

## Coping Mechanisms of Plants in Arid and Semi-Arid West Kordofan State – Sudan

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**Abstract:** The study showed the subject of adaptation mechanisms of plants in arid and semi-arid, and the researcher has adopted the descriptive and analytical and statistical methodology, as well as the historical significance, in addition to the approach of political ecology, and ecosystem approach, also adopted a paper on the survey. The research found that the rain and the heat and light of the most important elements of the climate affect either directly or indirectly, in the life of the plants, although the lack of rain and lack of effectiveness is one of the factors leading to the occurrence of drought and the formation of what is known as drought agricultural or climate in the study area, and characterized the plants characteristics of biological weapons to cope with environmental stress, which exposed in arid and semi-arid through modulations of biological and morphological and anatomical, and there are environmental factors influential (climate, biome, topography and type of sandy soil) The awareness of environmental and agricultural production (natural and artificial) of the most important solutions to protect the environment in the region. the study recommended an increase of farming to Neem and Samar trees to the suitability of the areas of arid and semi-arid.

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**Keywords:** Coping, Arid, Semi-Arid, Plants

### 1. Introduction:

Life is not a plant that grows naturally in any of territory, but as a result of the interaction of a number of natural factors that are related to, inter alia, in the prevailing climatic conditions. Sudan is mostly from areas of arid and semi- arid areas in the majority of the country is suffering from limited water resources, soils with low fertility and frequent droughts. These situations during which a number of erroneous practices of human making Sudan very fragile, and the plant carries out many of the mutations morphological, physiological and anatomical to adapt to these changes and in this paper we try to identify these mutations biology.

#### **Axis I: methodological framework:**

##### **Define the research problem:**

This study attempts to identify the coping mechanisms of plants in arid and semi-arid (morphological, anatomical and physiological), and the behavior of plants and the struggle for survival and living in drought conditions and climate volatile as a characteristic of arid and semi-arid, and the factors that make up the image of vegetation west Kordofan, as well as modifications that occur on plants in the study area even highlight the natural processes and human and biological, which is reflected on the plants and then maintain it.

##### **Reasons for choosing the topic:**

1. The importance of plants in arid and semi-arid to their fragility.

2. Showing signs of drought and desertification in the study area, and plant the most important solutions to these problems.

3. To learn how to plant resistance to extreme drought conditions.

##### **Research objectives:**

1. Highlight the specific nature of which is characterized by plants in the land dry and semi-dry.

2. Highlighting the role of drought in its impact on all aspects of the natural geographical in these areas.

3. Identify strategies for addressing the problems of dry land and to clarify the role of geography in this aspect

4. Study of man's relationship with his environment through natural activities with respect to plants and trees.

5. Provide some solutions and proposals contribute to minimizing the effects of drought and maintain the plants

##### **Research hypotheses:**

1. Rain is considered the most important factor in determining the image of the vegetation in the study area.

2. Combine natural and human factors in the emergence of the problem of drought in the study area.

3. To man the greatest impact in bringing the problem of drought and the removal of vegetation.

4. The awareness of environmental and agricultural production (natural and artificial) of the

most important solutions to protect the environment in the region..

#### **Research questions:**

1. What are the major problems and the effects of social, economic and environmental resulting from the drought in the study area?
2. Do humans region a significant role in bringing about the problem of drought and aggravated?
3. What are the processes and factors that necessitate the plants to adapt to the environment?
4. What modulations biological and physiological and anatomical carried out by the plant to cope with the environment?
5. How can maintain the plants dry and semi-dry?

#### **Methodology used in this research:**

To achieve the objectives of the study researcher Follow the descriptive and analytical and statistical methodology, as well as the historical significance, in addition to the approach of political ecology, and ecosystem approach.

#### **1: Descriptive approach:**

Cover a single subject and assemble It is an approach depends on the description through the method of observation and observed in the field, and on the way is described in many natural phenomena such as vegetation and ground forms and valleys and drainage system and the types of soils and rocks and description of geological samples and describe the topography of the region and its contents from the mountains and hills, and the reflection of the natural biodiversity, Add to the negative effects of man and his activities. Where the data collection and statistical analysis (1)

#### **2: The analytical approach**

Everything related to it (2)..

Through this approach is the analysis of the information collected in the field work and other sources.

#### **3: Statistical approach:**

Is the use of measurement and statistics in research and utilized here in the use of some mathematical equations used to calculate the coefficient of rainfall and drought in the analysis tables and statistical information that has been obtained from the relevant institutions are also analyzing the information collected in the field work and other sources.

#### **4: Historical approach:**

Uses the historical method to get the types of knowledge about the past through the study of some fundamental problems and social processes present (3). And the time factor is very important in geographical studies generally, Knowing the history of the phenomenon appoint a lot in understanding the phenomenon itself, and analyzed properly.

#### **5: Political ecology approach**

Ecology means the science that studies the interrelationships between human, animal and plant on the one hand, and between them and their environments different from the other hand (4) and the political ecology approach is an integrated approach to studying the relationship between living organisms and the environment, focusing on policies rights in this environment, it is curriculum addresses the problems arising from the growing pressures of humans on environment, resources and capabilities.

#### **6: ecosystem approach**

The ecosystem approach Interested in ecological and historical dimension which is concerned with the details of phenomena when? Why?, And how? Besides Where?

The ecosystem approach is a strategy of the ecosystem approach to integrated management of land, water and living resources, promote the maintenance of all of those resources and use them in a sustainable and equitable. The approach is based on the application of the ecosystem adapt scientific methodologies focused on levels of biological organization, which includes the basic structural processes and modus operandi and the interactions between organisms and their environment. It recognizes that humans are an integral part of many ecosystems depending on their cultural diversity. And requires the management of the ecosystem approach allows rapid acclimatization to deal with the complex nature of ecosystems and dynamic, in the absence of full knowledge or full understanding of how they work. The primary goals to destroy biodiversity conservation and ecosystem structure and the way it works, in order to maintain ecosystem services.

Report of Working Group II - Impacts, Adaptation and Vulnerability IPCC

#### **7: Tools used:**

The researcher in this study Adopted on field work and personal interviews and treatise on the subject of articles, reports, letters and web site (pdf), in addition to books and relevant references..

#### **8: Frame temporal and spatial search:**

Set the time period for the study of the year 2002 and until the year 2012, and the reason for the choice of this period and the emergence of the effects of variables on the plants area (West Kordofan) dramatically.

#### **9: The Importance of Search:**

1. The importance of research in plants that are important in arid and semi-arid.
2. Problems caused by the emergence of natural vegetation removal, such as drought and desertification.
3. The sensitivity of arid and semi-arid.

#### **Research objectives:**

1. Describe adaptations that God singled out - the Almighty - by succulent perennial plants to stresses facing drought and extreme heat in the hot deserts.

2. Explains the morphological characteristics and the anatomical and physiological singled out by God - the Almighty - by Plants in dry areas harsh for you living in the hot, dry desert environment.




3. Describes the characteristics of the seeds and fruits of adaptive desert plants, which help them to survive the hot, dry deserts, God willing.

#### Location

**West Kurdufan**

**Gharb Kurdufan [State](#)**



Location in Sudan. Coordinates:  [12°0'N 28°9'E](#) Coordinates:  [12°0'N 28°9'E](#) Country  [Sudan](#) Region [Kurdufan](#) Capital [Al-Fulah](#) Area • Total 111,373 km<sup>2</sup> (43,001 sq mi) Population (2006 (est.)) • Total 1,320,405 [Time zone EAT \(UTC+3\)](#)

#### Glossary of terms:

##### **Acclimatization**

Physiological acclimatization and adaptation to climate change.

##### **Active Layer**

*The active layer of the upper layer of soil or rock in the permafrost under the processes of freezing and thawing Alvsalitin.*

##### **Adaptability**

The ability to adapt

##### **Adaptation assessment**

Adaptation assessment process of identifying options for adaptation to climate change and evaluate the application of criteria such as availability and the benefits and the costs, effectiveness, efficiency and feasibility..

##### **Adaptation benefits**

Benefits of adaptation costs of the damage that has been avoided or benefits occurring after the adoption and implementation of adaptation measures.

##### **Adaptation costs**

The costs of adaptation costs of developing plans for adaptation measures, preparation and facilitation and implementation, including the costs of transition.

Climate change climate change refers to a change in the climate all over time, whether due to natural variability or human activity.

##### **Environmental factors affecting:**

1. A range of climatic factors air
2. A combination of soil
- 3 - a combination of factors site (topography)
- \* - group -stage biotechnology (5)

1 - The concept of adaptive

2 - is mutated in the behavior of the organism or the installation of his body or vital functions for members to become more suited to the conditions of the environment in which they live

[http://animalgroup2.blogspot.com/p/blog-page\\_31.htm](http://animalgroup2.blogspot.com/p/blog-page_31.htm)

**Adaptation:**

Modified natural or human systems in response to climatic stimuli or unexpected or real with their effects,

Reducing the impact of the damage to those systems or allows exploiting beneficial opportunities. It can distinguish many types of adaptation and adjustment, **including proactive and self-programmed:**

**Proactive adjustment:** is an adaptation that occurs before Note the effects of climate change. And also called Anticipatory adjustment.

**Self-adjustment:** is an adaptation that does not constitute a conscious response to climate stimuli, but comes as a result of ecological changes occurring in natural systems, or as a result of market changes or the level of well-being that occur in the human systems. Also referred to as automatic adaptation. It is the ability to adapt Adaptive capacity.

**Programmed adjustment:** adjustment resulting from a political decision taken on purpose and is based on the perception changed circumstances or about to change, and the need to take measures to return to the hoped- or maintain or achieve.(6).

**Drought:**

(Definition Smith, 2001) that the unusual dry period results in a shortage of water and a shortage of rainfall caused this lack of a permanent shortage of

water beneficial and which are found in the soil and in the rivers and dams may result in the end of a disaster.

**The concept of arid and semi- arid:**

These areas are characterized by water scarcity, or areas that are experiencing a shortage of water and the amount of the deficit is the exact degree of drought.(7)

**Founded the identification and classification of drought:**

Through mathematical equations can be identified to the case of a drought situation and whether or not the associated plant. Group I (coefficient of drought Marton) The second factor (coefficient of moisture) Group III (coefficient of drought Bodiko) Group IV (coefficient of drought climate Climatic Aridity)).

\* Group I (coefficient of drought Marton)

The de Marton of the early geographers who put way to determine drought and adopted in his study on drought coefficient The Index Aridity on the basis that the act of temperature and precipitation Hence coined coefficient de Marton dehydration way The following: \* The second factor (coefficient of moisture).

The coefficient has been designed Thornthwait coefficients of moisture which is possible to set limits on the values of the drought came and treated by the following image.

**Surplus water - water deficit**

**Humidity coefficient =**

$$\frac{\text{Surplus water - water deficit}}{\text{The amount of evaporation and transpiration underlying}}$$

**Climatic Aridity Group IV (coefficient of dry climate)**

In this regard and the private codification drought coefficient is proposed Narbin in 1972 and called the coefficient of drought climate Climatic Aridity aridity or a

$$\text{Coefficient of aridity and drought} = \frac{\text{The actual coefficient of evaporation (E)}}{\text{Maximum evaporation potential (EO)}}$$

The greater the gap between the actual value of the coefficient of evaporation (E) and the value of the maximum potential evaporation (EO) there is a drier more dangerous. True or close to it, it disappears the risk of drought 1

The classification of modern practice to classify environments dry and semi-dry depends on the water balance, if rain is equal to evaporation during the year, the guide drought is equal to zero, but if the rainfall was equal to zero during the year the value of the evidence of drought (- 100), but if the rains were

much more of potential evaporation during the year, the value of drought guide (+100), and based on this determine environments arid **and semiarid as follows:**

- Sub-humid environment (zero to 20)
- Semi-arid environment (-20 to -40)
- Dry environment (less than -40)

Environment severe drought (less than -40) did not fall off the rain. (Omar Abdullah Adam, Eve 0.2012 m:10- 11)

The drought factor determines the rain through the following equation:

$$\text{Rain coefficient} = \frac{\text{average annual rainfall / mm}}{\text{The average annual temperature / m}}$$

Thus, the environments are less than the percentage coefficient of rain less than (40) are classified as dry, this coefficient by drought and by the following equation:

$$\text{Drought coefficient} = \frac{\text{average amount of annual rainfall / mm}}{\text{The average annual temperature / m} + 10} \quad (8)$$

### Types of drought:

The types of drought affecting the plants are as follows:

#### A. Almitrologi drought:

He happens when the lower -than-average rainfall during the year or another for many years.

#### B. Hydrological drought:

Is the lack of water runoff to streams and the natural decline of the level of aquifers and groundwater.

#### T.. Drought of soil:

Known lack of scalability nominated for soil and water penetration in it, which leads to the appearance of increased aridity and we mean

The active layer or the top layer of soil or rock in the soil Active Layer.

#### W. Agricultural drought:

Hoamlah scarcity of water necessary for agriculture (9). Combine a range of different factors and leading to the appearance of drought and of these natural factors and human rights **with the environment and with the following breakdown of some of these factors:**

#### 1. Downward vertical winds:

It is the process associated with the session aerobic year in the area offers Central (30 northward +30 S), tropical, where heated air rises to the top is divided into two parts, one heading towards the North Pole and the other towards the south and during the landing quantities of air at (30 northward +30 southward) then become those areas because of the high pressure air in which the focus is Java, which leads to the formation of deserts as is the case in the desert southwest Asia and North Africa and the Sonora Desert in New Mexico in the United States and the Kalahari Desert southwest Africa and elsewhere.

This is the reason why very influential in increasing the area of the dry areas in the world where the areas are located in the broadest extension of the previous accidental omnivore and occupy a large area subject to these conditions and dominated by high pressure because of blowing air.

#### 2. To drop the local air:

It is the process associated with the horizontal motion of air, particularly when facing mountain ranges then the air is forced to rise to the highest peak of the series and then begins to decline again with the slope during the heated air due to compression or decline, which increases the ability of the air

saturation more than condensation in the sense that the air does not fall rain it increases the evaporation in the soil, plants and water bodies which increases the drought as is the case in the west of the Andes mountains and the northern coast of Chile and Peru (desert Otaa) and others.

#### 3. The stability of air masses:

And the lack of movement of air and wind that carry moisture as the relationship between the water available for fall and between precipitation actual are not simple ways where there may be dry weather in areas of high humidity, while no rain profusely in regions reached by air currents wetlands which are necessary to rainfall although it may also be insufficient, however rain falls examples include deserts and steppe of Central Asia be far away from the monsoon that hit the mountains of Himalaya and the Tibetan Plateau in western Africa has been working antibodies hurricanes in the presentations Arctic on the stability of air is cool and helps all of this leads to a reduction of the content of the cold air humidity decreases him to moisture and therefore be relatively low amount of precipitation

#### 4. Characteristics of rainfall:

Rain is considered a form of precipitation is characterized as rain in dry areas, including several features.

- variation in quantity throughout the year.
- Low amount of rain in the ninth nest Twenty-average.
- The most frequent value (token) was less than the median value.
- general lack of rainfall

Lack of rain and lack of effectiveness is one of the factors leading to the occurrence of drought and the formation of what is known as agricultural drought or climate, has become a low degree of effectiveness of rain less than the low amount of rainfall responsible for the occurrence of drought.(10)

Is the rain and the heat and light of the most important elements of climate that affect either directly or indirectly in the life of the plants, and the higher the temperature increased the amount of water lost. This means that the temperature determine the actual value of the rain. The temperature on the activity helps the plants, has emerged what is known as a zero growth? It is appropriate degree of growth, it is known that light is one of the most important elements necessary for plant growth greater the amount of light helped to speed growth (11). There is



a range of climatic characteristics that are characterized by arid and dry land from them.

- extremism warming.
- Lack of rain and fluctuating.
- a local winds laden dust.

There are many elements of climate characterized by dry areas at different locations in the world and these elements

- \* heat (thermal properties).
- \* rain (lack of rain and uneven).
- \* evaporation (evaporation intensity).
- \* storms (dust storms).

It can be argued there is climate change Climate change and desertification indicators in the study area is characteristic arid and semi-arid, Acclimatization and adaptation to cope with the physiological changes of climate, reflecting the strong relationship between climate and vegetation.

(FAO) said the Organization of the United Nations World Food

Are normally dry land to water scarcity - a result of the low level of precipitation and volatile, and high temperature, high evaporation rates - resulted - and as a result of the poor quality of the soil. annual rainfall is very limited as the rainfall patterns are irregular and largely unpredictable. The soils tend to be fragile and suffering from washing nutrients significantly and And erosion of the soil severe for metals and low natural fertility.

And classified the United Nations Convention to Combat Desertification, depending to the index of aridity - arid, semi- arid and dry sub-humid lands they dry. These include land, by definition, " other regions of non-polar and semi- polar, which is located where the average annual rainfall to the potential evaporation - resulting ] index of aridity [ within a range between 0.05 and 0.65."

Also includes the Convention on Biological Diversity and Ecosystem Assessment Goals (2005) severe aridity in areas defined dryland. After the classification of the latter, arid lands covering approximately 41 per cent of the Earth's surface

(No more than six billion hectares) and is home to more than two billion people (nearly one-third of the world's population. Estimates suggest that 18 per cent of these dry land covered by forests and other land tree.

#### **Types of plants:**

Desert plants are characterized as simple in composition and poor in the development and growth of vegetation and be open due to the spacing of plants and lack of continuity. The plant can be classified into four groups in the arid environment and associated inferiority in the amount of water available (rating Hills).

1. Hrash and seasonal bushes and cactus also include gatherings in the southwestern United States and the jungles of trees low and short. 2. Plants quarterly with a few types of growth which is short of the kind of waterless 30-120 cm high and only a short bushes and weeds quarterly.

3. Plants jungles of permanent or seasonal composed of both permanent or seasonal plants and prevail by Junkie.

4. Plants grow casual or temporary and that exist in the form of flat lid prevail throughout the year in areas where rain falls over low from time to time over the soil of these areas and restore the soil moisture.

The grass steppe has been possible to classify (Goodall and Perry) into two types

- steppes in semi-desert areas which is a short jungle estimated growth rate of approximately (10-30 %) of the natural vegetation with grass quarterly.

- steppes in the desert of the real cactus plants with less coverage of plants and brush about 10% or less with a few long brush that accompany the annual weed.

There are kinds of grasses prevail in semi-arid areas, including the semi-arid Lands weeds are found in areas between forests and deserts are the main quarterly. (12)

#### **Adaptive plant:**

There are many ways to adapt the plant in dry areas and which ones (heat tolerance, withstand wind, bearing the lack of humidity, lack of rain carrying, storing water, salt tolerance, deepening the roots) The following is an explanation of these methods to adapt the plant

. The ability to withstand the heat

Adapted plants with climate conditions, especially in the desert climate characterized by high temperatures most of the year and the lack of rain Plants Herbal up endure temperatures 50-55 m in dry air and some of them (Cactus, a prickly pear) has the ability to withstand heat up to 65 m while the husks only to assemble sand around and grow plants in sand, which feature wind Aersbtha Examples include plants dormant sand sand dwellers

Plants and coated sand sand binde working on building Allenbak and sand dunes (sand dune stabilization) and less of the movement, as there is competition between the sand and the compilation process of plant growth in order to stay above the surface.

2. The ability to withstand the lack of moisture

Considering humidity One important element to complete the process of photosynthesis and the humidity may ensure the continuation of the life of the plant cells, but in the case of the rule of drought for a long time be a guarantor to kill the plant, but may be renewed life in the event of rainfall means that the

plant adapts himself to the drought, such as acacia Alternative Carriers or stereotypes on the African continent and the other in India and Brazil, where herbaceous plants grow above the ground in half of the dry season and the roots of the plants remain green.

4. The ability to withstand the lack of rain.

Affect the amount of rain on the amount of plant growth as they largely determine the amount of the amount of water available to the plant where it is if it increased the amount of rainfall, the plant height increases and the following table shows us the effect of the rain on the height and length of the roots to the plant.

4. The ability to store water.

At the plant in the arid desert environments and to adapt by storing water in the roots or in the form of links under the soil surface and the large-sized bulbs where preserved for a period of 3 years and did not lose weight because of the drought and then grew after he ended a long drought.

There are plants store water in their leaves, such as cactuses and prickly pear and become the most components of a securities cells saturated with moisture.

5. The ability to withstand salinity.

It is a way of adapting the plant through salinity tolerance where the salinity -loving plants that require soil is salty.

6. The ability to deepen the roots.

Deepen the roots of a method by which gets the news T. water for example, a plant that does not increase the height of about 1.2 meters above the surface while deepening its roots to a distance of more than 4 meters in order to be able to get fresh water and the plants tamarisk tar -Maleh is also to deepen the roots for on the water.

There are other ways to adapt some plants, both by reducing the water lost from the plant, or to amend the situation and adjust the plant or face a water deficit and that the behavior of the best ways to get water from the air directly through the dew and fog condensation and water in the gaseous form.

**The definition of the desert:**

$$\text{The relative distribution of the degree of dehydration} = \frac{\text{rate of precipitation}}{\text{Determination of evaporation}} \quad (14)$$

**Plants adapt to living in the desert:**

We have shown previously that the desert environment factors constitute stress overshadow the lives of the types of plants that survive the desert. I have singled out God - the Almighty - This plant species characteristics of biological enable them living

"Sahara is a region where water resources far less than the capacity factors of evaporation and transpiration drying - and is reflected in the lack of rainfall and the lack of regularity and intensity of evaporation - in addition to extreme inequality in temperature between day and night, summer and winter, and characterize the soil lack of organic material, and it affects the vegetation shall be a grown sparse

Linder and the presence of trees, is also characterized by the presence of large areas of the desert naked –

completely - from plants. "(13)

**Deserts classification on the basis of the degree of drought**

Drought recipe for geographic areas of the world where water resources of precipitation - rain and the most important among them the dew, and the cold and the snow - less than the amount of water that can be them flouted by the forces of evaporation and transpiration.

Expresses the ratio between precipitation and evapotranspiration determination, the rate of dehydration; means the determination of evaporation potential, turning water into steam due to weather factors; means transpiration of water vapor out of the leaves of plants and its market. We have adopted the program of the United Nations Environment in 1992, and therefore, deserts can be classified on the basis of the degree of drought to three mattresses are: extremely dry deserts Extremely arid deserts and dry deserts of Arid deserts and semi-arid deserts Semi-arid deserts.

Deserts serious (severe) drought are those deserts which passes them in - or more - without dropping by rain, any rain is not an event repeated annually, and for example, the central regions of the Sahara Desert in North Africa, and the Empty Quarter of the Arabian Peninsula.

Deserts and arid deserts are those few women with irregular rainfall which does not exceed the annual average of about 125 millimeters.

The semi-arid deserts, deserts are those which ranges where the average annual rain between 152 and 250 millimeters.

in the desert; can distinguish plant species are different, with images different growth adapted to living in the desert, living in a community vegetarian one has faced each problem of living in the desert, a set of adaptations, may which is similar or may vary with other species.

### 1.1 annuals seasonal Ephemeral annuals

This group is characterized species of plants, as complement their life cycle in a short period; Studies have shown that members of the plant species *Buerhavea Rens Boerhavia repens* Holi complement their life cycle in the Sahara desert from the onset of the gesture and even the stage of formation of the fruit during the period ranging from 8-10 days; in a study conducted (the yearbooks in the desert northwest of Khartoum, he found members of the genus *Aldharash Tribulus* in the case of blossom and fruition after twenty-five days since the first precipitation Heavy rain, and that members of the two types of vegetarian *Aragrosts Bilosa Eragrostis pilosa* and *Mulujo Serviana Mollugo cerviana* took the life cycle stage of germination to flowering stage and fruiting period of one month.

Activity is limited to members of the types of vegetative annuals over a period of rain that are - usually - a short, wipes dry period, which may extend to several years in the form of dormant seeds, retain vitality for several years. The donation of God - the Almighty - These seeds bearing capacity of environmental stresses in the desert,

beyond what borne by members of most types of plants in the vegetative stage of growth. These plants, as such, fleeing drought.

One of the main advantages of morphological, that the total vegetation is small in size, and a whole root Shallow does not delve deeper into the soil; has between **Cannon(1911)**, the annuals in the desert of America, featuring the roots are shallow, and that the growth of most of the lateral roots are at a depth of between 4-5 centimeters, this root and spreads horizontally to cover a large area of soil Vistql - so - even rainwater few of them that do not wet the soil to depths far, as well as benefit from the water dew that condenses at night.

The types of annuals, fleeing drought, survival - God willing - in the desert, on their ability to produce seeds enough high, and the organization of the germination of the seeds in place and the right time in order to achieve the initiatives emanating from the seeds after germination successful to complete their life cycle, by the will of God; therefore, the types of annuals as well as characterizing what God - the Almighty - fast growth and ability to flowering and fruiting early, it may be summed up by the ability to regulate super- size depending on the growing conditions available in their habitat environmental. It has shown (**Obeid and Mahmoud 1971**), that members of the types of plants *Buerhavea Rens Boerhavia ripens*, up the process of maturity and have the size small when they grow in the home ecosystem are its water resources are scarce and thus, ensure the

production of new seeds, if less number, and thus, they do not spend their resources in the formation of a large shoot, do not allow the available water resources. In the case of growth in habitats are in rainy years resources abundant water and soil sedimentary soft deep, such as depressions and valleys, they grow to a large size holds hundreds of flowers, and so, they improve the exploitation of appropriate environmental conditions, which do not have always been in the desert, in the production of a plethora of seeds increase its reserves and stocks in the soil.(15)

In addition to the above, it has singled out God - the Almighty - the seeds of species of plants annuals mechanisms to regulate germinate, so germination successful in the appropriate time and place, where they have the best environmental conditions for the largest possible number of seedlings emerging from the seed, to complete their life cycle and produce seeds of new, since these mechanisms to prevent premature germination and reduce the waste of seed germination and in attempts to resettle failed.

Because the types of annuals similarity types of plants set other plants. (16)

### 1-2 semi- seasonal plants Ephemeroïds

Belong to this group of plant species perennial, similar to the types of annuals, seasonal, ephemeral, in that its members operate vegetation during the rainy season; has been characterized by God - the Almighty - a period of growth is short, as it completes its life cycle over a period of between one to three months ending the production of a new crop of seeds; this, with the beginning of the dry season, the parts thereof Supreme aboveground dry, and the remaining members of the reconstruction of Raizumat and bulbs, tubers, Ccormit, buried in the soil to a depth of between 20-30 Sntmitra, and in a dormant state during the period of drought; this, in and saves the members of the reconstruction - this - as much of the water. And represents the type of plant Bois Sanaïke *Poa sinaïca* this group of plant.

### 1.3 succulent perennial plants Perennial succulents

I've singled out God - the Almighty - Types of perennial plants succulent abundant tissue Albranchimih soft, which reduced the spaces between the cells, while the swells where gaps cellular and accommodate much of what can individuals types of plants - this - of storing as much of the water that is collected during the rainy season, to exploit during the dry season; the plant stores water in the leaves as the members of the types of cactus plants and aloe vera cactus *Al\_husar aloe rubroviolacea*, (image 1) and tolerant *Mesembryanthemum forsskalii*, or in the leg as members of the species in Plants *Algthe Carrluma penicillata* (Picture 1), or in the roots, as in the type of plant personnel *Ciba Parfaiflora Cieba parviflora*.





**Image (1) describes a type of plant licensed individuals, sewn, and ten in the study area**  
**Source: imaging researcher, 2013**

As the members of this plant species rely on the water that collected during the rainy season and store in their cells to use it in the dry season, they - and as far as God - have roots close to the surface of the soil, to absorb water rain until the little ones who wets the surface of the soil, and water dew that condenses at night. Nor characterized members of this plant species - generally - with deep roots strike deep in the soil, but is characterized by the roots extend into the soil offer is away from the surface; has shown (Cannon, 1911), that members of some species of plants succulent in the desert of America, such as prickly pear *Opuntia arbuscula* and *Verukakedz* and *Aslizina Ferocactus wislizeni*, are rarely rooted in the depths of more than 2 centimeters from the soil surface, but they are heavy and abundant roots extend into the soil is casually away from the surface. When the rainy season and the availability of water in the soil, swell parts of the reservoir in individuals succulent plant species quickly; this, they begin to atrophy gradually during the dry season to the next as a result of the consumption of the water inventory. God has singled out - the Almighty - the ability of this species to retain the super water. Vnbat figs, for example, if you leave a piece of it remains in the laboratory for months without losing its water from very little; has made it clear (Thomas 1951), that succulent perennial plants shut down during the day Tgoreha - where climatic conditions encourage transpiration - and yawning during the night.

The process of breathing in the types of perennial plants succulent differ from those in other plant species, as breathing in the dark leads to the formation

of organic acids of the type Almalit (Malate) and other (Thomas, 1951), and do not degrade these acids - to give carbon dioxide - but during the day following when exposed to light; nor uttered types of perennial plants succulent, carbon dioxide to the outside, as do other types of plants, but keep it and exploited in the process of photosynthesis; considered (Kluge 1976), this metabolic pathway for the production of compounds carbohydrates in the types of perennial plants succulent, mutation is consistent with her life in the arid desert environment.

This, and when you close members types perennials succulent Tgoreha during the day, they continue to loss of water through transpiration - epidermal junction, and even this, they lower it to a minimum, as their bodies are covered - completely - Badme very thick and reinforced by additional layers of wax), and materials Allipidah, which makes it less permeable to water (Denna, 1970) which protects individuals succulent perennial plant species lost water. (17)

### **1. plants In dry areas harsh Sclerophytes**

Include - this - most types of desert plants that belong to the patterns of the morphology of the different grasses, and herbs stiff and bushes and trees, which form the structure of permanent vegetation Desert, which is facing stresses In dry areas and suffer from its effects; was summed up by God - the Almighty - the characteristics of biome adaptive different enable meet the conditions of scarcity of available water resources, and unit factors evaporation which increases water loss by transpiration; these included adaptations ability to increase its water

resources to increase the absorption of the maximum amount of water and get it, and move it - enough speed - to parts transpiration, and reduce lost Balenth even You can keep the water balance in the case allow - God willing - her constantly; and we will review in the following part of this bio- adaptive characteristics:

**A. Increase the ability to get on the water**

I've singled out God - the Almighty - most of these herbal plants Almtkhcbh, shrubs and trees with a total radical prolific branching, spreading vertically into the depths of deep, and laterally to the long distances, thus occupies a large portion of the soil, Absorbs him as much as possible from the water Vistaad by the plant than lose Balenth Studies have shown The shrub -type plant licensed *Leptadenia pyrotechnica* and famous in the study area which has a high total vegetative 160 centimeters, totaling root to a depth of 11 meters and spread its roots laterally in each direction and covered a radius of ten meters; has been shown that the water available to them in such a large volume of soil - which spread its roots in it - the equivalent of 23,000 kg of water, and that all that touring this shrub Balenth a year, no more than 5300 kg grams, that is, the amount of water available in the soil could last for a period of four years, without the need for new supplies of rainwater. This, and helps spacing members of species of plants, which distinguishes vegetation desert open, to expand the scope of available soil per capita to absorb them needs water; also helps pressure Alawzmosze high juice cellular individuals types of desert plants such, to absorb more water.

Demonstrated (Altesan 2001), that the root system of the members of each of the two types of vegetarian Alsnamkh *Senna alexanrina* and were remarkably *Senna italica* extends to a depth of two meters and spreads - sideways - in the region of 1.5 meters in diameter.; Studies have shown the roots of perennial plant species in the desert of Arizona, USA, found that the length of the roots of plant species mesquite *Prosopis velutina* up to a depth of 15 meters. The roots of the individual types of *Acacia* *Acacia* sp. To 30 meters.(18)

**B. Transfer speed enough water and connect it to the parts of the plant by transpiration:**

Even in the case of the availability of affordable water in the soil, it is incumbent on the members of the species of plants In dry areas harsh, that the movement of water absorbed as quickly as they lose their surface Nath, otherwise, they will wither and become susceptible to damage caused by drought

**c. The ability to reduce water loss**

And we will explain this property by eating plants recipes In dry areas severe morphological, physiological and anatomical which enables these desert plants that survive the hot, dry desert

environment. I've singled out God - the Almighty - members of plant species In dry areas harsh morphology check which reduce the surface area by transpiration, reducing transpiration, and human, which reduces water loss. And morphological traits common among members of the species of plants In dry areas harsh, which reduces the surface area transpiration, the phenomenon of expansion in the growth of root and reduced the shoot, as the ratio of the first to the second, high either on the basis of height or weight; Studies have explained (that one of the members of the plant species *Acol graecorum* herbal chives, which does not exceed the height of half a meter leg, total root length up to ten meters.(19)

This, there are recipes morphology, adaptive another, reduce the surface area, and clearly show the members of the many types of perennial plant in the desert, including:

Individuals carrying large numbers of plant species In dry areas harsh desert, a group of small-sized leaves in the dry season instead of broadleaf regular borne - usually - in the rainy season Research also proved this phenomenon mutation useful for these plant species, in the desert, because they can practice the process of photosynthesis throughout the year, in addition, to reduce the transpirationprocess.

The bearing members types of perennial plants desert - General - papers small *Microphylls*; In another study sees that feature important papers small in the desert, it does not heat up too much when exposed to high temperature, and therefore, they do not overload the transpiration to cool. Carrying members of a lot of species of plants papers small in the rainy season, and drop it in the summer, and is (Mujahid et al 1995), the drop leaves and a very effective way to reduce transpiration, because the branches bare, a low transpiration significantly; The phenomenon in plant species following: From Unaizah in the desert of Saudi Arabia (20) - Featuring members of some species of plants *Bthurat* in the form of leaves, or its market to reduce transpiration Photos; these are, in the following mutations:

1. Mutation of the atria to the thorns, and watched, for example, the types of individuals, such as runny *Acacia* *Acacia raddiana* In Sidr *Ziziphus spina-christi*.

2. Mutated branches and thorns to watch, for example, the members of the two types of vegetable basket *Zilla spinosa*, and *Acol Alhgi graecorum*.

There are members of the plant species do not carry papers at all known plants paperless *Aphyllus* plants, and where the stems and branches of green photosynthesis process; these plants and even some of its branches in the fall season of severe drought, indulging in reducing the surface Nath. The non-paper plant species: licensed *Leptadnia pyrotechnica*,

Ghada Haloxylon perezii, Alti Calligonum polygonoides, Alti Capparis decidua, catamaran Haloxylon salicornicum.

One of the mechanisms that help to adapt to life in a dry environment, to change the paper Zawitha with leg movement active (ie, move the paper through to make energy from the plant) to avoid the fall of radiation vertically on the paper, as the falling vertically requires increasing the rate of transpiration to work on the cooling of the paper. The types of desert plants that live in conditions Ajafafah continuously for long periods, the majority of the stock in which is in a fixed position for the angle of the fall of the solar radiation and their leaves do not move the movement of an active but to be in an upright position; notes this phenomenon in the leaves of plant species ten Calotropis procera, and sheets qualitative vegetarian Alsnamkh Senna alexandrina, and were remarkably S.italica this, and there is a characteristic morphology of adaptive plants Alajafafah task - again - a phenomenon wrap or convergence sheet where you meet the edges almost constitute cavity closed open it stomata; increasingly, they turn in the dry period of the day, and decreases in the wet period, and leads the wrapping to reduce transpiration much, because the stomata open in the cavity closed, and the water that comes out through transpiration moisturizes the air located in these cavities, leading to high air humidity which, thus, reduce the intensity of transpiration, or stops; and see this phenomenon in many types of plants, such as grassy type plant cane sand Ammophila arenaria.(21)

This, and reduce personnel types of perennial plants grassy - well - from the loss of water, it loses most of the total vegetative, above the surface of the soil, in the summer because it dries up and break down, and the remaining buds live at the base of the plant, and operate the remnants of the shoot dry protection; When Solutions the rainy season, these buds grow and produce, green branches New; represent this group of plant, plant species cosine Panicum turgidum, and Mahrab Cymbopogon proximus, this, members can plant species Alajafafah durable, reduce water loss through the reduction of transpiration Iigra and human; Valtgor are windows that are through the exchange of gases between leaves and the atmosphere, It is that you can - God willing - to organize and determine the rate of transpiration significantly. I've singled out God - the Almighty - members of the plant species that have the ability to resist drought, the ability of super- lock Tgoreha in periods of extreme heat, than those plants that are drought-resistant, and therefore, they can - and God willing - to reduce water loss through transpiration Iigra when intense heat and water loss factors to be at its most intense. It is observed in some cases that more

plants ability - God willing - to resist drought, are those that summed God - the Almighty - the ability to open Tgoreha and for long periods during the early morning hours, and so, in the process of photosynthesis, and at the same time, the water loss from the transpiration by the narrowest.(22)

**Second: the anatomical characteristics:**

I've singled out God - the Almighty - types of desert plants qualities anatomical assisted living in the desert, as some of them achieves its speed transmission of water to compensate for what he was inspecting the papers and Members of water, some of which help to reduce transpiration, and some saves Securities and market its body if it is exposed to wilt the interim, and saves each of the vessels form without closes slouch cells, which is going soft - usually - when they lose some of their water.

And the following are the most important qualities of desert plants anatomical

A) increase the total area of the wood and display Oeith, as studies have shown, that the transmission speed of the water, and piped to Nathh surfaces, depends on the adequacy of the timber carrier devices that come up the total area of the wood and display Oeith.(23)

B) the presence of epidermal cells monolith in congestion.

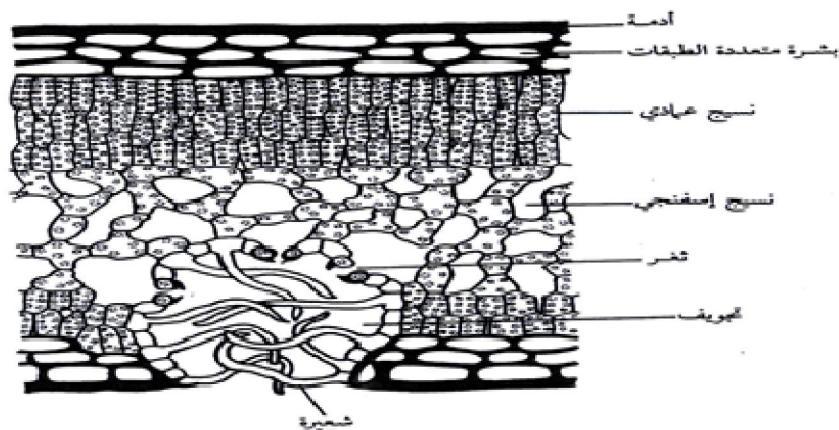
C) the presence of a layer under the skin in many types of desert plants; They add to the epidermal layer stacked in congestion, help to complete the protection function of anti- water flow or vapor to the outside through the cell walls.

H) the existence of a layer dermis thick impermeable, covering the skin from the outside Vtqll of water loss Balenth; characterized most of the plants that survive the dry areas the presence of dermis thick, working to reduce the transpiration of hand, and to protect the plant from the sun's rays on the other hand (Figure 1).

E) the presence of stomata in declines make it below the level of the surface of the skin, but it is in some plant species, found in the rooms, especially in the gaps, and protect their openings, many capillaries protective (Figure 1). Located in some of the gaps in the grooves of long legs.

F) the presence of lymph salt on the skin of some types of desert plants, especially those that live habitat salt, as the salt -secreting that are - often - of calcium carbonate that cover the surface of the paper, absorbs moisture at night, and thus reduce the rate of transpiration in plants, as in the types of plants Alhleyl Limonium axillare, and Ibn Sina Avicennia marina, and Alguendl Rhizophora mucronata.

G) the presence of water and the cells in the tissue wide Albranhimy the water and storing it in plants with leaves and leaflets and market juiciness.



**Figure 1: cross section in the paper type plant oleander *Nerium oleander***  
**Source: Mahmoud, A. (1977)**

### **Third: the physiological characteristics of plants Alaj In dry areas:**

#### **1) The lack of water content of the plant**

Characterized by desert plants - General - lack of significant water content, and is likely this shortage to glut the content of mechanical elements and thickening walls of their cells; are also likely to be attributed this shortage to a lack of water in the Albrocollazm himself that gain the ability to resist the lack of water and the possibility of its adverse effect, and the prospect of a significant lack of water without the injured damage.(24)

#### **2) the high proportion of water restricted**

Containing plants Alajafafah in the desert - usually - a high percentage of water restricted (Bound water), which is the water that is strongly associated materials colloidal in living cells to the point that it loses its property free water in terms of its ability for rapid evaporation under the influence of factors evaporative air; Whenever lack of water content of the cell, the greater the ability of water to those that bind Colloids. And makes the existence of this water unrestricted protoplasm - always - in the case of reservation Hydrolysis it vitality in serious drought conditions, and prevent it from exposure to drought destroy him, God willing. This is, of the most important physiological characteristics of desert plants that play a role in its relations with water.

This is linked to the high proportion of water restricted - closely - the ability of the plant to resist drought, and the possibility of permanent wilting. It has been observed that plants exposed to wilt Permanent repeatedly gaining resistance to fading gradually, with less than plants that die of it after all fading gradually Vtkon death rate as high as possible after wilt first, and less - a little - after wilt second, then wilt the third, and so on. And the concomitant increase in resistance to permanent wilting, a similar increase in the percentage of water restricted. As the

desert plants exposed - frequently - in their natural habitats for permanent wilting frequently is likely to be a repeat of this wilt factors that develop the ability to prospect drought by further restricting the water and stuck Colloids in living cells. (5)

#### **3: high pressure Alawzmosze:**

Of physiological characteristics important that characterize desert plants high pressure Alawzmoszy for juice, as ranges that pressure in most plants Egyptian desert between about 15 to 45 pressure air, and not more than that, except in rare, a pressure higher than in plants moderation (Mujahid et al., 1990).

It is noticeable that the high pressure Alawzmosze, recipe inherent to the drought conditions, it was found that the pressure Alawzmosze any plant, grow smaller the water content of the soil in which they live.

It is known to increase the pressure Alawzmosze juice cell in desert plants designated to absorb more soil water;

In light of the lack of water content of the soil, the soil water associated Bhabibadtha forces make great absorbed by the roots is difficult, therefore, the importance of pressure Alawzmosze high is to increase the capacity of the plant the water absorption associated with large granules of soil forces, and ensure their absorption of water and Vera.

#### **4) gathering proline**

It has been observed for a long time to increase the pool proline, an amino acid, in the tissues of the plant species that are exposed to high temperatures or drought or salinity.

Has interpreted the benefit of gathering proline in the tissues of plants in response to drought conditions, that the proline - and with its natural characteristics - may change in the nature of the cell walls divides them hydrophilic sticking to it, which



helps to link the water in the cell and its steadfastness in the face of drought.

### 5) tracks the process of photosynthesis

Studies have shown - to many species of plants that belong to the taxonomic groups and different environmental - and there are three types of photosynthesis pathways. in the following tracks:

A) the path where the primary outputs to represent carbon, organic acids containing three carbon atoms; therefore known species of plants that belong to this group as the carbon plants (**3 plants as 3 = C3 plants**).

Featuring a group of species of plants, that Tgoreha remain open for a relatively long period - during the day to get the carbon dioxide, and thus lose a great deal of water; Examples of this group - the types of plants that live Sahara Arab world - Lasaf (Shafalah) Capparis spinosa Leptadenia pyrotechnica and licensed and members of Fabaceae.

B) the path where preliminary outputs of representation carbon, organic acids containing atoms of four carbon;

known - this - as the plants carbon (4 plants as 4 = C4 plants); This track is common between the types of plants that belong to the subfamily grassy such as plant species cosine Panicum turgidum the script Stipagrostis plumosa and others, as well as in the types of plants succulent of the platoon Almuramip Chenopodiceae such as plant species catamaran Haloxylon salicornicum characterized by plants as 4, that the optimum temperature for the process of photosynthesis are high for the optimum temperature for the process itself in (plant k 3), and considered this property. Appropriate adaptation to life in the hot deserts (26).

This, reported studies, that the plants as 4 when receiving a certain amount of carbon dioxide from the air, you lose some degree of water less than the inspecting plants as 3 when you get the same amount of atmospheric carbon dioxide; addition to its superiority by the terms of the production of organic matter, as the organic matter produced by plants as 4 - to use a certain amount of water - are larger than those produced by plants as 3 if they used the same amount of it; therefore, considered plants as 4 more rational use of water and save him them, and more adapted to living in the desert.

C) the path of metabolism Alkrhiawla Crassulaceam metabolism

Known - short - on behalf of CAM, which is the path of special types of succulent plants such as Aseriaat Alkakedz Cacti and Euphorbia Zaqqum and know - this - plants CAM. Featuring plant species, as close Tgoreha during the day where the weather conditions encourage the process of transpiration, and yawning during the night, though her breathing in the

dark leads to the formation of organic acids of the type Almalit (Malate) and others; nor degrade these amino acids to give carbon dioxide, but during daytime second when exposed to light; this, nor uttered these plant species succulent carbon dioxide to the outside - as do other types of plants - but keep it and exploited in the process of photosynthesis; considered (Kluge1976), this metabolic pathway for the production of compounds carbohydrates mutation is consistent with her life in the arid desert environment.

### 1. Ecological seeds and fruits of desert plants

I've singled out God - the Almighty - the seeds and fruits of the desert plant species, the characteristics and features to help enable these plants living in the desert, include the following:

First, the characteristics related to seed Banbat

Characteristics concerning the organization of the germination process and the challenge of failed attempts in order to resettle the seed is wasted.

The dry seed of more phases in the life of the plant tolerant to environmental stresses caused by drought and extremism in temperature. Represents initiate seed germination stage moves the fetus developed a safety - which is where the latency within the novels on the short - to the process of gesture lively bio, where more dependent on environmental conditions surrounding them, and more influenced by; Under such circumstances, the desert unsecured and risky hazard, is the timing of the germination process - with the season, which is preparing the best conditions (solutions rainy season and water availability), which enables the seedling emanating from it, to grow and is endemic, the will of God - is crucial and important; therefore, the mechanisms that regulate the germination process are between important adaptations that enable plants from living in the desert environment. And supports the survival of these plants in that desert environment, it singled out God - the Almighty - by units of the breed characteristics of the biome genetic enable them to respond to the signs and effects of the external environment are exploited to explore the environmental conditions prevailing in their habitat environment, so it is not germinate only in place and the right time, where available the best conditions for much of the seedling emanating from it to grow to maturity phase.

Below, we will present some of the mechanisms that work - God willing - to organize the process of seed germination of desert plants, which limit the incidence of premature germination and reduce failed attempts in order to resettle, and the waste of seed.

A) the presence of chemicals that impede germination

Characterized by units of reproduction - in many kinds of desert plants - the existence of a barrier material for germination, a chemicals dissolve in



water; There are those - usually - in novels on the short, or in the embryo, or endosperm, or - sometimes - atmospheric fruiting. Obstacles and lead germination - this - an important role in regulating the germination process. It seems that the amount of these substances barrier for germination related to the amount of water required availability of seedlings emerging from the seed to complete their life cycle later, God willing. If the material barrier present in the seed as is the case in seed plant species Rue *Rhazya stricta* (**EL-Naggar, 1965**), it when the rain begins seed inherent in the absorption of water, and begin to matter particles barrier for germination in soluble in water, and spread from the seed to the soil. If the rains continued for a long time, and in sufficient quantities, it will be the concentration of the barrier for germination in the soil - due to the ingress of water into the ground - less than it is inside the seed, therefore, will continue its exit from the seed to the soil, and after going down equally critical of rain, falling concentration Article barrier for germination in the seed without a certain extent, and wash material barrier for germination away from the shrine of the seed, embarks on a germination; but if an interruption occurs to rain, before it is available equally critical of the water, the seed begins - usually - to reconfigure the material barrier for germination; order germination is successful, we have to wash the material of the barrier again and biologists have likened this phenomenon biological device for measuring rain, can measure the quantity of seed before they begin to germinate, blessed be God, the Best of creators.

This is the accuracy in determining the water requirements for seed germination, adaptations of the task that involved a great deal of seedling resulting from the germination process conditions for the subsequent appropriate, to enable them to grow and reach maturity, God willing.

Studies indicated, the fruit of that type plant *Salsola Anirms Salsola inermis* - which grows in the desert of Najaf - hands of shadowy cover of Pink (Perianth), contains a hormone -like substance Aloxan hinder the germination of seeds, and regulate the process of germination. And type of plant *Zaigovlm Dmosm Zygophyllum dumosum dendritic* - that people desert occupied Palestine - when they dry off disintegrate into five units proliferation, per unit of which contain the seed or two atoms, surrounded by fruiting part of the casing, which contains a substance barrier for germination, Dissolve in water, and the seeds germinate when the availability of adequate water which washes this article barrier.

Has conducted **Batanouny etal 1972**), experiments have demonstrated that the cover fruiting on the type of plant *Basketball Zilla spinosa* contains chemicals hinder germination, and that the presence of

seeds inside the casing fruiting prevents germination as a result of several factors, including the existence of this article anti- germination; has been found that these materials do not hinder the germination of the seeds of the same plant - but - but its impact extends to other seeds of plant species in the vicinity of its members.

B) is carried out novels on the short water-caused latency and regulate seed germination process

Is often a barrier to seed germination, is the fact that the shortened them thick impermeable to water. This phenomenon is widespread in many types of desert plants, especially between the types of plants species cornea Leguminosae. Can make Qasra such seeds permeable to water ways, mechanical, Kkhaddchha with a blunt object or dipped in acid; Perhaps this was what happens in nature, as the friction of these seeds continuous gravel and sand particles, as a result of floods and storms, and exposure to temperatures varying between day and night, as well as to the high degree of soil moisture in the rainy season, all these factors make Qasra these seeds, impermeable to water. This and many of the trees and shrubs that live in the desert valleys produce seeds solid impermeable to water, and rub against these seeds with gravel and sand grains as a result of floods and storms Vtkhaddh shortened them and become impermeable to water. The trophism some of the animals on these seeds, and it passed through her digestive system, and exposure to digestive juices, leading to Nvadih shortened them after they leave the water with animal manure; often seen in dry areas seedling types *Acacia Acacia sp.* In the course of the animals to places of drinking wells or excavations which collects rainwater, as well as in barns where animals congregate and spend the night after returning from the pasture. And bushes type plant *retama Ritam Retama raetam* - which outlive valleys in the desert of occupied Palestine - feeding animals, such as goats raised by Bedouins, the fruit; percentage of seed germination, which extracted from animal dung 50%, while the percentage of germination of seeds collected by hand from fruit mature 2 % and outlive the types of qualitative runny *Acacia Acacia raddiana*, and the hills *A.tortilis*, valleys in the deserts of Sinai and Najaf, and deer feed on the fruit of the type *Gazella dorcas*; as feed Camels and goats on the fruits of *A.tortilis*. The seeds of the plant runny *A.raddiana* which extracted from animal dung, grew by 21 %, while the seeds that were collected by hand from the fruits grew by 4 % during the ten days of cultured.

In a study conducted by (Mahmoud 1977), the germination of the seeds of three species of *Acacia*, are hills *A. tortilis*, and runny *A.raddiana* and *acacia Arab A.nilotica*, it became clear that the seeds of the three types of plants characterized by restricting it

thick impede water permeability and germination; has been possible to increase the permeability of the novels on the short water and thus increase the percentage of seed germination scratch chainsaw, without affecting the fetus, and also c) seeds in response to the temperature of the external environment.

It has been shown in many types of desert plants, the response of the seed is inherent to the temperature of the external environment - the habitat environmental - exploited as a mechanism to regulate the germination process, making them possible - just - when available conditions optimum environment (solutions to the rainy season and the availability of adequate water) which enables a great deal of seedling emerging from the seeds that germinated, that complement its life cycle and is endemic - the will of God. It seems that the seeds of this desert plant species, exploit their response to the systems daily temperature cycles, when germination as an indicator to explore the environmental conditions prevailing in the appropriate environmental habitat that ensures a large number of seedling emanating from it to complete the cycle of life and endemic. For example, in a study conducted by (Mahmoud etala 1983), the germination of seeds of plant species Adr Artemisia abyssinica, collected from Dahna desert in Saudi Arabia, show that germination of seeds is at its best, in a regular temperatures volatile (8 / 18.10 / 21 m), which represent those that prevail during the months of the rainy season, which is December, January and February; represents the system temperature 8/18 m, cycles daily temperatures that prevail in the months of December and January at the home of natural ecosystem to the type of plant a. abyssinica (18 m = average score daily maximum temperature is 0.8 m = the average daily temperature Minor), and represents a system temperature 10/21 AD, cycles daily temperatures that prevail during February.

Table (1) The reasons for the decrease in the trees

The reason	repetition	rate
The reason	Repetition	Percent
Lack of rain in	23	32%
Irregular rainfall	9	13%
Cutting and overgrazing	37	51%
Lack of environmental awareness of the importance of trees in	13	18%
Total	82	114%

Source: researcher 2014

It was clear that the seeds cultured in these two systems, the intervention in the case of latency, out of which sprout and a high percentage if cultured again in the system temperature is so prevalent in the one - month rainy season. According to the phenomenon of seed germination rates high and fast in the two systems to thermal 8 /18 10/21 AD, that it can be of most seeds of this type of plant - in his native natural environment - that sprout at the beginning of the rainy season - relatively cold, it can be a great deal of seedling emerging from the seed, would benefit from a period of five months (December to April) where there is adequate moisture and proper temperature for growth, even if they accept the roots Corynebacterium summer long, had penetrated the sandy soil to reach deep applied wet. This, the researchers watched the abundance of seedlings that emerged from seeds germinated at the beginning of the rainy season in December. Featuring the seeds of many species of desert plants, they carry growths of poetry to help them move by the wind, recall, for example, seed types platoon Decathlon Asclepiadaceae, such as the type of plant ten Calotropis procera, and there are some types of desert plants that fruit growths help them sticking the bodies of animals, thus borne from one place to another; Among these we mention, fruits Aldharash plant Tribulus terrestris, and Al\_husknyt Cenchrus biflorus and monkeys Neurada procumbens.

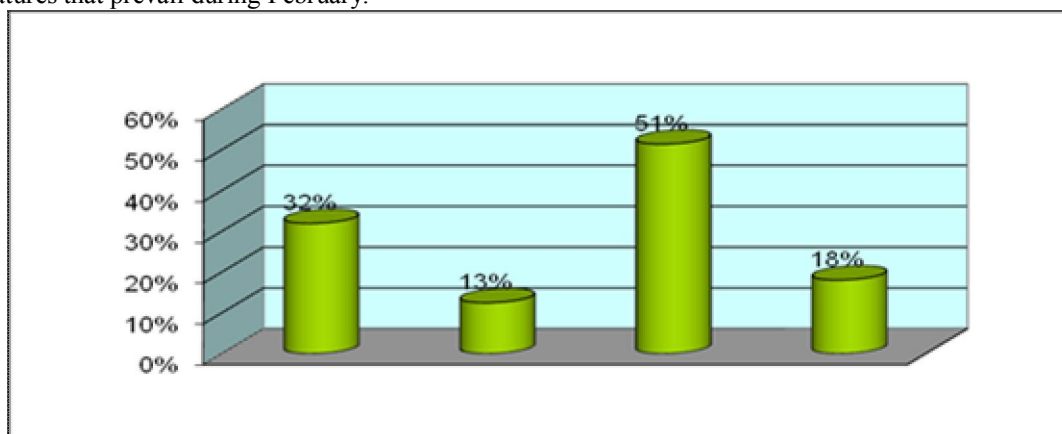
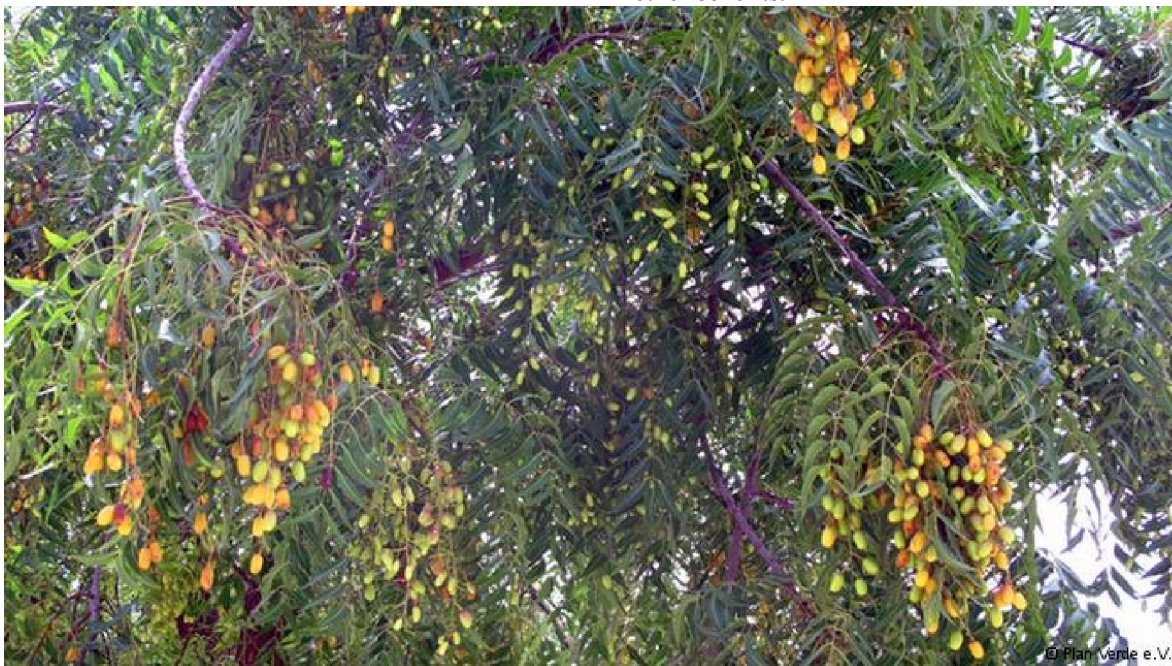


Figure (1) The reasons for the decrease in the trees  
Source: researcher 2014

As for the decrease, we find 51% of the respondents said that the reason for the decrease is the cutting, overgrazing, lack of rain, followed by 32% of the sample. Followed by lack of environmental awareness and 18% Table (24) to prove it.



**Picture (2) the neem tree as a solution to environmental problems in the study area**

**Source: filming researcher 2013**

Enthusiasm was strong from the beginning of this tree, they are highly resistant to climatic factors, it also uses a variety of well, and she says Elke Kruger Foundation Association Plan Verde and in Arabic means (Green Plan): "We have put the tree for several months under the water, and she was able to bear temperatures up to 50 ° C, and we have even planted directly on the coast in saline soils." Neem tree grew and grew in those extreme conditions, like neem trees braved two hundred thousand trees, which were planted around the city of Piura in northern Peru.

The first was planted neem tree 14 years ago. The age of neem trees up to 200 years.

Fragile sandy soil does not have good resistance in the face of storms and floods. And witnessing the northwest coast of the country, the so-called El Niño, which hit the coast every two years to 7 years. There are precisely show features neem trees, taking a lot of farmers in the region fields for these trees, which are deeply rooted in the soil, thereby providing the necessary protection against desertification. Trees that can grow up to four meters within just one year, the improvement in time the same quality of the soil, and the oil is an effective insect repellent harmful, contains materials to prevent proliferation and growth

### **Neem trees - rapid treatment of desertification**

Indian neem trees need a little water to a rapidly growing and deeply rooted in the soil. German planting these trees in dry land in northern Peru, which benefits not only the environment, but bring other benefits.

of mosquito larvae, from here, the cultivation of these trees will be very useful, especially in areas where the insects that cause the transfer of fever epidemics and malaria.

#### **Tree multiple benefits**

The oil extracted from the fruits of the neem For example, it can be used in the manufacture of disinfectants and some other products.

#### **Samar Tree to Combat Desertification:**

Called acacia, and often described as a tree « umbrella sticking » a reference to the distinctive crown, which is most widely used in dry areas in Africa and the Middle East. It is prevalent in many plant communities in the territory of the savanna (tall grass a few trees) and constitute a new source of feed for animals and wild civil.

Contrasting form of a tree hills of multiple logs, trees to a single trunk reaches a height of 20 meters, with a rounded or flat crown. Is also characterized by a tree hills for the rest of the African species the existence of two types of spines: long straight and short brackets. And that the vehicle of the paper sheets reciprocal situation on the axis (usually less than one millimeter in width), which is smaller compared to the rest of the species Buriqat bilateral installation. The



flowers hills eggs and zero pale, aromatic, round heads gather in Qatar per one centimeter. It rains flowers as the number of flowers in the branch up to a length of one meter up to 400 flower. The flower

heads turn in later centuries to carry bunches spiral is open. As you see rarely centuries also straight and vary in length between the centuries eight centimeters to 12 centimeters.



**Picture (3) Samar tree as a solution to the areas arid and semi-arid**  
Photography researcher 2013

#### **Tree arid and semi-arid**

Spreading tree dry hills in Africa from Senegal to Somalia and south to southern Africa. In Asia grow in the Arabian Peninsula and in Iran. And grow in all countries located around the Sahara and is often a tree that penetrate deep into the desert and in areas Iggsr grazing them in the territory of savannah, and grow a tree hills above the sand dunes and the surfaces of the rock in the valley bottoms of mud, and avoid areas where submerged by floods seasonally. It is a tree probability of severe drought and only by annual precipitation as low as 40 millimeters, and accept Htola Mellmitra up to 1200, and tolerate drought periods ranging between one month and twelve months. And the tree -loving alkaline soil and its ability to colonize the soil saline and gypsum as well. For the tree root and guided deep penetrates in sandy soil was up to 35 meters in the south of the Sahara, as the shallow roots in shallow soil, extend to twice the diameter crown of the tree, and grow the tree at altitudes ranging from 390 to 2000 meters above sea level and tolerate temperatures up to fifty degrees Celsius at midday, and degrees cooler at the freezing point at night. You can also large trees (about 3 meters in height) the possibility of frost and light the fires of grass fires.

#### **Samar tree feed and fuel:**

Tree is the source of samar good fodder for beauty and goats in the semi-arid regions, and is available Alvha along the dry season in the absence of other sources of fodder for him, as fodder for animals

and human food as well. And provide food for centuries milch animals to raise the rate of productivity of milk. The pods and leaves are rich in protein digested (average = 12 %) as they are also a source of energy for large Mobile 6.1 kg of dry matter, it is also rich in minerals. The seeds are rich in protein crude (38%), phosphorus, an element that is very rare in the land Alhacaúh. And you need to have already crushed the centuries to raise the proportion of digestion by cows.

The estimated proportion of flowers that fail to fertilization and fall from the trees at about 90%, but while this fall to be an important additional fodder. The production is estimated at about one ton of forage dry material per hectare per year.

Trees provide shade for the animals hills, and these trees grow under most types of grassy weeds palatable has been observed in the Turkana region in Kenya, high rates of mineral salts and the high proportion of herbal substances under the trees in remote areas compared with them.

Succeeded in planting trees, hills sand dune stabilization projects in Somalia and the United Arab Emirates and Rajasthan in India. The tree used in the establishment of green belts along with neem trees, to prevent the movement of sand.

Featuring wood trees hills that heavy makeup red color is perfectly fit for the production of charcoal and firewood. (About 4360 kcal per kilogram) and burning firewood in a slow and has little smoke if Java. The market used the tree stumps and in particular the

construction of the nest, and housewares industry. Also, trim the tree and cut the branches stimulates the production of the most prolific and faster than commensurate branches, utilization and management for the production of firewood, as happened in the natural forest land in Sudan. Eaten fruit and flowers source of wild honey and believe the good folk medicines

Enters every part of the tree in the hills all the activities of traditional pastoral communities, and believes tree flowers hills a good source for a good quality of wild honey.

### Conclusion

Adaptable plants, pictures of various growth, living in the desert, where I knew that God Almighty has summed it up, biological characteristics to meet the environmental stresses we are exposed to in the hot, dry desert. Plants seasonal annuals, characterized as a complement their life cycle within a short period, a period of rainfall and spend a period of drought, which may extend for several years in the form of seeds retain vitality for several years and bear the environmental stresses. Total vegetative small size, the whole root Vdhal not delve deeper into the soil. It also produces a high enough seed.

As it turns out that the plants are semi- seasonal perennials, annuals resemble seasonal ephemeral in that short life cycle, as it operates vegetation during the rainy season, and dry in the upper parts of the dry season, and the remaining members of the reconstruction buried in the soil.

Succulent perennial plants, characterized by an abundance of soft tissue Albranchimih that store water during the rainy season for use in the dry season, the water is stored in the leaves or roots or leg; roots and is characterized by occasional rain and abundant close to the surface of the soil is deep. And are also characterized by their ability to reduce the rate of transpiration Ptkulailha to the number of stomata and its presence in the depressions closed during the day and open at night. And reduced transpiration during the day -epidermal junction by corium thick waxy reduce water loss. And breathing in the dark is not decompose organic acids to give carbon dioxide during the day, but when exposed to light and Atelfez this gas to the outside.

They showed that the plants Alajafafah harsh, representing most types of desert plants of perennial weeds and grasses stiff and bushes and trees, and form, structure sustained Klads of vegetation in the desert. God has been characterized by morphological and anatomical characteristics and physiological increase their ability to get on the water, and move quickly and adequacy of different plant parts add - to reduce the lost Balenth.

We were the ecological seeds and fruits of desert plants; We have reviewed the mechanisms that singled out God Almighty to organize their seed germination process to reduce the occurrence prematurely and thereby limit their failed attempts in order to resettle the seed is wasted. These Alalebatt to the timing of the germination process with the rainy season, which is preparing the best conditions that enable seedling emanating from it to grow and endemic, God willing, the reproduction, I knew that God - the Almighty - has given her the mechanisms help to spread by wind, The seeds and fruits of many plants, characterized by compact, light weight and some with wings, and each carries growths of poetry, and that the fruits of some species, growths help sticking the bodies of animals Vtnqlha from one place to another. And even reap the benefits of adaptation Adaptation benefits which the cost of damage that has been avoided or benefits occurring after the adoption of adaptation measures and Tnivhahnak several tapir.

### Results:

1. Rain is considered the most important factor in determining the image of the vegetation in the study area.
2. Combine natural and human factors in the emergence of the problem of drought in the study area.
3. To man the greatest impact in bringing the problem of drought and the removal of vegetation.
4. The awareness of environmental and agricultural production (natural and artificial) of the most important solutions to protect the environment in the region.
5. Neem and samar tree considered appropriate to the area and are resistant to drought.

### Proposals to resolve:

- (A) drought monitoring and management programs;
- (B) plans to adapt to climate change in partnerships with sponsors and managers of pastures;
- (C) the development of crops and trees that are drought tolerant;
- (D) address land degradation and desertification, to reduce vulnerability to the effects of climate change;
- (E) keeping vulnerable habitats (including through dune stabilization, and water management in the oases, and the rehabilitation of degraded land);
- (F) To conduct research on the linkages between biodiversity, climate change and desertification;
- (G) the monitoring programs on impacts of climate change on the biodiversity of dry and sub-humid;



(O) put the costs of adaptation Adaptation costs which the costs of developing plans for adaptation measures, preparation and facilitation and implementation including the costs of transition.

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