Michel Batisse Award
for
Biosphere Reserve Management

United Nations Educational, Scientific and Cultural Organization

University of Alexandria
Faculty of Science

Working Together for a better Livelihood in Omayed Biosphere reserve

By

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2008

Form

Michel Batisse Award for Biosphere Reserve Management
Application form

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8. Title of case study: Working together for a better Livelihood in Omayed Biosphere Reserve

9. Definition of a management issue/problem: Enhancing management and conservation to face adverse conditions

10. Solution(s) and/or mitigation measure(s) identified:

- Promote economic sustainability and resource conservation, in particular of soils and water,
- Rehabilitation of Roma cisterns
- Assessing Ecosystems' Goods and services with participation of the local community
- Identify people's adaptation and traditional knowledge in coping with adverse dryland conditions.
- Assessing Local community needs and priorities and establishing income-generating activities
- Propagation of Endangered species
- Using OBR for environmental education for youth and children

11. Methods, processes and approaches for implementing solution(s) and/or mitigation measure(s):

Solutions were brought in through the generation of an NGO from graduates of environmental studies university degree, who used their knowledge and education to help people. This NGO was able to obtain a grant to fulfill their objectives in helping the community to have a better livelihood and help OBR to fulfill its management plan. The main methods used were:

- Participatory GIS and Satellite Image Analysis
- Ecological and Socio-economic surveys
- Solar Water desalination
- Rehabilitation of Roman cisterns yo derve as water catchments
- Training on sewing for women and provision of equipments and material
- On-site workshops for capacity building
- Field visits for training and education of youth and Children

Please see attached document and photos.

12. Results and outcome:

- Clear assessment of land degradation factors and habitat fragmentation
- Locating areas of valuable Natural resources using the traditional knowledge of the local community
- Identifying habitats and ecosystem components and their goods and services
- Identification of causes of stresses on the ecosystems
- Provision of Fresh Drinking water to the community from local saline wells
- Availability of water catchment through rehabilitated roman citerns
- Encouraging women to start sewing projects as an income generating activity
- Training school and university students
- Generation of a 5 years management plan based on rotational grazing and sustainable use of natural resources

13. Comparison of results and outcome to those expected at the stage of the definition of solution(s) and/or mitigation measure(s):

The work carried out has fulfilled more than 90% of its objectives due to the following: Before the project there was no clear assessment of the natural resources and their location, Habitat fragmentation and loss was not assessed, Local community had no provision of fresh drinking water as they had to walk more than 10 kms to have assess to bad quality water, the idea of ecosystem goods and services was not implemented

14. Lessons learned:

Without Local participation no development could be achieved
Information and Technology and Traditional Knowledge of local community are complimentary

Assessing goods and services of ecosystems makes the valuation more meaningful and more appreciated by decision makers
Rehabilitation is possible through the use of local native species
Local community can adapt to stresses and generate innovative approaches to face drought and climate change.

16. Annexes and supporting documents:

Coping with changes - NGO activities in OBR: Working together towards a better livelihood

APPLICATION ENDORSED BY THE PRESIDENT/SECRETARY OF THE MAB NATIONAL COMMITTEE/NATIONAL COMMISSION FOR UNESCO

FOR SUBMISSION TO UNESCO

_____

(Date) (Signature of the President/Secretary of the MAB National Committee/National Commission for UNESCO)

_____

(Name of the President/Secretary of the MAB National Committee/National Commission for UNESCO) and address:

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Tel:_____

Fax:

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E-mail:

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Note: Documents presented for Michel Batisse prize are arranged according to the fulfillment of the objectives of the Seville strategy . Each objective stated and followed by the document that is deemed fulfilling this particular objective.

GOAL I: USE BIOSPHERE RESERVES TO CONSERVE NATURAL AND CULTURAL DIVERSITY:

Objective I.1.4 Analysis, and taking into account existing protected areas, establish, strengthen or extend biosphere reserves as necessary, giving special attention to fragmented habitats, threatened ecosystems, and fragile and vulnerable environments, both natural and cultural.

The document associated with this form include activities that involves surveys of vulnerable and sensitive habitats to degradation. It also provides satellite image analysis of fragmented and lost habitats.
Other references include;

B. Salem 2006 Assessing Habitat fragmentation Proceeding of SUMAMAD workshop (2006), and
B. salem 2006 Moghra Oasis (Extension of the Biosphere Reserve): Proceeding of SUMAMAD workshop (Aleppo - Oct.2006)

Objective 1.2.5 Use biosphere reserves for *in situ* conservation of genetic resources, including wild relatives of cultivated and domesticated species, and consider using the reserves as rehabilitation/re-introduction sites, and link them as appropriate with *ex situ* conservation and use programmes.

The asoocited document demonstrates the activities regarding In situ conservation of genetic resources.

GOAL II: UTILIZE BIOSPHERE RESERVES AS MODELS OF LAND MANAGEMENT AND OF APPROACHES TO SUSTAINABLE DEVELOPMENT

Objective II.1.5. Survey the interests of the various stakeholders and fully involve them in planning and decision-making regarding the management and use of the reserve.

Several stakeholders where involved in the work of the NGO, including the manager of the BR, and local community who participated in the Geodatabase produced.

The associated document also includes activities regarding Harnessing Solar Energy for water desalinantion of well and sea water as a propority need of the Local community

Objective II.1.7. Evaluate the natural products and services of the reserve, and use these evaluations to promote environmentally sound and economically sustainable income opportunities for local people.

In the associated document, several resources has been valuated, and used to promote better livelihood for the community

Objective II.1.8. Develop incentives for the conservation and sustainable use of natural resources, and develop alternative means of livelihood for local populations, when existing activities are limited or prohibited within the biosphere reserve.

The associated document shows the training on sewing machines for women and providing the necessary equipments and Material to develop an alternative means of livelihood (SUMAMAD Report 200?)

Objective II.1.1. Ensure that each biosphere reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it.

The management Plan of the Omayed Biosphere Reserve

Objective II.3.3.Organize forums and set up demonstration sites for the examination of socio-economic and environmental problems of the region, and for the sustainable utilization of biological resources important to the region.

Harnessing Solar Energy for water desalinantion of well and sea water as a propority need of the Local community

Use the resources of Moghra Oasis

GOAL III: USE BIOSPHERE RESERVES FOR RESEARCH, MONITORING, EDUCATION, AND TRAINING

Objective III.1.4. Encourage the development of innovative, interdisciplinary research tools for biosphere reserves, including flexible modelling systems for integrating social, economic and ecological data.

Document 4 Assessing Habitat degradation using multidate Satellite imagery and Participatory GIS

Objective III1.8. Use biosphere reserves for basic and applied research, particularly projects with a focus on local issues, interdisciplinary projects incorporating both the natural and the social sciences, and projects involving the rehabilitation of degraded ecosystems, the conservation of soils and water and the sustainable use of natural resources.

Document 10 Use of Omayed Biosphere Project in SUMAMAD Project (Sustainable Management of Marginal Drylands

Objective III.2.2.Encourage the adoption of standardized protocols for meta-data concerning the description of flora and fauna, to facilitate the interchange, accessibility and utilization of scientific information generated in biosphere reserves.

Document 9 Omayed in part of ArabMAB work and electronic database

Objective III.2.4. Use the reserve for making inventories of fauna and flora, collecting ecological and socio-economic data, making meteorological and hydrological observations, studying the effects of pollution, etc., for scientific purposes and as the basis for sound site management.

Document 11 SUMAMAD Report 2002-2003 on assessing the current status of natural resources of Omayed Biopshere reserve

Objective III.3.3. Include information on conservation and sustainable use, as practiced in biosphere reserves, in school programmes and teaching manuals, and in media efforts.

Document 12 Scientific trips of School and college students to Omayed Biopshere reserve

Objective III.4.4. Use the reserve for on-site training and for national, regional and local seminars.

Several Open day workshops and trainng workshops were held in The Biopshere rserves in Bedouin tent to involve the local communityin the on-site training.

Objective IV.1.10. Identify and map the different zones of biosphere reserves and define their respective status.

Document 14 Omayed Biopshere Reserve Geo database map with full identifies zonation

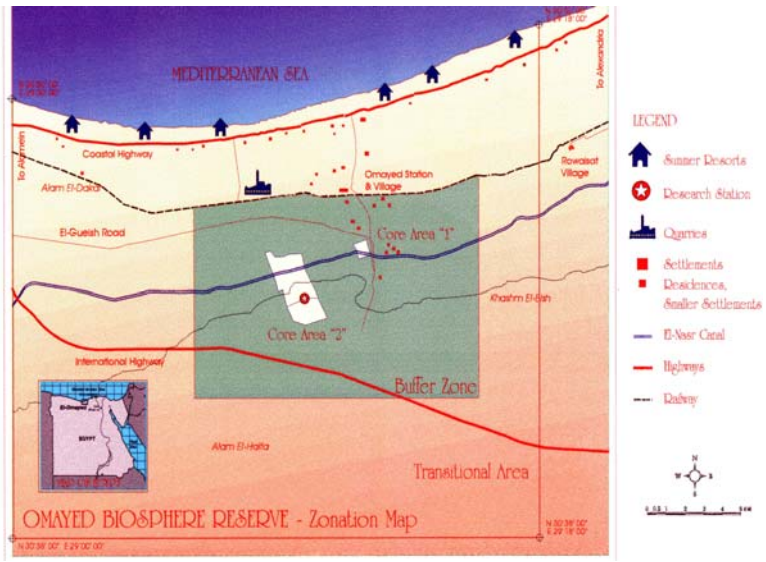
Objective IV.1.19. Mobilize private funds, from businesses, NGOs and foundations, for the benefit of biosphere reserves.

Document 15 A New NGO was formulated from volunteer students form the faculty of Science and involves in the Biosphere reserve development. This NGO succeeded in obtaining a fund for the management of water resources from the private sector (TOYOTA COMPANY). The project is ongoing now and for another 2 years.

Coping With Changes

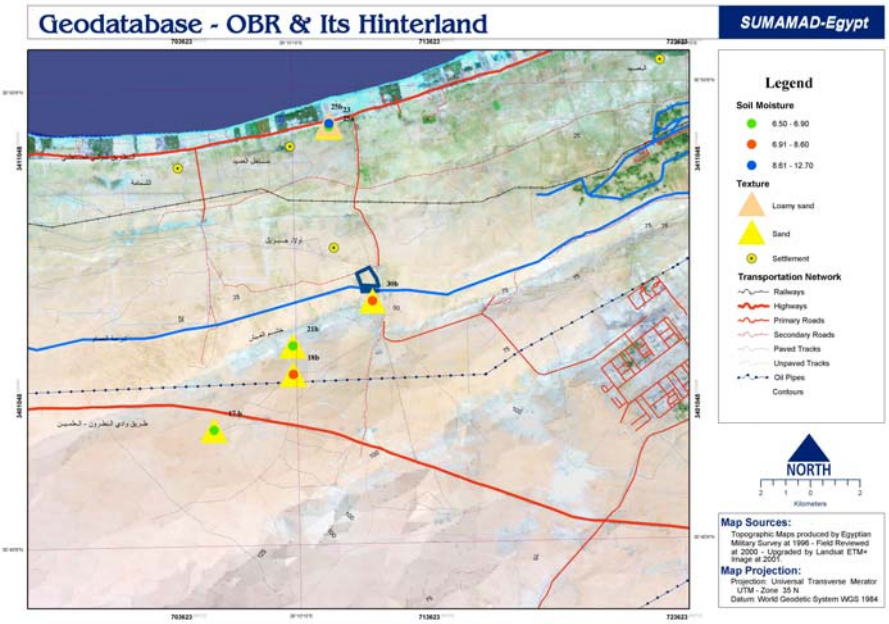
NGO activities in OBR: Working together towards a better livelihood

Omayed Biosphere Reserve is located in the western Mediterranean coastal region of Egypt (29° 00' - 29° 18' E and 30° 52' - 20° 38' N). It extends about 30 km along the Mediterranean coast from west El-Hammam to El-Alamin with a width of 23.5 km to the south. Its N-S landscape is differentiated into a northern coastal plain and a southern inland plateau. The coastal plain is characterized by alternating ridges and depressions running parallel to the coast in E-W direction.



Location of Omayed Biosphere Reserve

This physiographic variation leads to the distinction of 6 main types of ecosystems. They are arranged in the same sequence from the northern Mediterranean coast to the south



The NGO "Ecosystems and Human Development" was able to carry out the work mentioned below. This was achieved through the activities of the multinational project "Sustainable management of marginal drylands (SUMAMAD), and also by obtaining a grant fromm TOYOTA Environment grants that enabled the continuation of the work as planned.

1. Environmental Information System (EIS)

a. Satellite Image Analysis: SPOT-HRV imagery was the main source of data used in the present study. SPOT frames that cover the study area has the path/raw number 107/188, and were made available for September (common date in the data available for the study area) in the years 1987 and 1993 and 1999. The image processing work was carried out at the Remote Sensing and GIS unit of the Department of the Environmental Sciences, Faculty of Science, University of Alexandria, using ERDAS/Imagine image processing software. A geodatabase was built by digitizing base maps and integrating field observations and attribute data using PC/ArcInfo software and ArcView GIS. The study area of OBR, that covers about 722 km2, was extracted as a subscene from each of the three SPOT frames, georeferenced and registered. False colour composite images of the three subscenes were examined visually, and confirmation on visual interpretation were made through field investigations and ground truth using the base maps and aerial photos as a reference, and a GPS for determining geographic locations and boundaries. The distribution of digital data of the three subscenes was examined through histograms and scatter plots and the spectral signature of each land cover class was extracted. The three subscenes were processed by unsupervised classification into 5 major land cover classes and the results were compared to assess land cover changes through time. Classification accuracy measures were estimated for the resulted classification using confusion matrices. Field surveys were conducted to verify the satellite image classification results are accurate and comparable for different dates, and to check the existence of the documented vegetation list in each habitat (presence/absence). In case of the absence of a dominant or a co-dominant species in any particular plant community as compared to previous records, this is regarded as an indicator of habitat deterioration. Samples from all the habitats in the OBR were surveyed and vegetation composition checked against documented lists. Soil conditions were also recorded in each habitat.

b. Participatory Geographic Information System (PGIS): The spatial database produced is based on automation of base maps and satellite Image interpretation. The spatial database of OBR was extracted and added the above existing digital geodatabase. The whole process of establishing the geodatabase involved the following:

1. Interpretation and classification of the existing satellite image
2. Spatial and aspatial data automation to build on the existing geodatabase
3. Automating the GPS locations of the soil and water samples according to database forms and adding the physical and chemical analysis of these field samples (forms attached at the end of this chapter)

Automating the maps produced

The local inhabitants in study area were provided with sheets of the base maps, colored pens and asked to draw boundaries of the best rangeland areas, fresh water resource areas, and best cultivable lands. They were also provided with a satellite image of their area and asked to mark the boundaries of its different zones based on their recognition of the habitats. The information obtained included local soil types and their classification and distribution within the landscape, local habitats, water catchments areas and local rangeland systems and indigenous agro- ecological zones.

Table 1.4. shows the master database content

Title	Type	Attributes	Reference	Comments
Sea_area	Polygon	ID, Area	1	Layer to describe the water wells that recorded by the observatory team
Protectrate_wells	Points	ID,	2	Layer to describe the water wells that recorded by the observatory team
Standard_topo_map	Points	ID,	1	Layer to describe the water wells that recorded on the military topographic maps
Settlements	Points	ID, Title	1	Layer to describe the settlements that recorded on the military topographic maps
Roads	Line	ID, Title, Label	1	Layer to describe the transportation network that recorded on the military topographic maps
Oil_pipes	Line	ID, Title, Length	1	Layer to describe oil transition pipes that recorded on the military topographic maps
Epoints	Points	Elevation	1	Layer to describe elevation points that recorded on the military topographic maps
Contours	Line	ID, Contour	1	Extracted using interpolation method to Elevation points
Canals	Line	ID, Label, Kind, Title, Length	1	Layer to describe drainage/canals network that recorded on the military topographic maps
Depression	Polygon		1	Layer to describe the natural borders of El-Qattara depression that recorded on the military topographic maps
TIN	TIN			Extracted from the Elevation points that recorded by military survey
DEM	Grid			Extracted from the Elevation points that recorded by military survey
Slope	Grid			Extracted from the Elevation points that recorded by military survey
ASPECT	Grid			Extracted from the Elevation points that recorded by military survey
HILLSHAD	Grid			Extracted from the Elevation points that recorded by

				military survey
Participatory GIS maps	Polygon	ID, Landuse	3	Land resouce maps that presented by local community individuals
Field Observations	Points	ID, Name, N, E, Z, Depth, pH, Tempratue, Salinity, EC, soil moisture, soil structure	4	Water wells that recorded in fields, soil samples location

This information was then transformed into geographic data using a Global Positioning System (GPS). Individuals form the local community incliding women were asked to :

- Delineate major habitats and their spatial distribution and attributes.
- Identify optimal conditions for the occurrence of target plant species.
- Identify, delineate and monitor land cover changes.
- Plan orchard development and their spatial distribution.
- Understand the dynamics of pastoralism and the threats of its environmental impacts
- Delineate areas of inappropriate land use and determining their environmental impacts
- Understand land tenure in relation to natural resource management.
- Plan locations for rainwater harvesting reservoirs.
-

The whole process will involve the following:

1. Satellite image interpretation and classification,
2. Spatial and aspatial data automation to build on the existing geodatabase
3. Physical and chemical analysis of field samples, specially water and soil,
4. Identification of vegetation types and spatially locating their major habitats, and
5. Recording the indigenous knowledge pertaining to the use of resources and conservation particularly rangelands and water resources.

The establishment of the above master database, based on the above methodology proved to be invaluable for use in the evaluation of Egyptian study site, It facilitated comparative evaluations with other study sites and dissemination of information amongst the partner institutions.

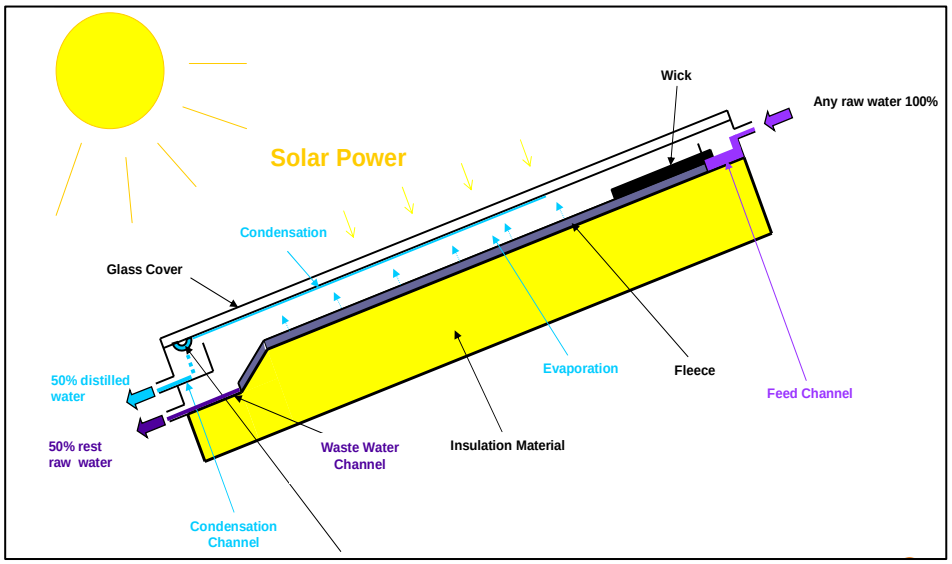
2. Management of Water issues in OBR

Dry area ecosystems are generally fragile and have a limited capacity to adjust to change. If the use of natural resources (land and water), is suddenly changed by water harvesting, the environmental consequences are often far greater than foreseen. Consideration should be given to the possible effect on natural wetlands as on other water users, both in terms of water quality and quantity. New water harvesting systems may intercept runoff at the upstream part of the catchment, thus depriving potential down stream users of their share of the resources. Water harvesting technology should be seen as one component of a regional water management improvement project. Components of such integrated plans should be the improvement of agronomic practices, including the use of good plant material, plant protection measures and soil fertility management.

2.1.Solar Water desalination

The 1st pilot project for solar water desalination was implemented in Awlad Gebril village, Omayed Biosphere Reserve, which is a water-devoid village in the OBR. Before implementation of this pilot project, the solar system was tested and its costs benefit analysis was conducted to asses its feasibility. Several meetings with the local community (photos) were conveyed to show and explain the benefits of the system, and make them familiar with this new technology entering their lives. As the system requires no maintenance from the users, as mentioned in the previous report, and depends only on the availability of the saline well water (raw water) and sun, it is considered as an "appropriate" technology for healthy drinking water provision to the community. A detailed description of this pilot project is provided below:

The well was drilled 10" in diameter by the one of the local community, in the hope of finding fresh water, but contains only brackish water with the same salinity as the Mediterranean Sea. As the water could not be used for irrigation the well was closed and the surrounding land was not cultivated as planned. The owner of the land donated an area of 150 m2 to the project, including the well. He promised to build a solid shed over the well as protection and stand for the raw water tank. In addition he agreed upon building the solar stills and the salt collection pond. He would buy the pump as well. The idea of using the raw water and producing fresh water was very appealing to the community and everybody start to help. The solar units used are presented below.

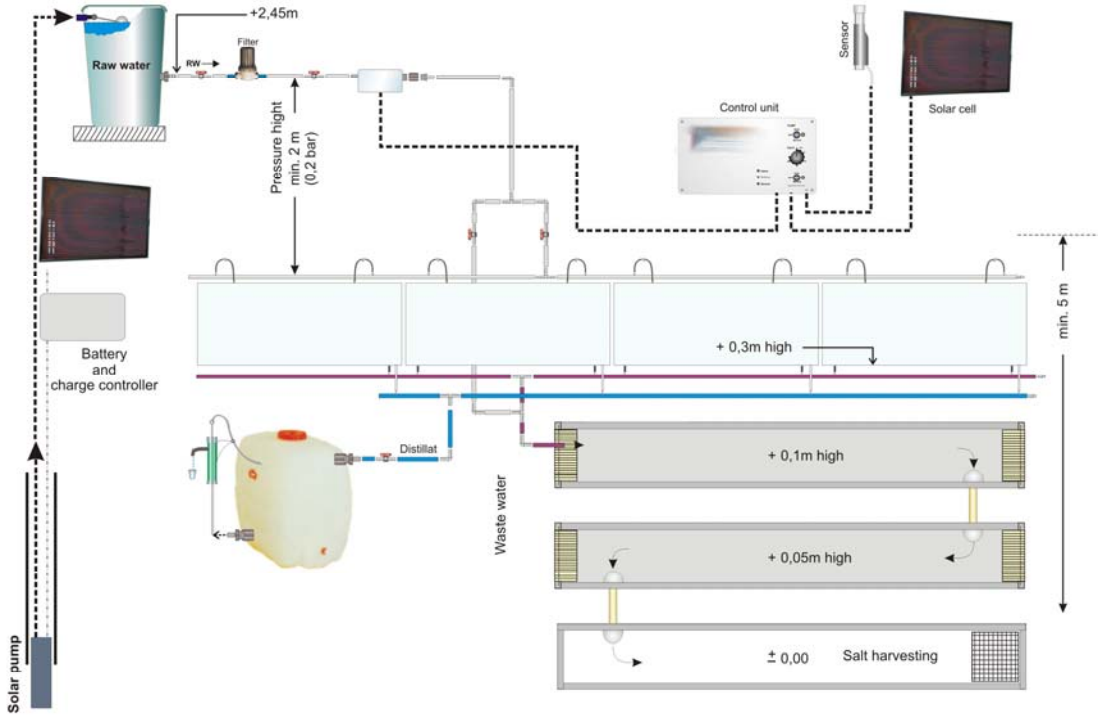


Solar desalination unit structure

As the solar desalination plant is supposed to serve several families it was decided to install 4 cells. 2 Mexican stills and a salt pond were added to concentrate the brine in order to keep it from running back into the ground as no other means of evacuation were available. The solar stills would add to the water production and the salt could be harvested for further use. With regard to the salt production, it is currently used by the local community for tanning of the leather and use this leather to furnish their houses.

As the cells produce 6 – 8 litres of distillate per m2/day, 4 cells with a total surface of 10m2 should deliver 60 – 80 litres/day. As the cells should distil 50% of the raw water the same amount of brine should be expected. The raw water needed would be distilled water plus brine, i.e. 120 – 160 litres/day. The solar stills produce about 3 litres of distillate per m2/day, accordingly the area of the solar stills had to be about double the area of the cells to reduce the amount of brine by another 50%. A flat pond evaporates about 6 - 10 litres of water per m2/day, 10 m2 should be enough to evaporate the rest of the brine and produce salt as by-product

Raw water	160 litres/day
4 cells (10 m2) distil 50%, the rest is brine	80 litres/day
2 stills (20 m2) distil 60 litres/day, the rest is	20 litres/day
1 pond (10 m2) evaporates up to 100 litres/day	

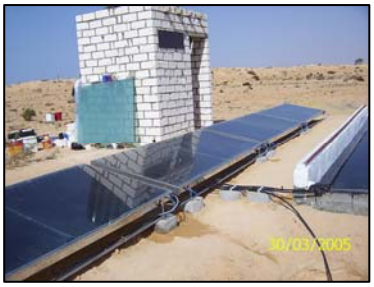


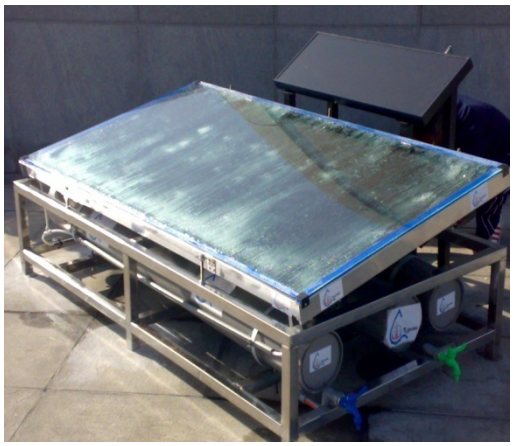
The plan o f the solar desalination plant.

An open day and workshop was held in the main meeting room of the community and at the site later. It was explained in length what the setup is doing, what kind of water comes out of

it and how important hygienic treatment of fresh water tank and pump is. To the persons who where named to be responsible for the maintenance of the plant a special course was held.

There was a lot of appreciation by the Bedouin community. Specially women where very happy about the water for their children, which was expressed even in a song that was made for this occasion. Everybody is looking forward for the project to continue as there is at present only some families who have access to healthy drinking water.





Installed Solar Desalination units in Omayed Biosphere Reserve,
(Awlad Gebreil Village)

The following table indicates the other sites has been chosen, the number units, Also the number of people served for each site.

Site	Number of units	Number of people
Burg El Arab	5	22
Burg El Arab	5	25
El Ariesh	6	28
El Ariesh	6	25
OBR	8	25

2.2. Rehabilitation of Roman cisterns:

The roman cisterns refers to the roman period of ancient Egypt about 2000 years ago, were cisterns constructed to collected water during winter. This is known now as rain water harvesting. The collect water is store for agriculture and grazing use throughout the rest of the year. As the time pass, most of these cisterns were damaged and covered with sand , partially or completely damaged due to water pressure on walls and floor, and lack of maintenance, but few is still working. Field work and satellite images has shown about 26 cistern is only left at OBR, among which 6 are considered to be lost and their location were not determined preciously. From the 20 remaining cisterns3 were chosen for repair according to the value of the cisterns and the benefits.

Location of the roman cisterns: There are about 26, only 20 of them could be located exactly and registered , 3 of which were chosen to rehabilitation in this phase of the grant project, and another five in the next phase 2008-2009. The three roman cisterns are

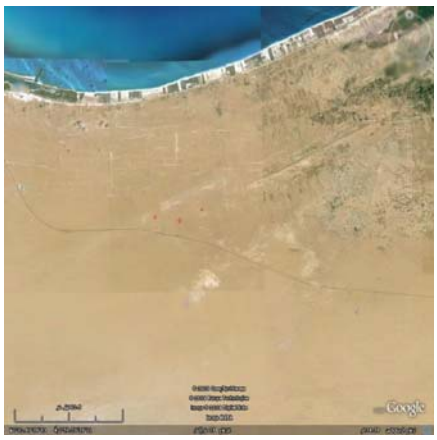
1- El- nakhla cistern
2- Zamoot cistern
3- Abo-hitha Cistern

The following photo indicates, the three cisterns are located to the south west of the plateau of Khash Eleish about 10 kms of the sea cost.

Criteria for selection:

The three cisterns were chose according to

1- Location of the cistern at a good catchments of rain
2- The added grazing area.
3- Recommendation of local inhabitants.
4- Storage ability (amount of water).
5- Condition of the cistern

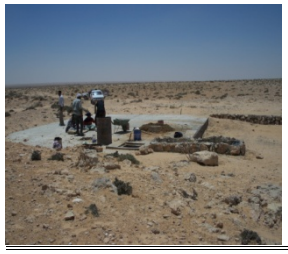


The main task carried out by the members of the NGO was to rehabilitate the cisterns from the damages that were almost due to complete cover of the cistern by sand or breaking of walls due to water pressure for a long time. All the other work carried out was for the preparing the cistern to be easy in handling during drinking of animals, and providing good cover that minimise water evaporation and protection of the cistern from sand and wind.
The following table indicates the work has been done for each cistern.

Cistern	Work carried out
Abo-hitha	1- Removing of sand around the cistern 2- Preparing the way for water entrance and exit 3- Repairing of the cistern floor and testing under water pressure. 4- Construction of Small Sedimentation path for the coming water to prevent sedimentation inside the cistern 5- Repairing of the animal drinking path.
El- nakhla	1- Removing of sand around the cistern 2- Establishing of 25m long fence for water directing to the entrance hole. 3- Repairing of the animal drinking path 4- Repairing of the animal drinking path.
Zamoot	1- Removing of sand around the cistern 2- Preparing the way for water entrance and exit 3- Repairing of the cistern floor and testing under water pressure. 4- Construction of Small Sedimentation path for the coming water to prevent sedimentation inside the cistern 5- Repairing of the animal drinking path.
Abo-hitha	

Photos provided below, demonstrate the cisterns before and after rehabilitation

Cistern	***Before***	**After**
El- nakhla	   	   
Abo-hitha	   	   
Zamoot	 	 




Values of roman cisterns:

There are several values of the repairing of the three roman cisterns discussed before. Among these values are

a) Environmental values: The recovering process of the roman cisterns will help greatly in the conservation of the plant cover of the area as it prevent over grazing around the old cisterns by adding about 150 km2 as a new grazing area that help reducing pressure at the old sites**.**

b) **Social and Economical values :** The three cisterns will save water for about 5200 cheep and camels grazing in the area around the cisterns.


These animals are owned to 15 families and provide work for about 41 person as indicated by the following table

3. Conservation efforts:

3.1. .Propagation of of Endangered species

Desertification is the complex result of the overuse of natural resources. It is particularly noticeable in semi-arid and arid zones under the combined assault of climatic variability and human and animal demographic pressures. To help minimize these pressures, there is an urgent need to elaborate appropriate measures to restore and rehabilitate rangeland resources. Technical options are available; one of them is the re-establishment and use of native plants. Many native species could play a role in rehabilitation programs of the marginal lands and rangelands of the arid and semi-arid Mediterranean zone, not only as a feed reserve but also in soil and water conservation in environmentally degraded areas (Gintzburger et al., 2000).
Restoring and rehabilitating damaged ecosystems is the best means of increasing and conserving their biodiversity (Cairn, 1988). The restoration and rehabilitation programs

strongly emphasize on re-vegetation, far less attention being paid to the reintroduction of animal species. Introduction of fast growing exotic species of trees and grasses have proved highly successful towards the control of desertification, ecological regeneration, and restoration of the degraded arid land ecosystems (Sinha *et al.,* 2002). Therefore, beside protection and rational management of natural resources, it is of great importance that extensive programs be formulated and executed for the propagation of the multipurpose native species. Harsh environmental conditions, particularly those related to drought and excessive radiation, are not easily overcome. Thus, it is critical to foster the establishment of some predator-resistant, stress tolerant and deep-rooted species (Uhl, 1988).

The present application aims at: **a)** investigating the socioeconomic value of the native plant species in the ecosystems of the north western Mediterranean coastal desert of Egypt through the documentation and surveying of its traditional uses; **b)** testing the possibility, practicability and capacity of germination and growth of these native plant species with the emphasis on the multipurpose species; and **c)** detecting the most suitable methods for propagation of the most promising species.

The objectives of this study is planned to be achieved in two stages. **Stage one** will involve the field surveys for specimens and seed collection together with the germination trails. **Stage two** will involve the propagation trails of the most promising species based on the results obtained from phase.

a) Stage one: field work

Field visits were conducted so as to survey the natural plant resources of (OBR) EL Omayed Biosphere Reserve (80 km west of Alexandria a representative area of the western Mediterranean coastal desert of Egypt; to assess their uses sustainably and provide basis for their conservation, together with collecting plant and seed samples from the different ecosystems in area. Samples from the recorded species were collected and prepared as herbarium sheets for identification. Collected seeds were prepared for subsequent germination and propagation trials. Floristic identifications are according to Täckholm (1974) and the Latin names of the species were updated following Boulos (1995) and Boulos (1999), Boulos (2000), Boulos (2002) Boulos (2005). Through field collection a total of 37 species were collected . The following table representing the different range of ecosystems and habitats in the study area of which 15 species are perennial shrubs, while the rest are annual herbs. These species are belonging to 28 genera and 10 families. More than 62% of these species belongs to Leguminosae, Compositae and Cruciferae families, members of these families are known to have a wide distribution in the Egyptian desert. The rest of the species belongs to Alliaceae, Labiatae, Malvaceae, Plantaginaceae, Umbelliferae, Zygophyllaceae and Papaveraceae families.

Family, life-form and habit of the wild plant species used in the study.

Species	**Family**	**Habit**	**Life form**
Allium blomfieldianum Asch. & Schweinf.	Alliaceae	Herb	Geophyte
Allium roseum L.	Alliaceae	Herb	Geophyte
Astragalus caprinus L.	Leguminosae	Herb	Chamaephyte
Astragalus hamosus L.	Leguminosae	Herb	Therophyte
Astragalus urbinate Vahl	Leguminosae	Herb	Therophyte
Astragalus schimperi Boiss	Leguminosae	Herb	Therophyte
Astragalus sieberi DC.	Leguminosae	Sub-shrub	Chamaephyte
Astragalus spinosus (Forssk.) Muschl.	Leguminosae	Shrub	Chamaephyte
Brassica tournefortii Gouan	Cruciferae	Herb	Therophyte

Bupleurum semicompositum L.	Umbelliferae	Herb	Therophyte
Carrichtera annua (L.) DC.	Cruciferae	Herb	Therophyte
Conyza bonariensis (L.) Cronquist	Compositae	Herb	Therophyte
Deverra tortuosa (Desf.) DC.	Umbelliferae	Shrub	Chamaephyte
Erucaria crassifolia (Forssk.) Delile	Cruciferae	Herb	Therophyte
Fagonia cretica L.	Zygophyllaceae	Shrub	Chamaephyte
Glebionis coronaria (L.) Tzvelev	Compositae	Herb	Therophyte
Hedyponis rhagadioloides (L.) F. W. Schmidt	Compositae	Herb	Therophyte
Lathyrus aphaca L.	Leguminosae	Herb	Therophyte
Limbarda crithmoides (L.) Dumort.	Compositae	Shrub	Chamaephyte
Lotus polyphyllos E. D. Clarke	Leguminosae	Sub-shrub	Chamaephyte
Malva parviflora L.	Malvaceae	Herb	Therophyte
Malva sylvestris L.	Malvaceae	Herb	Therophyte
Matthiola longipetala (Vent.) DC.	Cruciferae	Herb	Therophyte
Medicago polymorpha L.	Leguminosae	Herb	Therophyte
Medicago ▯ urbinate (L.) All.	Leguminosae	Herb	Therophyte
Melilotus indicus (L.) All.	Leguminosae	Herb	Therophyte
Ononis vaginalis Vahl	Leguminosae	Shrub	Chamaephyte
Papaver rhoeas L.	Papaveraceae	Herb	Therophyte
Peganum harmala L.	Zygophyllaceae	Shrub	Chamaephyte
Phlomis ▯ urbinat D. Don	Labiatae	Shrub	Chamaephyte
Plantago crypsoides Boiss.	Plantaginaceae	Herb	Therophyte
Plantago lanceolata L.	Plantaginaceae	Sub-shrub	Chamaephyte
Plantago ▯ urbi Forssk.	Plantaginaceae	Herb	Therophyte
Salvia Lanigera Poir.	Labiatae	Shrub	Chamaephyte
Scorpiurus muricatus L.	Leguminosae	Herb	Therophyte
Scrozonera ▯ urbinat Vahl	Compositae	Herb	Geophyte
Vicia monantha Retz.	Leguminosae	Herb	Therophyte

Economic importance of the species : All the studied species were selected to have a least one aspect of the potential or actual economic uses as indicated in the following table. Most of the species are reported to have either grazing vale or medicinal use. Some of the species are considered multipurpose species reported to have more than two or three uses (*Deverra tortuosa*, *Malva parviflora* and *Brassica tournefortii*). Propagation trials will concentrate on those specie that have more than one economic uses and that have a promising germination and propagation potential.

Economic value of the studied species, Grazing (Gr), Medicinal use (Md), Fuel wood (Fu) and Human Food (Hf).

Species	**Uses**
Allium blomfieldianum Asch. & Schweinf.	Gr
Allium roseum L.	Hf, Md
Astragalus caprinus L.	Gr
Astragalus hamosus L.	Md

Astragalus ⁄ urbinate⁄ Vahl	Gr
Astragalus schimperi Boiss	Gr
Astragalus sieberi DC.	Gr & Md
Astragalus spinosus (Forssk.) Muschl.	Gr & Md
Brassica tournefortii Gouan	Gr, Md & others
Bupleurum semicompositum L.	Gr & Md
Carrichtera annua (L.) DC.	Gr & Md
Conyza bonariensis (L.) Cronquist	Gr
Deverra tortuosa (Desf.) DC.	Gr, Md, Hf & others
Erucaria crassifolia (Forssk.) Delile	Gr
Fagonia cretica L.	Md
Glebionis coronaria (L.) Tzvelev	Md & others
Hedyponis rhagadioloides (L.) F. W. Schmidt	Gr
Lathyrus aphaca L.	Gr
Limbarda crithmoides (L.) Dumort.	Gr
Lotus polyphyllos E. D. Clarke	Md
Malva parviflora L.	Gr, Md, Hf & others
Malva sylvestris L.	Md
Matthiola longipetala (Vent.) DC.	Md
Medicago polymorpha L.	Gr & Md
Medicago ⁄ urbinate (L.) All.	Gr
Melilotus indicus (L.) All.	Md
Ononis vaginalis Vahl	Md
Papaver rhoeas L.	Md & others
Peganum harmala L.	Md
Phlomis ⁄ urbinat D. Don	Md
Plantago crypsoides Boiss.	Gr & Md
Plantago lanceolata L.	Gr
Plantago ⁄ urbi Forssk.	Md
Salvia Lanigera Poir.	Gr & Md
Scorpiurus muricatus L.	Gr
Scrozonera ⁄ urbinat Vahl	Gr, Md, Hf & others
Vicia monantha Retz.	Md

Stage two: germination Experiments

Policies on land management strongly promote the use of native plants in restoration, rehabilitation and other re-vegetation projects. Maintaining the diverse native plant communities on a long-term basis is an essential part of preserving ecosystem health and productivity, and the introduction of persistent non-natives is clearly contrary to this goal. Native restoration is a quickly expanding field, and knowledge of techniques and strategies has grown exponentially in the last decade. Through careful planning, collection, and

production it is possible to meet all of re-vegetation needs with appropriate native species (BLM, 1996).

Knowledge of the most suitable method and time for propagating rehabilitation plant species is a key factor in the success of the rehabilitation of the degraded ecosystems. Studying germination requirements of the plants of potential for use in re-vegetation and rehabilitation of disturbed lands is of great priority to provide information as an aid to its use in these programs (Fulbright *et al.*, 1983).

Seeds of species representing the different range of ecosystems and habitats present in the experiment study area at El-Omayed Biosphere Reserve (83 Km west of Alexandria) were used in this experiment to determine the possibility and the practicability of germination and propagation of the studied species. In selecting the species with economic value and high conservation value were used.

To test the germination capacity of the studied species, seeds of the same species were germinated in Petri-dishes in two sets. One set was not subjected to any treatment, where 10 seeds of each species were placed in Petri-dishes on filter paper moisturized with water and then left in the room temperature. Water was added when necessary to keep the filter paper moisturized during the experiment period. The other set of seeds was subjected to cold condition, where 10 seeds of each species were placed in Petri-dishes on filter paper moisturized with water and then left in cold condition at 4 C. Germination was observed for a period of 20 days. Germination percentage was calculated for each species.

About 43% of the studied species germinated under no treatment, while about 24% of the studied species germinated under cold condition. This suggests that the future germination and propagation trials will not be undergone under cold conditions. Generally species germinated under not treatment showed higher percentage of germination than those germinated under cold conditions (Figure 4). A germination percentage of more than 50% was attained by 16% of the studied species under not treatment (*Astragalus sieberi*, *Brassica tournefortii*, *Erucaria crassifolia*, *Plantago crypsoides*, *Salvia Lanigera* and *Vicia monantha*). The highest germination percentage reported under cold condition was attained by *Erucaria crassifolia*. Five of the studied species germinated under both conditions (Figure 3). These species includes *Astragalus sieberi*, *Erucaria crassifolia*, *Lotus polyphyllos*, *Medicago ∕ urbinate* and *Plantago crypsoides*. It is noteworthy that these species attained higher germination percentage under no treatment than that under cold condition. From the results obtained attention will be given to the species attained high germination percentage (more than 50%) under no treatment in the subsequent propagation phase of this work. Also other treatment for breaking the seed dormancy will be adopted and tested on the selected species.

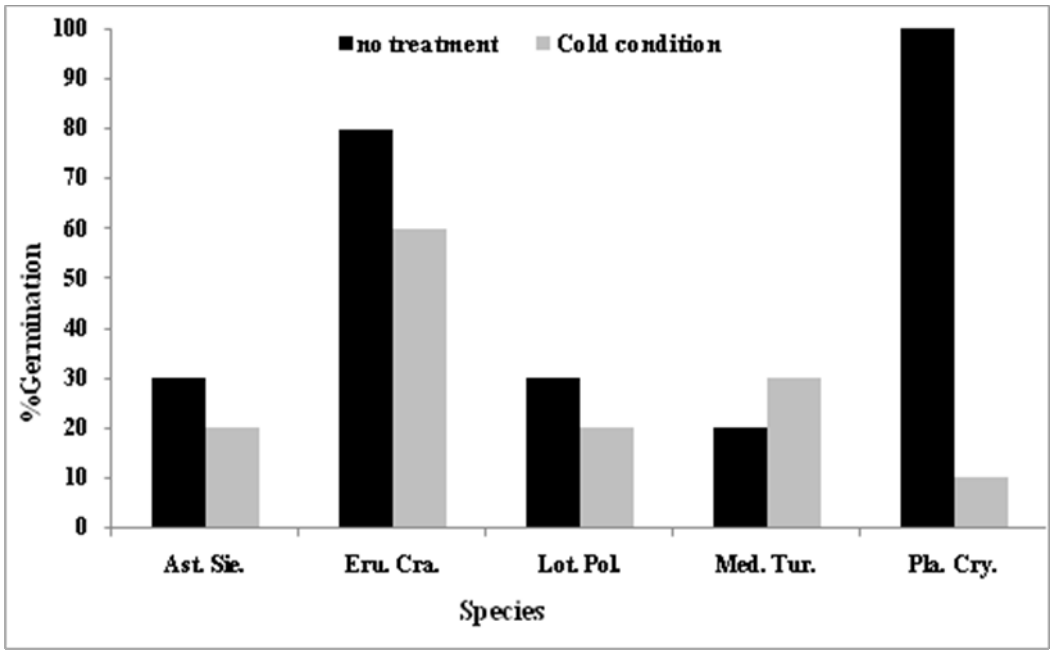
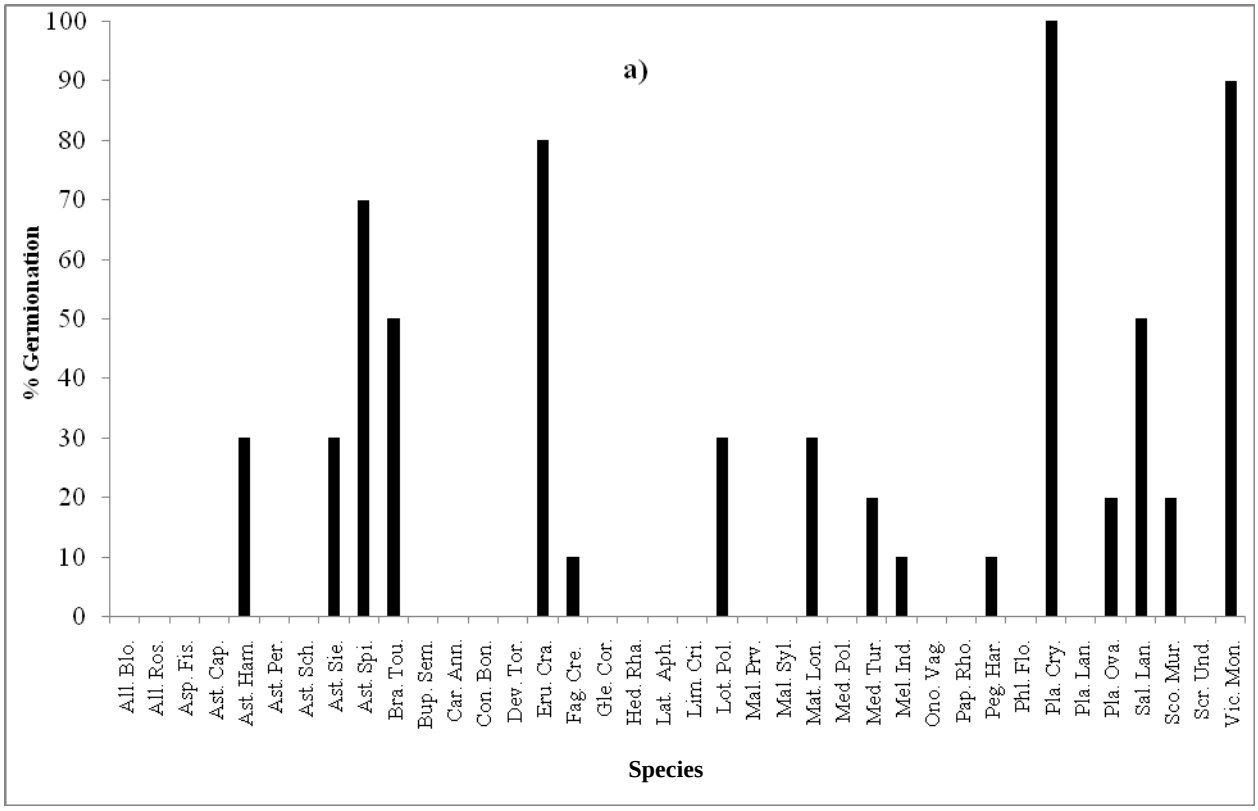


Figure 2. Germination percentage of species germinated under both conditions.



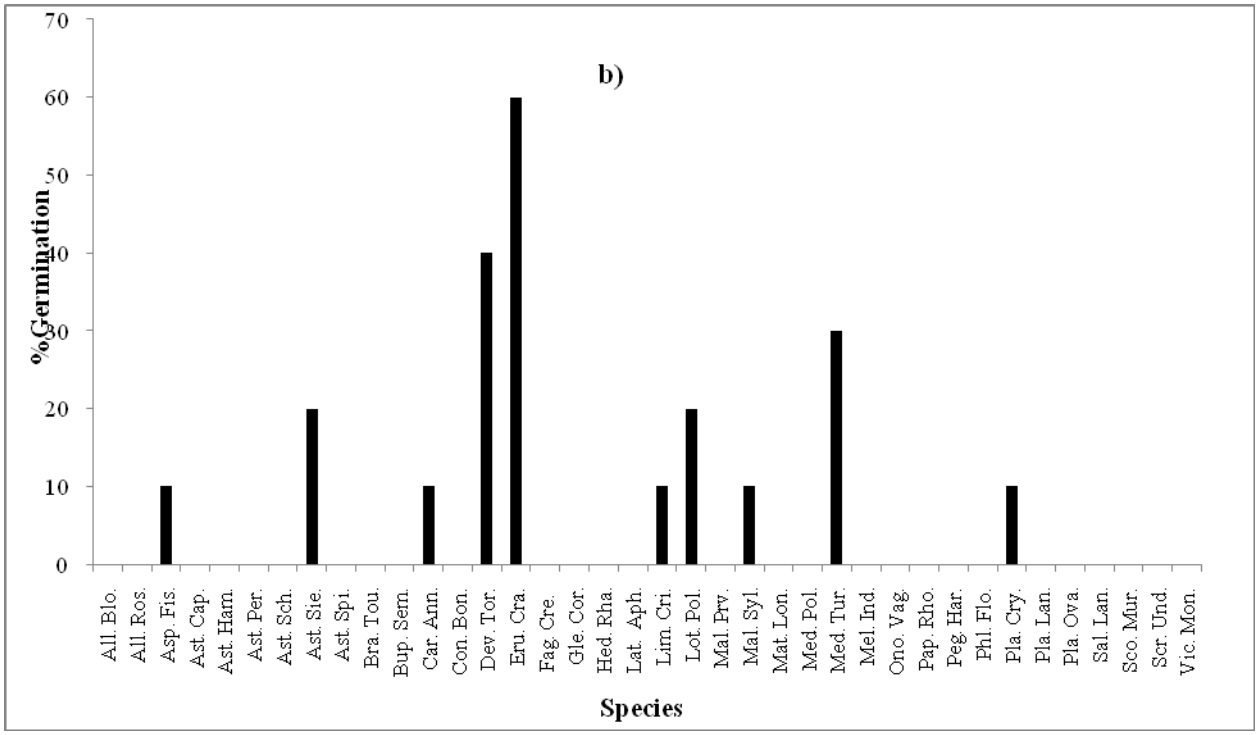


Figure 1. Germination percentage of the studied species **a)** germination under no treatment and **b)** germination under cold condition.

Plate 1. Preparation of seeds for germination. NGO members working in-house

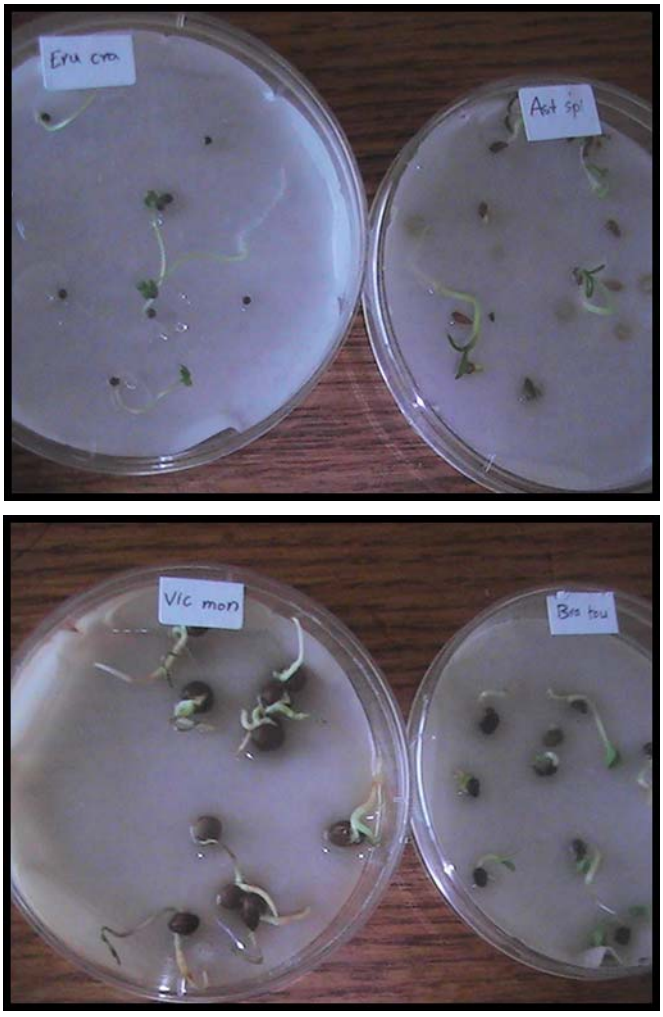


Plate 2. Species showing promising germination percentage without any treatment

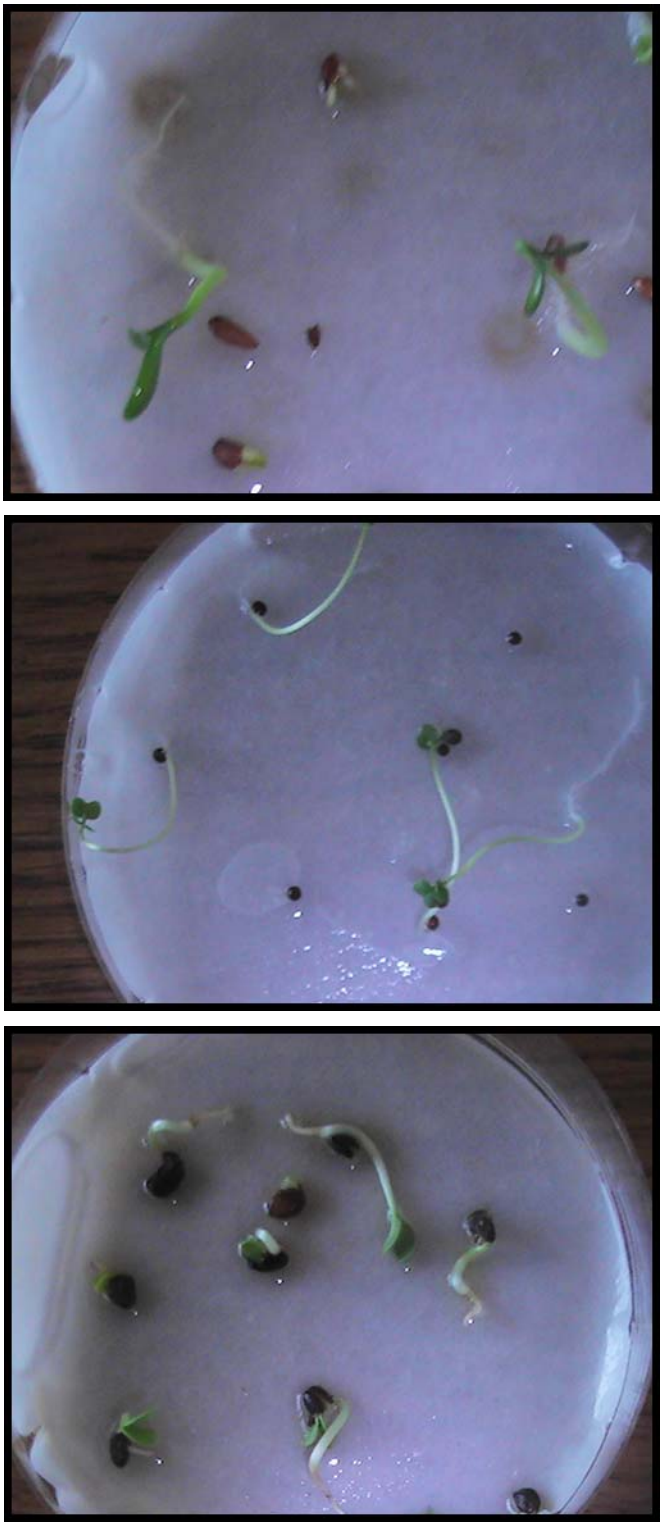


Plate 3. Species showing promising germination under cold condition

The work is in progress, where a green house is under construction, and the selected species will be transferred to the green house, then to the field. It is expected to finish the work in about one year.

4. Environmental Education for youth and kids.

The capacity of the NGO members enabled organizing several environmental education workshops where children were trained in the field, using the drylands kit produced by UNESCO. Each workshop include about 30 students, and with the help of the library of Alexandria facilities were provided that made these workshops possible. Field visits were a major activity and all participants (12-18 years) were set for hands-on activities. Each participants uased his/her own workbook to report on his/her findings and observations, and contests were carried out to enhance the sense of the environment and drylands properties. 5 workshops were carried out so far that provide to be successful. The following photos shows hoe the students enjoyed such workshops.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1. Socio-economic studies for introducing income generating activities:

The criteria for selecting the appropriate income generating project are to comply with

- Focusing on the poor and the deprived group from people.
- The technical aspect for the project should be integrated and shared by the society members.
- The project and its activities should appeal to the target group.
- The project is to improve the living conditions for the individuals through providing a fixed income for the families and does not cause damage.
- The management of the project is to be according to human resources available and job description for the member is to be available
- Clarifying the kind of cooperation between people for the success and sustainability of the project.
- Communicating with the society and making links through the participating members cooperation

From discussion that went on with the local, they all agree upon their willingness to improve their economic status which would consequently contribute to the improvement and development of abilities and skills of society the members.

The consensus of the locals on selecting the income generating activity will avoid failures through member's participation, thus maintaining the success of selected projects and creating thoughts consistent with the nature of the local society and improving the social and economic states for the members, by helping them acquire new skill of working together.

Below is an illustration of one of the income generating projects that were agreed upon by the local community and is appropriate for implementation from the economic, cultural and environmental aspects.

Name of the project: Sewing crafts and embroidery ((to be implemented for the women the Bedouin community);**.**

Project Description and Justification: It was observed through the analysis that girls in the Bedouin community are allowed to go to school only to a certain stage, primary school. And once these girls reaches the age that ranges from 12 to 14, they area not allowed to leave the house to go to school, or even to go to market. The number of young women and women who are not yet married and are completely indoors are in the range of 5-8 per household. The family head i.e. husband, father or brother refuses that women are to be allowed to go out for earning money and thus preventing her learning skills. This project therefore, is targeting this category of women and young women to using the time, developing skills, and earning money by implementing a project that can be run form their houses, and within a community of other young women from the family or neighbours. The project is based in one of the houses where a room is devoted for practicing sewing and hands-on training of young women and women by one form the family members, old women that may be an old sister or a mother on sewing. Therefore the teacher and recipient are from the related family. A schedule is set where the training is carried out 3 times a week. The families who expressed willingness to join the project should have a project manager, one of the old women in the family , to sign a contract and receives a sewing machine, and material (cloth, threads and all related items), and start the project by providing room for sewing , holding training sessions to other women in the family, and commit herself to return back one quarter of her revenues after selling to the SUMAMAD team, where this money can be collected and saved for buying another

sewing machine for one of the girls who get trained on sewing can start a new project on her own. The project was very welcomed by the women of the community and the SUMAMAD team was overwhelmed by the women who wished to participate and ones who seek the continuity and expansion of the project.

Project Objective: The following are the objectives set for this project

- Training as many girls on sewing and embroidery
- Providing incentives for developing skills (a sewing machine)
- Achieving the generation of revenues by selling the produced dresses ad costumes within the community.
-

Execution areas: Villages of OBR particularly the deprived areas.

Starting point: The project starts by 8 sewing machines and all associated needed materials.

Execution stages: In the first stage a number of women age (30-45) were selected. These women should have experience in handcraft and sewing and agree to teach at least 5 girls within her family on sewing.

Follow up: The first stage was followed up after two weeks from the project onset where seriousness of the process was assessed through:

- Measuring the project success: Speed of girls learning was observed.
- the amount of produced dresses and costumes the amount of produced dresses and costumes.
-

Project Economy: The cost of sewing machine and associated material (without electricity costs) is about L.E.1000. The material provided with the sewing machine is sufficient to produce 10 pieces in one month. Each piece is sold for about L.E. 30-35 depending on the material size, material and market opportunities. The total revenue is about L.E. 330 per month. The quarter of this money that will be returned back is be about L.E. 82. So the project life cycle could be completed in about one year.

Below is some photos demonstrating the activity.

2.

Conclusions

Capacity to manage has many components and can not be summarized in a single measure. A principal dimensions in the capacity to manage are the following:

1) The System of Governance:
    a. Political support.
    b. Legislation (legal obligations).
    c. Protected area design.
        i. Management objectives.
        ii. Needs to address threats.
        iii. Area of reserve and zonation.
        iv. Significance species/ ecosystems require management.

2) Research and Monitoring.
3) Community Support:
    a. Public awareness.
    b. Local participation.
    c. Need of resident and adjacent communities.

The present zonation of the OBR was developed about at least 10 years ago. It was based on the information gathered during previous years, as well as on the development activities and the inherent threats to biodiversity. The new information gathered during the current work, and the recent more devasting development activities, now provide a new background that necessitate a revision of the present zonation. It is necessary; in order to better preserve the core areas, to replan not only these areas, but also the buffer and transition zones based on sustainable development criteria. The most important points of information gathered, that maybe taken into consideration in the revision of the zonation system of the OBR are the following:

1) Eight major habitat types, beside 4 transitional habitat types are recognized from the sea shore in the north to Khashm-El-Eish rich in the south, besides micro variations within each habitat create a diversity of micro sites or micro habitats. This is more notable in the habitat of rocky ridges, which is reflected in the relatively high species richness of transitional areas between the habitats of rocky ridges and all other habitats. Therefore, these habitats should have priority in the future conservation planning and rezoning of the OBR. Conceivably, such notable diversity of habitats and micro habitats has produced a parallel diversity in planned communities.
2) Three major types of habitat, costal dunes, rocky ridges and non-saline depressions are suffering serious degradation due to recent devasting land uses. Conservation efforts should be directed mainly to these habitats. These efforts should include rehabilitation or restoration of their degraded ecosystem. Buffer zone(s) has to be redefined taking, whenever possible, consideration of avoiding the locations which have irreversibly been degraded.
3) Noteworthy (keystone) species are those which play an important role in the stability of ecosystem and in its productivity, and those which contribute to the welfare and economy of inhabitants. For example, the role is well known of *Ammophila arenaria* in the fixation of costal dunes and the role of *Artemisia monosperma* in the fixation of inland dunes created by soil disturbance due to the impace of irrational landuse types. The role of large shrubs such as *Thymelaea hirsute, Anabasis articulate and Noaea mucronata* is also notable in soil stability and in the creation of adequate micro environmental conditions for population of plant and animal species. Another example of noteworthy species which contribute to the welfare and economy of inhabitants is *Medicago sativa* as a valuable genetic resource for improving the grazing value of cultivars of medics. These species and their habitats are worthy of careful consideration by future zonation planning of the OBR.

4) The present study identified eleven rare species. Each of these species was recorded in less than 15% of the surveyed stand in very low abundance values (relative densirty, frequency and cover). These species are *Convolvulus lanatus, Dactylis glomerata, Kickxia aegyptiaca, Medicago sativa, Pancratium maritimum, Phagnalon rupestre, Polyonum equisitiforme, Salvia verbenaca, Silene succulenta, Thymus capitatus.* most of these species are well known for their important roles in the stability of their respective ecosystem as well as in the economic benefits of local inhabitants. Since they are rare and are restricted in their distribution to one or two habitats they may be considered more vulnerable to threats inherent in recent irrational land uses. The protection and rehabilitation of these species and their habitats should be carefully considered in the management plan and future zonation planning of the OBR.

The following proposals are extended to the concerned authorities for considering the revision of the existing boundaries of the core areas and the buffer zone.

A. Core area(s)

1. Additional of a number of new intact sites remaining on the coastal dunes after the heavy exploitation of this important habitat in establishing new settlements (summer resorts). Priority to be given to site which are large enough and which include rare, endangered and endemic species, as *Helianthemum sphaerocalyx.*
2. Revising the boundaries of the existing "Core area 2" to include most of Khashm El Eish ridge meantime to avoid the highly disturbed locations due to recent quarrying activities are two reasons which necessitate such revision: (a) The habitat of rocky ridges is becoming endangered due to extensive quarrying for brick-making. (b) The vegetation survey indicates that this habitat type is species rich due to the high diversity of microsites, and that a good number of rare and endangered species occur in it.
3. Another inland core area should be added that include Moghra, which is a wetland at the hinterland of OBR. This wetland is connected to the OBR socially, where the local community walk for at least three days t reach this wetland un the dry seasons, and use its resources as a natural rangeland.

B. Buffer zone

The boundary of the buffer zone has to be revised in order to avoid devastating impacts of recent irrigation and agricultural activity where restoration and rehabilitation of ecosystems became impossible, impractical or very costly.

C. The transition zones

This zone has to be clearly identified to local authorities and be used enhancing income generating activities and alternative livelihoods.