The National field research centre for environmental conservation

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Sultanate of Oman
Diwan of Royal Court

Issue 6

Warning alarm

Scientific study: about 85% during the last 13 years
The average production of the tree in Dhofar

Basel Convention

About the Convention:

This convention forms an integral part of the United Nations Environment Program for protecting the human health and the environment against the harmful effects related to the production of dangerous wastes, its cross-border transit and the management of its affairs. The convention focuses mainly on organizing the international trade of dangerous wastes, whose lists are mentioned in the annexures of the convention.

This international trade; allowed to specific parties only, is based on the prior knowledge approval procedures. Every party is entitled to prevent the import of dangerous wastes to its territories. The dangerous wastes covered by the Convention are poisonous wastes & substances, the wastes that cause infection, corrosive substances, environmentally poisonous substances, and the potentially explosive and flammable materials). Basel Convention has been ratified in Geneva in 1989 and became effective in 1992. 170 parties have joined this convention till date. There are specific conditions for the monitoring, application and compliance processes that should be observed while implementing the articles of this convention.

For examples, the articles of the convention obligate its members (the national governments that joined the Convention) to take all the necessary procedures for implementing the articles of the convention. This includes preventing any behavior that contradicts with the articles of the convention and imposing the suitable punishment on the offenders. These conditions form an integral part of the Omani environmental legislations. The Sultanate has joined the convention by virtue of Royal Decree no. (1191994/) dated 7 December 1994. The benefits obtained by the Sultanate from the Secretariat of the Convention include providing technical support, training courses, meetings, reports and guidance.

Objectives of the Convention:

To reduce the process of producing dangerous wastes in terms of their quantity and danger, to dispose of such wastes at the nearest possible location to the producing entity in environmentally sound ways, and to reduce its cross border transit.

To prevent the dangers of dangerous wastes resulting from the bad management.

To control the process of receiving, transporting and inventorying the dangerous wastes.

To avoid the operations of illegal disposal of wastes by the countries that produce dangerous wastes.

point view

Eco-Tourism

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Eco-Tourism is one of the most important tributaries of international tourism. It is also one of the best and fastest growing tourism in light of the great tourism openness witnessed by many countries of the world.

Thousands of tourists flock to the eco-tourism destinations seeking comfort, recreation, and discovery of new sites away from the noisy metropolitan cities. Therefore; the international statistics indicate a significant increase in the number of tourists who visit the countries enjoying natural attractions. Though some of these countries lack the development basics, yet they have paid a considerable attention to eco-tourism that opened up huge development prospects for them and constituted their most important source of income.

The mountainous, desert, coastal and historical areas; in addition to the forests and diverse wildlife constitute the most important environmental attractions in these countries. In this respect, tourists complement the efforts exerted by countries to conserve the environmental system according to regulated laws and mechanisms set by these countries to contribute into maintaining their natural, cultural and historical heritage. This way, such countries utilize their natural resources in ways that ensure conserving the ecological balance and seek to develop and sustain the aspects of such balance.

The Sultanate enjoys unique natural and tourist attractions. It has mountainous, coastal, desert, and aquatic environment. In addition, it has archaeological and historical sites, as well as unique biological diversity of animals and plants. This makes our country a perfect place for eco-tourism internationally and a popular destination for ecologists who visit it for performing ecological researches and surveys.

Various authorities at the Sultanate exert great efforts to develop such sector. However, the sector has not been utilized in an optimal way that makes it a tributary of national income for the Sultanate. Nature reserves may be one of the most important eco-tourism constituents in the Sultanate due to the unique and rare biodiversity they enjoy. The successful experiment of utilizing the turtles' nature reserve at Ras Al-Hadd is one of the successful experiments in this field. However, it remains as single successful experiment in light of the fact that there are diverse nature reserves at other various environments.

The eco-tourism sector in the Sultanate is a vital sector that will constitute one of the most important sources of income for the state if it is utilized in correct ways, which ensure the sustainability of its natural resources according to laws and legislations that pay attention to every different aspect. Utilizing this sector is not a difficult or complicated matter. There are many successful international experiments in this field that may be adopted in a way that suits our civilizational, cultural and environmental peculiarities. Therefore; we have great hopes in this sector because it is a very important source for diversifying the national sources of income.

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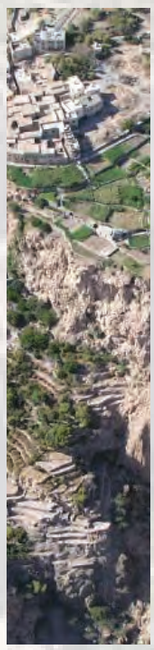
Over 30 scientists and researchers participated therein

MERU continues its programs for studying the Jebel Akhdar's Environment

In collaboration, the National Field Research Centre for Environmental Conservation (NFRCEC) has carried out a biodiversity study at the Jebel Akhdar Region in Dakhiliyah Governorate. More than 30 scientists and researchers participated in this study conducted as part of the scientific program of the Mobile Environmental research unit (MERU) Project for studying biodiversity carried out by the Centre in Al-Hajar Mountains and the project of studying vegetation at the Jebel Akhdar and Jebel Shams. Some governmental and prirate authorities in the Sultanate have also participated in such study.



During this project, the biological and wild diversity at the Jebel Akhdar have been studied. Moreover, the life of some existing wild animals has been studied. The researchers have also studied species of rare wild plants and perennial trees in the mountain like the boot (Reptonia muscatencesea) tree, Juniper tree, wild olive tree and many other trees. They have studied also the species of resident and migratory birds in the Jebel regions. Training sessions have been held on fixing camera traps for monitoring animals and birds and how to fix traps for insects, rodents and butterflies.

Dr. Saif Bin Rashid Al-Shaqasi, Chief Executive Officer of the NFRCEC said: "This project is being carried out as part of the plan conducted by the Centre through the field research with the objective of studying biodiversity at Al-Hajar mountains. It is considered to be a live experiment of field environmental work that serves many researchers and people interested in environmental affairs in terms of the data and photo gathering and environmental monitoring from the reality of field work." "The importance of such unit lies in the fact that it studies the environmental situation in the Sultanate and the importance of studying biodiversity so that it may contribute into setting the academic frameworks for many environmental subjects, in collaboration with some competent authorities. The unit conducts a comprehensive survey for biodiversity and studies it in sporadic areas at Al-Hajar Mountains like Al-Saleel Nature Reserve, Ras Al-Shagar Reserve, Jabal Qahwan, Jebel Akhdar, Jebel Shams and many other areas. The study areas have been carefully chosen due the very wide biological diversity enjoyed by such fertile areas for environmental study and explorations.

Al-Shaqasi: The project comes as part of the academic plan to study biodiversity in Al-Hajar Mountains

Dr. Saif Al-Shaqasi explained that the importance of such study stems from the fact that the vegetation at the Jebel Akhdar has been subjected to some threats whether natural or human. This affected the vegetation level at the region and caused some perennial trees and wild trees to suffer the extinction danger. Therefore; the NFRCEC has launched the project of studying the vegetation at the Jebel Akhdar and Jebel Shams, in collaboration. "This move aims to coordinate the efforts and involve the local community members in conserving the vegetation through combining between the findings of academic researches and local knowledge. The Centre seeks to create a sustainable system for conserving the environmental system in the Jebel region. The move comes as part of developing a sustainable environmental system to evaluate the current situation of the environmental system and identify the dangers that threaten its safety. Therefore; the first stage of the project included evaluating the vegetation and collecting the data regarding the situations of plants, environmental factors and the extent of human impact with the objective of identifying the threats facing the vegetation especially the Juniper tree, wild oliver tree and many other trees. This first stage aims also to involve the local community members in addressing such risks and the means of rectifying them." "The project of studying the vegetation at the Jebel Akhdar has been based on the previous projects conducted by some scholars. It aims to continue such researches about the Juniper. Some sites have been chosen for studying biodiversity at various areas of the Jebel and determining the vegetation patterns." Mr. Azzan bin Salim Al-Kalbani, wild life researcher at the NFRCEC explained."These sites have not been randomly chosen. They represent various environments and elevations in the Jebel Akhdar. The research team tend to evaluate trees the shrubs, weeds and grasses at every site by using a model square covering a space of 10 x 10 meters where the numbers of every species of plants are recorded. As for large trees, a bigger model square covering a space of 20 x 20 meters is used. These squares are utilized in defining the plant species and strains growing at every site." He added.

Warning alarm

Scientific study: about 85% during the last 13 years The average production of the tree in Dhofar

The study investigates the real situation of trees and analyze their protection policies to maintain a sustainable production of Frankincense ali bin Salem bin Muslim Bait Said for the frankincense "Boswellia sacra Flueck" populations at Jabal Samhan Nature Reserve in Dhofar Mountains.

This assessment has been performed in collaboration with the Desert and Arid Land Sciences Program, College of Graduate Studies at Arab Gulf University in the Kingdom of Bahrain.

The research included an investigation about the reality of the frankincense spread, an evaluation of its density and productivity, an analysis of the policies for its protection, and the contribution of local populations in maintaining a sustainable production of the frankincense.

The sustainability of natural resources in the nature constitutes one of the challenges that face the management of nature reserves in the Sultanate. The integrated environmental analysis that depends on indicators provides an effective means for evaluating the reality and prospects of using natural resources and analyzing the various effects of their usage. It is considered to be a practical way for managing the environmental effects of human activities through facilitating the framing process and the optimal implementation of the suggested policies and strategies.

The Biggest Nature Reserve

Jabal Samhan Nature Reserve is the biggest nature reserve in the Sultanate. It covers a area of 4500 km2; i.e. about 1.5% of the Oman's size. Jabal Samhan was announced a nature reserve in 1997. It has been classified under the second category of the International Union for Conservation of Nature's classification nature as a national park primarily managed for the protection of the eco-system. The nature reserve is characterized by its wild and coastal landscapes. It includes greatly endangered animals like the Arabian Leopard and semi-endangered species like the frankincense tree. The nature reserve is one of the main areas that produce frankincense in the Sultanate. It contains 60% of its environments; particularly the Hujri type, one of the best Omani frankincense types.

Frankincense in brief

About Frankincense "Boswellia sacra Flueck" The Frankincense "Boswellia sacra Flueck" trees are semi-endangered species. The populations of this tree fall under human and natural pressures that threaten their existence, as well as the live of local populations who depend on collecting its frankincense. These pressures include overgrazing, excessive collection of frankincense, soil erosion, and insect infestation. The pressures include also the precursors of climate change and the accompanying possibilities of a decreased rainfall and disruption in its circulation. The Frankincense trees belong to the Boswellia species and the Burseraceae group. The tree grow to 8m in tall. It has a single or branched trunk at the bottom. The bark of this tree is leafy peeled, and its leaves are dropped and compound. The leaves consist of 6 – 8 pairs of semi-opposite leaves with wavy edges. White yellowish light flowers with five petals and 10 stamens bloom on this tree. The fruits of the frankincense are small sized capsules that bloom broadly with sizes ranging between 8 – 13 mm. The tree propagates through seeds.

Regions of the frankincense

The regions of the frankincense trees' spread at the nature reserve have been specified through the field visits and the use of a geographic

Frankincense Trees

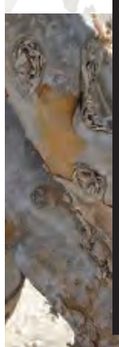
A Symbol of the Omani Ingaenuity

Findings

The findings indicated that the frankincense cover a space of 50% of the nature reserve's area with an average density of 2.3 trees/ hectare. Such findings indicated also that there was a significant decline in the density of the trees with about 85% during the last 13 years. The average production of the tree in the southern valleys area reached 3.3 kg/ year. The findings of the assessment showed that the local residents depend on grazing as a main source of income, followed by governmental jobs and fishing. The percentage of persons who work in the job of collecting frankincense reached 17%.

The survey conducted revealed that 34% of local residents think that draught is the reason of the trees' deterioration; while 32% of them attributed the deterioration to the injury of trees. 25% of the residents attributed that deterioration to the frequent injury of trees; while 9% of them attributed it to overgrazing. Despite the multiple legislations enacted for conserving the biological diversity; yet these legislations have not reduced the deterioration of the frankincense trees as most of these legislations are supervisory or regulatory that lack the economic tools and are distinguished with its weak implementation.

The increase in the number of populations residing in areas adjacent to the nature reserve, the economic development, governmental support for the craft industries related to the frankincense trees and the increasing demand on it are the reasons behind the deterioration of trees. The sustainability scenario is the best option for maintaining the sustainability of frankincense trees and their habitats. An array of policies have been suggested for stopping the decline of frankincense trees including reviewing the nature reserves law, implementing the pastures and livestock management law, building a database for the populations, their gatherings, herds, resources, the industries based on the products and services of the nature reserve, and setting a plan for conserving the frankincense trees in the nature reserve.



positioning device. Three sites at the nature reserve have also been chosen to be subjected to study. These sites include the southern valleys (Samhal, Recout and Dahnout), the central plateau (East of Sanaq Heights, West of Sanaq Heights, Moudin Heights) and the northern valleys (Amdat, Harwell and Karnah 2, 1). The density of the frankincense trees has been calculated according to the dimensional method – the nearest individual method. No less than 20 random spots of the frankincense populations. The distance from the random spot to the nearest tree (m) has been calculated. The average distance to the spot has been calculated in meters, then the density of trees has been calculated in hectares. The production of frankincense by the trees has been estimated according to the traditional method of collecting it by choosing three sites utilized by the local populations. The similarity percentage in the density of frankincense trees in the sites of study has been specified statistically using the cluster analysis.

Economic and Social Survey

The viewpoints of local residents about the real position of frankincense trees, the reasons of their deterioration, the pressures that face the nature reserve, and the current and suggested policies to maintain them have been reviewed through a questionnaire that included conducting interviews with a random sample of residents at various areas surrounding the nature reserve. Focus was made on the residents who work in the professions of collecting the frankincense. The questionnaire included questions about the social status and the professions practiced by local residents. In addition, it included questions about the products and services provided by the environmental authorities in the nature reserve for residents, their viewpoints about the benefits of creating the nature reserve and the extent to which they are aware of the policies and laws that regulate the management of the reserve and their suggestions about them.

Integrated Environmental Assessment

An integrated environmental assessment has been conducted for the deterioration of the frankincense trees issue in the nature reserve using the (DPSIR) matrix. The environmental policies applied in the Sultanate, in addition to the policies related to the nature reserve and the production of frankincense, in particular, have been collected, analyzed and reviewed. A scenario that serves as a supposed perception for the expected reality of the frankincense trees has been set in light of the current usage. This scenario has been compared to the sustainability scenario after taking the driving forces and the pressures experienced by the frankincense trees into consideration. These factors have been linked to the current reality, the effects resulting from these pressures and the responses to them. Alternative policies have been suggested to reach the status of sustainable usage of these resources.

The NFRCEC organizes a Photoshop course

The National Field Research Centre for Environmental Conservation (NFRCEC) has organized a Photoshop course at its headquarters with the objective of enabling the employees use the Photoshop program in designing advertisements, posters and awareness books. The course included identifying the employees with the Photoshop program, its main tools and how they are used. It also included an explanation about the way of using the internet to get some fonts and brushes; in addition to the way of setting up such fonts and brushes in the program. Application lessons have also been provided for some designs like the advertisements and posters. Furthermore; some lessons were provided about the ways of designing books, magazines and newspaper pages. This course comes as part of a series of media courses conducted by the NFRCEC with the objective of promoting the technical skills of its employees and identifying them with all the new developments in media and its most updated techniques.

DECLINE OF BEES AND OTHER POLLINATORS COULD THREATEN WORLD FOOD SUPPLY: UN

Thousands of species of pollinators including bees, butterflies, wasps, birds and bats are at risk of extinction. Thousands of bee species, butterflies, birds and other pollinators are heading towards extinction. This trend poses a huge threat to world food supply because pollinators help plants in producing their next generation and contribute to the hundreds of billions of dollars of food every year. According to latest United Nations' report, more than 20,000 pollinator species play a vital role in providing world food supply. Yet an estimated 40% population of invertebrate pollinators including bees, butterflies and wasps has declined considerably over the years, putting them at risk of extinction.

Unhealthy environment a factor in millions of deaths worldwide

Living or working in an unhealthy environment caused almost one-quarter of all deaths worldwide in 2012, says a report released Tuesday by the World Health Organization (WHO).

In that year, an estimated 12.6 million people died due to human-caused environmental risk factors, such as air, water and soil pollution, chemical exposure, climate change and ultraviolet radiation. Environmental hazards and risks wield «a devastating impact» on global health, the report said. "A healthy environment underpins a healthy population," said Dr. Margaret Chan, WHO Director-General, in a statement. "If countries do not take actions to make environments where people live and work healthy, millions will continue to become ill and die too young," she said.

Environmental risks are deadliest for young children and older people, the report said, with children under five and adults aged 50 to 75 years most imperiled. Yearly, 1.7 million children under five and 4.9 million adults aged 50 to 75 deaths could be prevented through better environmental management.

Fungi from goats› guts could lead to better biofuels

The legendary abilities of goats and sheep to digest a wide range of inedible materials could help scientists produce cheaper biofuels. Researchers say fungi from the stomachs of these animals produce flexible enzymes that can break down a wide variety of plant materials. The scientists say that in tests, the fungi performed as well as the best engineered attempts from industry. Environmentalists have long criticised the current generation of biofuels that are produced from crops, such as maize, as they believe that using land for fuel instead of food drives up prices and impacts the poor. Researchers have had some success making usable fuel from food and animal waste. But, so far, the ability to efficiently use the vast majority of cheap, waste organic material has eluded them. The problem with turning wood chips and grasses into fuel is the matrix of complex molecules found in the cell walls of these tough materials. Industrial attempts to break these down into the type of sugars that can be refined for fuel often require preheating or treatment with chemicals, which add to the complexity and the cost.

To solve the problem, researchers have turned to the well-known abilities of goats and sheep to digest almost anything they eat. Researchers believe this facility is the result of the presence of anaerobic gut fungi, organisms that have existed since the time of the dinosaurs.

To test their ideas, the scientists collected fresh manure from a zoo and a stable and isolated three previously uncharacterised cultures from goats, sheep and horses. They found that these fungi excrete enzymes that break down a wide range of plant material.

Unlike the best genetically engineered enzymes produced by the biofuel industry to date, they discovered that the sheep and goat fungi produced many hundred more of these proteins.

These were «substantially better» at breaking down a type of material found in wood - and when the researchers changed the diet of the fungi from grass to sugar, they found that the organisms changed the type of enzymes they produced in response. «Because gut fungi have more tools to convert biomass to fuel, they could work faster and on a larger variety of plant material,» said Prof Michelle O›Malley, the lead author from the University of California, Santa Barbara.

«That would open up many opportunities for the biofuel industry,» she said.

The scientists involved say that these types of fungi can be found in a wide variety of animals apart from sheep, ranging from cattle to elephants.

«In our work we have identified hundreds of enzymes from anaerobic fungi with commercial biotechnology potential,» said Prof Michael Theodorou from Harper Adams University, UK, another author on the paper.

«We need to invest more resources to study this group of relatively unknown micro-organisms. They may hold the key to the renewable technology of effective biomass conversion. Their full potential must be explored and exploited.»