combating wind erosion in a highly vulnerable area. Due to the high environmental value of the vegetation, the intensity of the impact is high.

Although these companies implement practical mitigation measures according to the relevant Libyan legislation, in places considered to be a hot spots species have survived for thousands of years perhaps millions of years and are certainly very hardy and can tolerate extremes of temperature , from zero to 50 C^{O}, and water availability from complete dessication to inundation, with exceptional quality.

According to the number of species and the presence of endemic species and other physical characteristics of the environment, these activities should be strongly followed or even prohibited and the area designated as a protected zone.

Recommendations

Although the study areas consists only a very small area of the desert lands around them, but they are an integral part of the overall environmental system, it can not be separated or isolated from the rest of whole region. Obviously, wildlife has been affected by what goes on in the around areas, and the areas around are also affected by what is happening in the study areas.

It can be understood from all the studies and surveys carried out, that the root of all threats to biodiversity in the desert areas is the lack of awareness about its value. Those who know about biodiversity issues in our country are very few indeed. We suggests that the protection of desert species should follow : identify species at risk; protect these species and their habitats, and establish a central data base to assist in the two preceding tasks.

Trees and shrubs play a vital role in ecological balance and improving the livelihood of people in the arid regions. Although the natural vegetation in the rural landscape must be studied and understood.

Due to the fragile ecosystem on this desert areas, the human activities is very harmful and must be studied carefully and narrowed as possible, to prevent environmental damage to soil, plants or animals.

It is must also be noted that the natural vegetation on the study zone linked to the presence of many types of insects, reptiles, mammals and birds, and any negative impact on the vegetation will have also a negative impact on these species, in addition to the impact on soil properties and increase the erosion process, because of the close correlation between the vegetation and soil. So we suggest the following points to make the damage resulted from human activities in the lower level:

1. Avoid the areas where the plants are spread, especially in valleys and low-lying areas which are characterized by more density of vegetation.
2. Commitment not to pollute the area of solid or hydrocarbons waste, and work on cleaning up areas around the wells after the completion of drilling operations.
3. Construct roads and tracks in the narrowest possible level, to reduce the escarpment and the trampling of the soil and plants.
4. Obligate the oil companies on the region, to develop environmental programs, such as the afforestation of tree species that appropriate to the environment of the area or resowing of the plant species that grow naturally, particularly in areas of low-lying areas and valleys.

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