



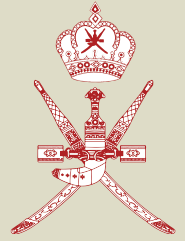
The National Field Research
Centre for Environmental
Conservation

Towards innovative
Environment Research

May 2016 -Shaban 1437

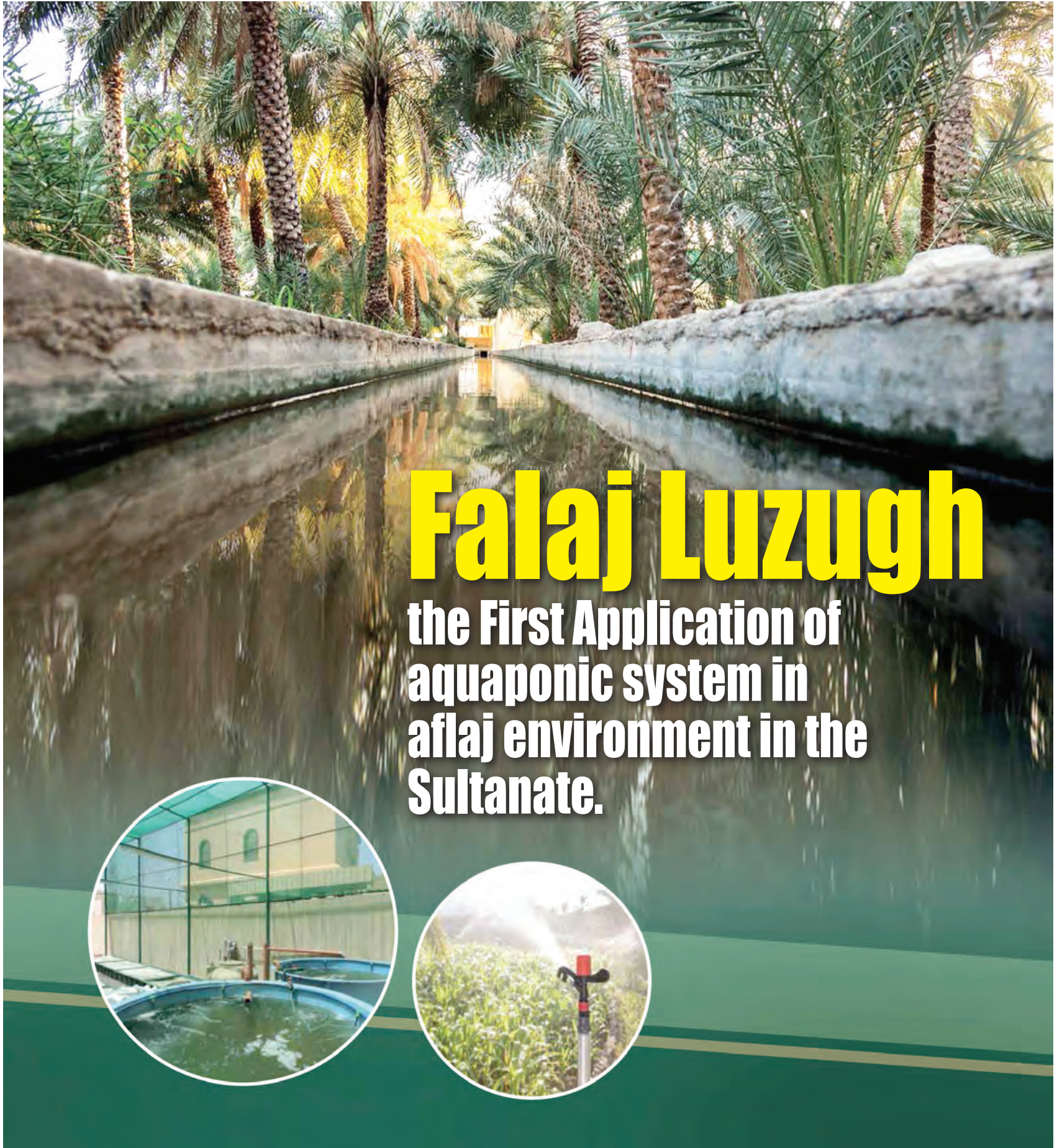


Environmental monthly newsletter issued by the National field research centre for environmental conservation



Sultanate of Oman
Diwan of Royal Court

Issue 8



Falaj Luzugh

the First Application of
aquaponic system in
aflaj environment in the
Sultanate.



- ◆ The National Field Research Centre for Environmental Conservation have been in participation with “Clean Up Oman”, with a number of governmental, private and civil organizations and NGOI in the annual clean-ups of Daymaniyat Islands Natural Reserve, which was organized by the Ministry of Environment and Climate Affairs.

Establishing true associations with different authorities to protect the environmental system

The National Centre participates in the annual clean-ups of Daymaniyat Islands Natural Reserve



Mohammed Al-Tobi,
Minister of Environment and Climate Affairs

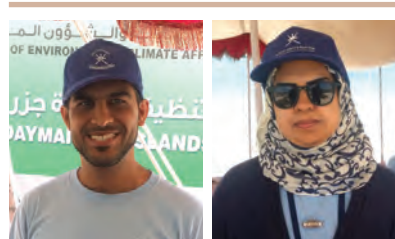


Moreover, the participation of the National Centre comes from their aim to find a true association with different governmental, private and civil organizations to carry out several programs, activities and events that contributes in protecting the environmental system in the Sultanate and so as to raise the environmental awareness of the importance of protecting the elements of Omani environment among several segments of society.

The Importance of the Natural Reserve

Daymaniyat Natural Reserve is an icon in the Sultanate's Marine Reserves. It was announced as natural reserve under the royal decree N. 23/96. The natural reserve occupies a total land of approximately 203 Km square and it is located northern the governorate of Muscat and eastern Wilayat Barka. In addition, it consists of 9 main islands which are: Daymaniyat, Kharabah, Huyoot, Al Jabal Al Kabeer, Um Al Liwahah (Minaret) and Al Jawn that includes three islands. When one approaches this natural reserve, several natural scenes will be remarkable to their eye such as seabirds and coral gardens reef whose colours sparkle under the water forming a natural archipelago that extends to far distances. The rocky shores can also be remarkable as it extends deep inside the waters to a distance of 20 to 25 meters. Not to

250 participants contribute in the campaign to raise environmental concern and assure on the importance of protecting the elements of nature



Omran Al-Kamzary **Batol Mohsen Baqer**



Gasem Al-Mawali **Khamis Al Hadi**

mention that it is the one and only location in the Sultanate where Osprey lay his eggs and reproduce in winter.

Furthermore, there are 15 species of wild plants that exists and grows in numbers in both Kharabah and Al Jabal Al Kabeer islands. There are also two species of reptiles: skinks and Gecko beside two species of turtles that also reproduce in the island: green ones which exists in small numbers and loggerheads who reproduce in ratio of 250 to 300 turtle annually especially in the areas where coral reefs grow most. In addition, several marine mammals live in it such as bottlenose dolphin, common dolphins, spinner dolphin and Megaptera. Regarding wild animals, there are not any species of wild animals living in the island as the only method to reach it is by sea.

Environment Concern

Maryam Al Farsi, one of the campaign's contributors, made it clear that her contribution came out of her concern of keeping the Omani environment clean and protect its natural elements as it is a national duty, for us members of society, to contribute in this national sense of environment. She added that we all need to work on raising environmental awareness with its different programs and forms. The campaign has been beneficial to Al-Farsi as she got to be involved with the system of nature of Daymaniyat islands with its environmental and natural panorama.

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Al-Tobi: The campaign aims at highlighting on the importance of the natural reserve

H.E Mohammed Ibn Said Al-Tobi, the minister of environment and climate affairs, assured that the purpose of organizing this campaign was highlighting on the importance of Daymaniyat islands and the Bio diversity, which made it qualified to be a sanctuary for many living creatures. Besides, this will help to enhance the role of environmental awareness of the importance to protect the natural landscapes in the Sultanate for different segments of society. Moreover, he pointed out to the interaction of participants from different organizations that assured on their awareness and environmental sense, which will reinforce the role of the Ministry of Environment and

Climate Affairs in broadcasting environmental awareness and establishing a strong awareness base. That should contribute in preserving the elements of Omani environment and achieve the sustainable principles of development in society. He added that the Ministry of Environment and Climate affairs is currently studying the carry out of a tourism project in the island to serve environmental tourism, putting in regard that this project needs to be connected with every environmental laws that keeps the natural reserve clean and protects the value of its landscape. This has to suit the environmental aspect, laws and legislations held within the Sultanate.

The Nature preserve consists of 9 islands and it is a sanctuary for several birds and other living creatures

Ministry of Environment: The Campaign aims at spreading environmental awareness

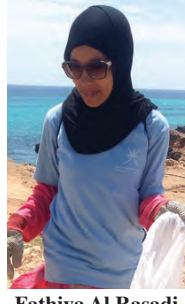
Omran Ibn Mohamed Al-Kamzary, an engineer and natural reserve specialist in the ministry, clarified that the campaign aims at spreading environmental awareness among segments of society; not only that, but also spread the culture of the importance to keep the Omani environment clean. This is achieved through the participation of the local sector and plant the roots of the importance to keep Omani's environment clean from any pollutant. He also pointed out that Daymaniyat Islands Natural Reserve is an important landscape and an icon in the Sultanate.



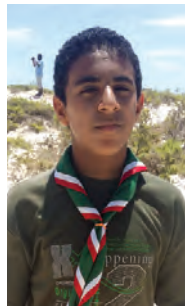
Maryam Al Farsi



Seham Al-Bosaidi



Fathiya Al Rasadi



Al Fadhl Al-Saqri



Furthermore, Fathiya Bint Ali Al Rasadi, an employee at the private sector, added that her contribution is one of its kind. She also mentioned her former roles in past campaigns to keep the Omani environment clean. Al Rasadi emphasized that contributions comes from one's self-complacency of the importance of keeping the Omani environment clean and the importance of serving the society; not to mention that Daymaniyat islands are an icon of beauty that needs more focus on how to protect it and keep it clean.

From his side, Al Fadhl Ibn Mohamed Al-Saqri, a student at Kaab Ibn Zaid elementary school, expressed his joy of participating in this campaign. He contributed with his friends in cleaning-up the natural reserve; he also expressed his admiration of the beauty of the natural reserve and the unique biologic variation of its creatures. Furthermore, Khamis Ibn Mubaraak Al Hadi, a member of ALSawadi group for raising awareness, assured on the importance of his participation in this campaign long side with the rest of the segments of society. He pointed out that Islam ordered people to keep the environment clean and health and that his team has several programs that have been carried out in this field; not to mention other programs to be carried on in the upcoming periods.

Be'ah The participation promotes the social responsibility

Gasem Ben Muhammad Al-Mawali and Seham Bent Salem Al-Bosaidia, representing the Omani holding company for Environmental services has declared that the participation of this company is one of the companies' priorities done by the company to promote the environmental awareness and to promote the culture of social and environmental responsibility for people; as the company keens on participating in such important social activities to show her role in the field of trash management in Sultanate.

Clean-up Oman: Our participation aims at preserving the natural reserve and its environmental components

Batol Mohsen Baqer - Member at Clean-up Oman organization- has pointed out that this participation is the third with the ministry of environment in cleaning this natural reserve, its importance lies within making society aware of the importance of preserving this natural reserve because it represents a haven and shelter for many kinds of birds and other living creatures; she also pointed to the importance of giving participants knowledge of waste and its kinds for them to be able to use this knowledge in their daily life.



One of the Fresh water Ecosystems

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The fresh water ecosystem is considered to be one of the necessary systems, as it has a big role in providing services like drinking and irrigation water, and to provide the safe haven and environmental attraction for biodiversity. It is a habitat for many plants, herbs, invertebrates, reptiles, and some kinds of sweet water fish and other kinds of living organisms. Aflaj are an evidence for the Omani ability and determination to build civilization. These Aflaj -since it emerged and spread in the Sultanate- represent the intentions of progress and civil, for what it provided of basics for the human civilization, and reasons for social stability, and it provided suitable environment for man and fungal life. As Aflaj are important, this project was carried out to study the environmental means regarding sweet water, through sustainable system represented in Aflaj. One of the Dawdian Aflaj is chosen for its powerful and stable flow throughout the year, it is Falaj Luzugh, Wilayet Samayl.



The Start

The projects was carried out in stages, the first stage was full survey to the Falaj and the places it irrigate, the biodiversity of the Falaj was studied, and a comprehensive questionnaire was held about the customs and Sunan of the Falaj, and the crops in the village. In addition, all the Falaj registers was scanned, and a study of maximizing the economic rent was carried out to guarantee its continuance.

The Questionnaire

In order to know all the important information needed, a questionnaire was designed with all the comprehensive questions that benefit the project in a direct way; the questionnaire also included people's opinions about the project and how they benefit from the Falaj.

Water Measurements and the Flow

One the project stages was testing the water chemistry and measuring its quality, in addition to the daily flow measurements using modern devices, and comparing its results with its precedencies. Many water samples was tested, to measure some elements like: dissolved oxygen, pH, basic

◆ **Falaj water chemistry is being tested and identifying its quality, in addition to the flow measurements which is done daily by modern devices, and comparing its results with previous measurements.**

◆ **Falaj waterwheels systems is being developed to find modern alternatives that decrease the amount of leaked water.**

elements, dissolved salts, turbidity, and heavy elements.

The Study of Biodiversity

The study included surveying many forms of fungal life, more than 60 species were reported, including wild growing plants and crops in Luzugh farms; also many various insects were reported, for example: dragonfly, multi wings. Six species of these insects were reported in Luzugh farms, for example: Blue tail Evans and Green Octal. Bug's life in Falaj farms provide a good source of food for many birds; regarding this part, 12 different species of birds were spotted in Luzugh farms; for example: the laughing dove, sparrow, Indian blue winged, and others.

Promoting Sustainability

The National Center intentioned through this project to find suitable alternatives to maximize the economic rent, and reach the maximum benefit of the water, this for the continuance and sustainability of the Falj for the upcoming generations, and to the safety of the environment, three projects were carried out regarding this aspect:

Aquaponic System:

It's a closed vital system, where the fresh water fish are being raised with the seasonal crops in basins, crops are planted soilless. Moreover, there is that kind of integration between the two environments, where fish provide essential nutrients for the (Nitrogen - Phosphate - Potassium) plants, and non-essential for (Iron - Copper - Calcium) through its organic





◆ **The study included biodiversity survey, and more than 60 kind of wild growing plants was registered in addition to crops.**

◆ **The project also studies the feasibility of modern irrigation system using the solar power, to accomplish the perfect administration for irrigations.**



waste. Plants also work on filtering the returning water through a closed dynamic system.

Hydroponic system provides several advantage that are not accomplished through traditional agriculture, where the soil is used; as hydroponics need less space where more plants can be planted, more than 50 plants in one square meter. The system based on recycling water provides bigger chance thrift water, and also less cost compared to traditional agriculture. Lastly, hydroponics goods are considered to be organic, free of chemical interference and has high economical value.

Solar Energy and Irrigation Systems

The modern energy irrigation using solar energy in Lazg village feasibility study is all about accomplishing the perfect administration for irrigation networks, by developing modern



ways to irrigate the crops. One farm was chosen, which is applicable for the study standard, as it has open fields where all kinds of irrigation networks can be applied, and all the old ways of irrigation (Flood irrigation) was replaced in this farm by three integrative systems for modern irrigation; we determine which way to use according to the crop. Throughout this project, the water owned by the farm owner is assembled in a cistern specially made for this purpose, where water is being pumped and crops irrigated using the alternative energy, according to the plants need.

Through the preliminary notes, the quality and efficiency of these systems were uncovered; plants irrigated by dripping increased significantly, as the humidity is provided in the roots all the time, due to the irrigation long duration, this allows removing salts from the soil, and that contributes in organizing its salinity. In addition, these systems, as the farmers certifies, decreased the labor by 75%, and electricity is saved in a way suitable to environmental standards, which helps accomplishing sustainability, this is through solar panels, where the solar energy is converted into electric, through photoelectric system to operate the irrigation system at low cost.

Developing Waterwheels holes:

The project aims to find modern alternatives more efficient than traditional waterwheel holes, the efficiency of these alternatives is in providing direct services; for example, decreasing the amount of the leaked water from the holes, and therefore, maintaining stable rate for the flow along the Falj. In addition, it contributes saving time and effort needed in exchanging irrigation. It also provides indirect services, represented in saving the leaked amounts and using it to agriculture more fields far from water reach, which contributes in enriching the biodiversity and agriculture production.

Future Vision:

Having variety in economic rent and entering modern systems for the maximum benefit of the Falj water is considered to be one of the major aspects for this study; as the rewarding economic rent directly contribute in the continuance of the Falj and drawing people's attention to it; that's why, we predict that these projects would be beneficial, and through their results and evaluating their efficiency, the center will provide models for real experiments provided with numbers and statistics, to be applied to other Aflaj environments, according to the nature of everyone.

Regarding the scientific and research aspects, there are many ways where the researchers and interested can go scientifically, environmentally, and touring, for what these Aflaj possess of cultural heritage, environmental enrichment, scientific diversity, and natural beauty.

Community Participation

The most prominent ingredient behind the success of this study is the local cooperation and their activity in creating the suitable environment for study, and providing all they can to serve and help success of this work; and now, here the projects goes on the road to success, which will benefit everyone specially to Falj society.



point view

The School Competition of Health and Hygiene

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Al-Batinah North governorate has won His Majesty Sultan Qaboos' Trophy for the sixth time in the competition of maintaining health and hygiene in the school environment for the academic year 2014 – 2015. This competition has completed its twenty fourth year since its launch in the academic year 1991 – 1992. It reflects the insightful vision of HM stressing on the importance of promoting the environmental awareness among the students considering that they are the mainstay of community development.

This competition, with all its different curricular and extracurricular aspects, and activities, has contributed into instilling positive health and environmental behaviors that help the students to be effective and productive in the community. It has also opened the way for creative and productive thinking. Furthermore, the competition has acquainted the students with research skills in a way that copes with the objectives of this competition. In addition, it has promoted the values of citizenship by consolidating the students' love for their country, defending it, and maintaining its properties and natural resources.

Promoting environmental education among the students is a main requirement sought after by the communities to achieve the sustainable development concepts, and to consolidate the principles of environmental actions in the community. This awareness mission targets the behavioral aspect of individuals for building a generation capable of performing a positive role in preserving the community. This was emphasized by the international academic conference on the aspects of environmental education.

To complement the role played by schools in this aspect, parents and families should support the environmental principles in the community. We should be good role-models for our children and relatives in conserving the natural resources of the country. The promotion of community values at the students should not be limited to schools only. The real and main breakthrough should start from home itself.

The killing heat threatens The Great Barrier Reef in Australia

A recent study announced that if temperature increased in Australia, the Great Barrier Reef ability to resist the seasonal climate change will fail eventually just as vacationers who suffer from sunburn if they are not cautious while taking a sunbath. In continuous, a study published by James Cook University in Australia observed data of temperature in 27 years where the largest gathering of coral reefs appears. It came to conclusion that these coral reefs were able to adapt with the increasing temperature of water gradually and not suddenly. The study also stated that in three quarters of the 372 observed cases along the barrier reef, temperature used to increase then decrease for about 10 days before it reaches the furthest height that can kill the reefs. It was also clear that these 10 days gave the coral reefs a space to build up its resistance and survive the killing heat waves.

However, researchers found out that coral reefs took more severe damage in the other quarter of cases as temperature used to increase massively to break the local records, causing damages to the barrier which extends at the length of 2575 Km. They added that this temperature increase by half degree percent will cause this protection mechanism to fail, which perhaps increases the rate of abrasion in the Great Barrier Reef. As a result for both human activities and Nino phenomenon in the Atlantic Ocean, last year, temperature held a new record with an increase that was never witnessed before since the 19th century.

50% of natural heritage is threatened worldwide

The World Wildlife Fund, also known as WWF, raised people concern of industrial activities such as mining and logging because it threaten nearly half natural wonders in world heritage from the Great Barrier Reef in Australia to the Inca citadel of Machu Picchu in Peru. Moreover, they induced global companies to respond to the call of the UN to announce to announce that all heritage sites are restricted; in other words, mining, drilling for gas and oil, producing wood and fishing are no longer allowed in these areas. They also pointed out that 114 sites out of 229 worldwide, which are endanger, are regarded as rare natural sites or even terrains that combines nature and culture. These estimations came to more than 18 natural sites which UNESCO's world heritage committee stated it is in danger.

Chernobyl .. from a Disaster to a wildlife Reserve

The area surrounding Chernobyl reactor, whose habitants abandoned 30 years after the nuclear disaster, has become a unique wildlife sanctuary where lots of wild animals live. Denis Vyshnevskiy, a chief engineer at Chernobyl's exclusion zone, pointed out that "when habitants abandoned the area, nature returned to flourish. In April 26th 1986, the fourth reactor at Chernobyl station located northern Ukraine exploded, spreading its radiation in a great part of Europe and within a 10 km diameter around the station that was held off in 2000. The level of radiations remained to reach 1700 Nano Sievert per hour which is 10 to 35 times higher than USA's records. However, Vyshnevskiy who is an animal scientist states that the existence of mankind is harmful for wild animals more than radiations. #In addition, animals suffer from a shorter lifetime and a

declining reproduction because of radiation, however, their numbers increased as never seen before since the dissolution of the Soviet Union in 1991. Furthermore, Vyshnevskiy confirms that radiations are everywhere and they have negative effects, but it is less dangerous than man interference and over than 130 thousand evacuated the area days few after the nuclear explosion. Nearly 10 km cubic of pine forests surrounding the plant were removed after the disaster as trees consumed radiations in high ratios. Meanwhile, several kinds of insects, birds and rodents who used to live in the area disappeared; however, nature had remarkable changes as a new pine and birch forest more radio-resistant flourished to grow in the same area. 30 years after the disaster and still about 100 persons with an average age of 75 years live in nearby villages surrounding the area.