



The National Field  
Research Centre for  
Environmental Conservation  
About innovative Environmental Research

July 2017 - Shawal 1438



Environmental monthly newsletter issued by the National Field Research Centre for Environmental Conservation



Sultanate of Oman  
Diwan of Royal Court

Issue 21



# A Study on the Treasures of the Wild Medical Plants at Jabal Al-Akhdar



## Environmental Psychology

Environmental Terms

It is the science that studies the relationship between the physical environment and human behavior. This science emerged due to increased attention to the environment and the challenges it faced, such as pollution, destruction, aggression, damage, tampering and corruption. The psychologists linked pollution to some psychological and social diseases that emerged in recent decades. It is a science that deals with the mutual relationship and the common influence

between man and his environment. It is a scientific attempt to contribute to the protection of the environment and to solve its growing problems. This is clear from the fact that most environmental problems are actually man-made. The content of environmental psychology is determined by identifying the relationship between the types of environments and human behavior. environmental psychology has a unique perspective in dealing with its subject.



point of view

## Environmental Investment

Dawood Sulaiman Al Balushi

Editor-in-Chief

Environmental investment is considered as one of the most important alternative sources for countries income, for the development of their economies and for commercial investments. Many countries in the world do not possess oil, gas or mineral resources, but they have beautiful natural environments and a diverse natural life of animals and plants, plus attractive natural reserves. Such countries put in place development strategies based on the investment of such natural and environmental sites inline with their culture, without prejudice to the environment of natural resources and without destruction to such natural wealth. Such sites have become the focus of global tourists' attention. attract the tourism and contribute in increasing the income of those countries.

The Sultanate is one of the countries that have unique natural resources. The diversity of its topography which combines sea with mountain, water with desert and historical sites with wildlife elements, made the Sultanate a destination for tourists from all over the world. Add to that, the fact that the Sultanate is the safest place amidst political storms experienced by many countries. This also makes the Sultanate an important station for commercial, economic and tourist investment.

It is important now to put in place new plans suitable for environmental investment. As well, it is a necessity now to activate the aspect of ecotourism with all its components. The government agencies should work together with the private sector to invest in this important sector which will directly contribute to the diversification of the country's income sources. The important point in this aspect is to develop conditions and laws that fit the physical and aesthetic situation of the tourist sites, so that such laws preserve the pristine and beautiful nature of these places, preserve all its innate ingredients and work on their development instead of become distructed and extinct.

The environmental balance in ecotourism investment in the Sultanate is a very important. That is why His Majesty the Sultan -may god protect him- has given it more attention in more than one speech so do not overwhelm side to side. That is because natural environmenta national treasures for all the generations of the Sultanate.

## Reading in an Environmental Book

### "ENERGY ECONOMY"

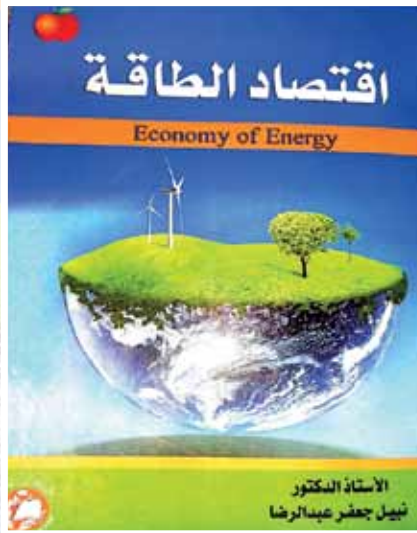
## A Book That Reviews History of Oil Usage and Its Renewable Alternatives

By: Maryam Hilal Al Maslahiyah

The energy economy has become the subject of the hour because of the direct impact of energy resources on countries economy, growth and development which usually rise up with the discovery or harnessing of new energy resources in any country, in a way that serves the economies and contributes to the diversification of public income. The book titled: Economy of Energy, written by Professor Nabil Jaafar Abdul-Riza, reviews the concept of the energy economy at present time, focusing on the history of oil energy use in particular.

The book consists of eighteen chapters. At the the chapters of the beginning, the author speaks extensively on energy generated from oil, and the theories that explain the dimensions of the dependence on oil energy. The most important topics highlighted are the challenges that arise from the countries dependence on oil energy. Among these challenges are the environmental challenges, the challenges of oil price volatility in world markets, the challenges of governments support for alternative energy sources, and energy conservation measures. The author presented, with some details, the case of the dependence of the State in its economy on discovered oil or natural resource, the matter which will affect the State in the long term in many ways, including:

1. Increasing dependence of the oil producing



countries, on oil revenues so that such dependence on oil revenues becomes entire.

2. The deterioration of the national non-oil economy, where its growth becomes negative, rather than improving, in spite of the increase in oil revenues of the country.

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**As a means of imposing control and entitlement in mating ...**

## **A Recent Omani Study Proves that Arabian «Tahr» Uses Holes for Communication**

A recent study conducted by the Office of Conservation of Environmental, under the supervision of the wild life specialist, Haitham bin Sulaiman bin Humaid Al-Rawahi and Dr. Steve Ross, on the behavior of the Arabian Tahr in the Ass. Sreen Natural Reserve, proved that the Tahr uses holes as means of communication with other members of its Tahr. The Tahr dredges its body into a hole as a means of imposing control and entitlement of mating. The videos recorded by the cameras trap show the act of dredging the body into used holes, which led the study team to assume that there is a function and importance of these holes to the Tahr such as testing their health. The experiment showed that males communicate with females, as well as with other males, by dredging the body into holes, while there is no available evidence of females communicating with each other in this way. The study conducted a test to determine whether there is a difference in the frequency of the behavior of dredging the body into holes according to the

seasons, sex or age of the Tahr. It turns out that large Tahr are more frequent than small ones. Young males stop the behavior of dredging the body on the approaching of mating season, while large males increase the frequency of this behavior during the same period. This pattern of body-sweeping behavior appears as a means of imposing control and entitlement in the mating. That is why this coincides with the mating season in October and February, which is the second mating season. The results show that this behavior plays an important role in the delivery of the male mating signal and the imposition of male dominance. As for the importance of message which the females seek to obtain from this behavior, it is likely to be looking for signs that show the physical ability and control status of the eligible partner to mate with. Dredging the body is a very important behavior in the social system of the Tahr, which contributes significantly to mating and choosing of the partner. Many mammals use the communication through chemical secretions, such as odors that secreted by these mammals.

## **Revealing the mystery of how air pollution can damage our heart health**

**Scientists can track path of**

# **air pollutants**

**in blood, heart**

Inhaled fine particles, like those emitted from vehicle fumes, could find their way into the lungs and then into the blood, where they increase the risk of heart attacks, according to scientists. Through experiments, where the gold particles of high-precision and harmless gold particles were used, scientists have for the first time managed to trace how these particles are inhaled and transported to the lungs and then into the blood stream. The scientists said in a London briefing recently that the most disturbing thing is that these particles tend to assemble in the damaged blood vessels of people who already have coronary heart disease which cause the risk of such diseases. "There is no doubt that air pollution is deadly," said Jeremy Pearson, a professor at the British Heart Foundation,

which provided part of the funding for the study. "This study brings us closer to revealing the mystery of how air pollution can damage our heart's health," he said. Experts have long known that air pollution carries serious health risks and can cause fatal heart attacks. According to the World Health Organisation, air pollution in open areas in both cities and rural areas caused three million premature deaths worldwide in 2012. However, researchers have confirmed, before now, how the particles inhaled across the lungs affect heart health. The new findings, published in the journal ACS Nano, reinforce previous evidence that the particles in the air that people breathe can reach the blood and move to many parts of the body, such as arteries, blood vessels and the heart.



◆◆ The National Field Research Centre for Environmental Conservation conducted a scientific study on the wild medicinal plants in Al-Jabal Al-Akhdar. The location was chosen because Jabal Al-Akhdar is characterized by botanical diversity that makes it a fertile area for research and environmental studies. This recent study is one of the many studies conducted by the National Centre in the field of botany in Jabal Al-Akhdar. The Mobile Environmental Research Unit has carried out many studies that have covered several aspects of rich biodiversity of Al-Jabal Al-Akhdar.

◆◆ Done by the National Centre Due botanical diversification of Jabal Al Akhdar...

The research was conducted by: Waleed Al Zakwani, Azzan Al Kalbani and Abdul-Haleem Al Rashdi



## A Study on the Treasures of the Wild Medical Plants at Jabal Al-Akhdar

### Stages of Study

The scientific study was divided into three stages, during which help was sought from environmental and botany experts and researchers. The first stage was the holding of several meetings and lectures on Ethnography and Ethnobotany of Jabal Al-Akhdar, followed by interviews with local residents living in the villages of Jabal Al-Akhdar and have experience of wild medicinal plants. The second phase was to learn more closely from the residents experience on the most important wild medicinal plants located in the study site.

### Objectives of the Study

The study sought to take accurate information concerning the wild plants from the local community and the specialists of plant sciences in the Sultanate and to collect and document these data and information, to be a database and a permanent reference for future research in the same specialty. This will enable researchers and scientists to benefit from such information, as well as contributing to the preservation of this rich biological heritage for future generations.

### The Plants Nursery

The plant nursery was based on the selection of plant species collected by the specialists and by local experts. A list of wild medicinal plants was prepared from the species found in Jabal Al-Akhdar, such as (Alalalan, Al-Atam, Al-Shahas, Al-Hanqalan, Al-Daja, Al-Saq,



### Results of the Study

- Multiple uses were identified for each plant.
- We found that there was a great deal of information about wild plants known by the local population.
- Saving endangered wild vegetation at Jabal Al-Akhdar by establishing a nursery.
- Raising awareness and educated the citizens at Jabal Al-Akhdar on the importance of wild plants and the economic feasibility of preserving them.

Al-Bot ... Etc.). The medicinal benefits of each cultivated wild plant were identified. The collected data showed the most prominent types of wild plants, such as:

**Al-Utum (wild olive):** It is an evergreen tree with a height of more than 3 meters. Its wood is often used in construction because of its durability and resistance to the termite insect. It is also used in the manufacture of sticks, while the fine branches are used as small sticks for putting the kohl around the eye. In the dry season, the fluffy branches with leaves are used to feed cattle.

**Al-Shahas:** It is a long life Dendritic Plant, used in treatment of mental illness, by rubbing the sickness place with plant leaves and fruits. Its wood is used in manufacturing tool handles, and sometimes, the stalks of Al-Shahas are used in manufacturing of mashakeek and Omani shiwaa sticks to give the meat a special flavor.

**Al-Qafs:** Its oil has many health benefits. It is used as a laxative to shrink the nerves when rubbed on the shrinking spot. It is also used as a treatment for constipation. It is laxative to the abdomen and there are many benefits out of Al-Qafs oil.

**Al-Hanqalan:** It is a small long living shrub. Its oil contains avian and alkaloids and flavonoids and combinets and episiotic materials used in the treatment of cracks that

■ The study sought to collect and document data and information, to be a permanent reference for future research.



Oman. It is a large shrub, famous for its delicious and moist fruits, which is often enjoyed by the inhabitants of mountainous areas and travelers. It can be used in the preparation of jam.

**Al-Mahlab:** It is a plant that belongs to the family of pink plum. It is one of the most important trees used as origin for grafting almonds and is grown in the cold mountainous regions. Its benefits are many such as strengthening of the senses, treatment of asthma, treatment of joints pain and treatment of tumors that are around the joints. It is also useful in treatment of diabetes.

**Al-Sakhber:** It has good smells, and used as medicine to cure colic. It is good food for animals, especially sheep.

**Al-Jaada:** It is used in treatment of headaches, and colic. It reduces the temperature and the sugar in the blood.

**The Plant of Elias or Ass:** It is used in treatment of abdominal diseases. Its leaves are collected, dried and crushed very well to extract a medical fragrance.

occur in the heels of the feet. The gum Al-Hanqalan from the stems of the plant, mildly warmed on fire until it softens and then stuffed into the cracks.

**Al-Dhuga:** It is one of the most famous plants in the Sultanate. It is used to treat chronic liver diseases, that is by crushing Al-Dhuga stem and its extracted juice, then the patient drinks it like tea. The Plant Extract is used to treat stomach diseases and burns. Newly grown stems of the plant have great benefit, for it is

very useful and is prescribed for the treatment of high blood pressure, pain, inflammation and it is good for diabetic when added to the salad with salt and lemon.

**Al-Saql:** It treats burns by rubbing the white sticky substance on the burned place. It also treats smallpox for children and has many other therapeutic benefits, especially the care of hair and beauty.

**Al-Namt:** It is considered as one of the wild trees that have a close relationship with the mountains of



### The Next Stage

- Complete the information from the local citizen through interviews.
- Identification of the spread of these plants in the study area through GIS.
- Expand this study to include other areas in the Sultanate after completion of the current study area.
- A complete book on medicinal plants in Jabal Al-Akhdar after completion of study and data collection.

## A Strong Presence for Environmental Projects at «INJAZ Oman» Exhibition

The Oman Achievement Exhibition, organized by (INJAZ Oman Establishment), witnessed a great response to environmental ideas. The exhibition, which was held for the fifth year in a row, included many environmentally friendly applicable ideas presented by the students. The ideas aim to utilize the waste by inventing high value and quality products out of it. Examples of such ideas, were the projects presented by one of students' company. The company focuses on the utilization of aquatic waste by transforming it into food for fish farming. Another company has recycled various materials and turning them into filtration systems for cars. Those filters are able to absorb chemicals and thus protect the environment from harmful emissions.

## «SQU» Establishes a Sustainable Energy Research Centre

Sultan Qaboos University has announced the approval of the University Council to establish a research centre for sustainable energy research. The idea of establishing the centre came as a response to the challenges facing the Sultanate now and in the future, in the fields of energy, due to the decline of conventional fossil fuel resources in a time that witnesses strong growth in the country's young population. The research centre seeks to diversify energy sources by expanding the use of renewable energy sources through the researches on energy policy and strategy, renewable energy, integrated electrical power systems, and energy management.

The areas to be considered by the Centre for Sustainable Energy Research include energy generating, energy rational use and the economical-social aspects of energy. Projects of such nature can contribute to further evidence-based decisions.

# Developing Falaj Luzugh



The National Field Research Centre for Environmental Conservation



The projects administration responsible for the study of the environmental systems of Aflaj water at the National Field Research Centre for Environmental Conservation at the Royal Diwan, launched the project of Falaj Luzugh, at the Wilayat of Samail recently. The project is the first one in the Sultanate to implement agro-fish farming using Aflaj water. It includes four different projects: i) fish farming, ii) plant farming, iii) solar irrigation system and iv) development of waterways.

What distinguishes this project is the participation of the people of Wilayat of Samail in the implementation and adoption of this project. They are well-aware that it will provide economic, environmental and social benefits for the people of the wilayat.

Dr. Saif bin Rashid Al-Shaqsi, Executive Director at The National Field Research Centre for Environmental Conservation at the Royal Diwan, confirmed that this type of projects constitutes a qualitative leap in the economies of oases associated with Aflaj. "We have been keen to implement a project

that can raise the economies of this falaj. Better economy mean higher income and more sustainability for Aflaj in the Sultanate. The project has proved successful. It uses modern technologies and is expected to spread. We call upon the owners of Aflaj in the Sultanate to implement such projects for their benefits and for sustainability of the system," he said.

As for the inter-relationship between this project and the solar energy project, Saif said it is known that the falaj irrigated land is divided into small holdings and the owner of a small holding finds it difficult to connect to the electricity grid. Each falaj has its own irrigation cycle, so water comes some days according to the system of each falaj. Therefore, this constitutes an impediment that prevents the farmer from feasible cultivation. However, using solar energy can provide water at the farm site. By using solar energy, the farmer can plant other crops, all of which lead to increase in production and increase the cultivated area in this region.

Eng. Khalifa Bin Badawi Al-Hijji, a specialist at The National Field Research Centre for Environmental Conservation, said that this inauguration is the beginning of harvesting fruits of this project that started at this place, with efforts made by many parties and completed with the unrivaled cooperation of the people of the Lazgh town.

He stressed that the selection of Falaj Lazgh to sow the idea of fish farming and water aquaculture projects plus the exploitation of solar

**The latest development  
introduces modern  
technologies into  
the existing aflaj-  
based agriculture and  
maximizes economic  
returns**



# constitutes a qualitative leap in the economies of oases associated with Aflaj



energy in irrigation, was not random, but according to the criteria found in this falaj, which includes abundance of water and sustainability, water quality and spatial proximity of Muscat Governorate, as well as the support of the local community to the idea.

Khalifa explained the idea of studying the environmental systems associated with fresh water represented by the falaj and praised Aflaj as part of the Omani civilization components that have continued to flourish and give us a historical and cultural record that reveal the greatness of our Omani ancestors, Hijji also pointed out that Falj Luzugh is still in its spatial splendour, engineering efficiency and administrative skill, a matter that astonishes everyone who happen to see it. That is why The National Field Research Centre for Environmental Conservation, in cooperation with a foreign organization and the University of Nizwa, represented by its Aflaj Unit, have sought to study the environment associated with Falaj Luzugh as an ideal model for Aflaj. The project included studying the biodiversity of the falaj environment, surveying

## The project included the development of Aquaponic system, the solar irrigation system, and the development of waterways

types of irrigated plantations, and planning pathways from Umm Al-Falaj to the end of the cultivated area, using spatial survey and geographic information, as well as reviewing the falj administrative records. The study did not forget to measure the quality of water which proved to be of high quality and encouraged the establishment of project. The engineer also stressed that Aflaj in general face many challenges, some are nature-made, some by humans. Many Aflaj have been adversely affected and have become extinct. So, giving attention to them must be one of the basics of sustainable development. "We are all aware that one of the biggest challenges facing Aflaj is their weak economic returns, which do not meet the requirements of their maintenance to ensure their sustainability. This is one of the reasons why the National Centre adopted the idea of starting such projects to maximize the economic return of Aflaj through Aquaculture and the utilization of solar energy for crops irrigation, using the available water to grow larger areas" he said.

The head of the Aflaj Research Unit at Nizwa University Dr. Abdullah Al-Ghafri explained the role of the Aflaj research Unit in this project, as well as the procedures and studies that were carried out to ensure that the project achieved good results. He pointed out that Nizwa University is the only university that has a special unit for Aflaj research. He added that Aflaj is a symbol for old and contemporary Omani life and role it plays in raising the economic well-being of individuals in particular and the country in general.



Environmental Vocabulary

## The monster of nature

Eng. Khalifa Badawi Al Higgi  
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He wanders with full lightness and agility between rocky highlands and the deep valleys, hidden from the whisper of human, searching for his prey that shares him time and space. Is unique to his location, movement and silence, and resumes living with his group or dominating his family. He lives individually and died as well. Is the top mammal species in the Arabian Peninsula that belongs to Panthera pardus nimr species. In Oman, his existence currently restricted to Dhofar mountains as it was previously found in Al Hajar mountains. It is the largest and most powerful species of Arabian Cats, but it remains the smallest among the 15 tigers in Asia and Africa. The male weighs about 30 kilograms, while the female is about 10 kg less. It is characterized by its yellow-brown fur along its back, and its body is spotted with a rosy pinkish-black spots, with a long tail at the back of the body for balance during climbing.

The Arabian leopard, the carnivorous, survives on its prey, for example Tahr and Gazal, and its activity increases at night, hiding under the darkness of night and continuing during day time activity with great caution of human presence. His isolation made him freer and more ferocious, and he did not meet any other leopard except during the mating season, which lasts only five days. Then the male is separated from the female, each looking for his way. If there is an opportunity for pregnancy, the female gives a cub to four cubs after a pregnancy period of up to 100 days. Cubs open their eyes to the world nine days after birth, beginning to explore nature around them. When they reach the age of four weeks they leave their den where they born, bearing to the wild individually, struggling with the harshness of life, and begin another episode of the chain of life with all the scenes and details, which may be up to fifteen years.

The individualism of the Arabian leopard and lack of its preys, in addition to the negative interference of human to his environment, has made the chance of declining numbers increases day by day, the current numbers warn of the risk of extinction. The existence of the Arabian leopard in its natural environment as the top mammals in the Arabian Peninsula and particularly in Oman, has the scientific, economic and social significance because of its integration in the food chain and the health of the environment and biodiversity. Therefore, the protection efforts must take a different approach to retain the current numbers and reproduction, hence, this great cat, the Arabian leopard, remains high in its natural and scientific status, a monster trembling from it scientific research and field studies, a monster that gives meaning to nature and adds beauty to the beauty. Let us convert this enemy mythic beast to an environmental component reconcile with and protect it to serve the nature and human beings.

## A Study warns of the future impact of heat waves on humans

Extreme heat waves will threaten human lives in the coming decades, researchers say, pointing out that 30 percent of the world's population is already exposed today to temperatures that seriously affect the control on human body temperature for at least 20 days. This percentage will increase to 48 percent by 2100 due to climate change.

The researchers analyzed earlier studies published between 1980 and 2014 on deaths due high temperatures, and discovered occurrence of 783 heat waves in 164 cities at 36 countries with a significantly higher death rate among their populations. For example, there was a heat wave on 2003 in Europe where thousands of people died in France and Germany.

The study pointed out that, in Moscow, the number of up normal victims heat in 2010 reached more than 10,000. In Chicago, the number of deaths from heat in 1995 was about 740. As well, New York, London, Tokyo and Toronto witnessed similar extreme heat waves. The study then analyzed climatic conditions during those stages, such as temperature, humidity, wind speed, and ray indications and they compared the results at normal time rates. Thus they discovered a temperature barrier that can be lethal if exceeded. They pointing out that the determining two factors in this regard are the temperature and relative humidity.

## For the Diversity of Its Natural and Archaeological Tourist Components

## Dhofar Shines during Its Autumn as An Undisputed Destination for Environmental Tourism

Dhofar is the undisputed capital of ecotourism in the world, for its many natural reserves which are distinguished by their unique Biodiversity of animals and birds.

The same can be said about its unique and varied landscapes, from plains, valleys, mountains, beaches to waterfalls. It is the pristine nature in its finest form, especially when combined with a long glorious history. No doubt, the visitor should think of this unique miracle of harmony between what is built by nature and what is built by the ancient Omanis. These aesthetics testify that the people of this homeland have long being reconciled with their environment. They preserved it and cared for it.

### Autumn in Dhofar

The autumn season in Dhofar has become one of the most unique tourist seasons, attracting hundreds of thousands of tourists annually. They are ranging from Omanis, Gulf citizens, Arabs and foreigners from all over the world. Latest statistics show that 652,986 tourists visited Dhofar in 2016. That is an increase of 26.8% compared with the year 2015, which witnessed 514,777 tourists. This confirms the global momentum of Dhofar Autumn.

### Beauty of Nature

Dhofar has great natural components. The coastal plain extends from the Raysut area west

of Salalah to the outskirts of the western city of Taqah. This coastal plain is characterized by fertile soil, clear groundwater, and moderate climate temperatures, throughout the four seasons of the year.

Dhofar Mountains are connected mountain series that extend from the east to the west, facing the Arabian Sea, to penetrate the various Wilayat of the Governorate. The Moon Mountain forms a proximity between the sea and the mountain series where separated by Salalah Plain.

Badia (Bedouin Rackets), overlap with a large part of the desert of the Empty Quarter in the north-west of the Governorate. Its climate is dry desert with little rain.

### Multi-Tourist Options

Dhofar has many tourist options which expand the wishes base of its visitors. There are the natural water springs, such as Ain Jarziz, Ain Sahlout, Ain Tobruq and Ain Rizat. All these springs are surrounded by trees and caves, as well as the beach of Al-Hafa and the beach of Al-Maghsal which is ranked among the top ten most beautiful beaches in the world. It is characterized by the abundance of waterfalls which give it a special aesthetic dimension, especially in the winter.

### Nature Reserves

The Governorate of Dhofar has a number of nature reserves, famous by name Al-Akhwar reserves, such as the small Qurum Khor and the Great Qurum Khor, both characterized by their Mangrove Tree species, environmently friend.

## Current Agricultural Life Threaten 41% of Wild Animals

The German Nature Protection Agency (GPA) has warned of a worsening situation for birds, insects and plants. «The state of large environments in agricultural life is constantly deteriorating, as all animal and plant groups in the agricultural arena are threatened with vanishing,» said the agency head, Piete Yassel, adding that this development is «alarming» and there is an urgent need to make a shift in agricultural policy.

In its new agricultural report, the Agency summarized many studies on the evolution of nature in relation to agricultural environments. «The situation of birds and insects is the most sensitive. For example 41 percent of the total 560 species of wild animals are threatened. Negative impact on the agricultural environment is noticeable even in protected natural areas,» said the report.

The Agency noted that the meadows, which are the habitat of many plants, as well as the pastures, suffer from this negative development. «Although it seems that the injustice has been stopped on the agricultural areas, but we have recorded the existence of a distinct and clear deterioration in green areas» explained Yassel who attributed that to intensive farming that relies more on the concentration of pesticides and industrial fertilizers.

As the Agency explained in its statement, insect loss does not only harm pollinator-based agriculture, but also harms the lives of the population.

