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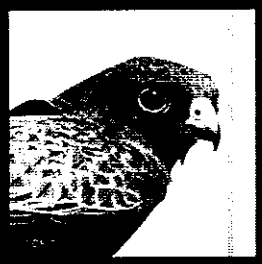
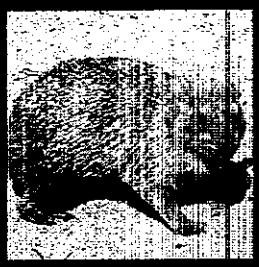
Under the Auspices of H.E. Mrs. Suzanne Mubarak

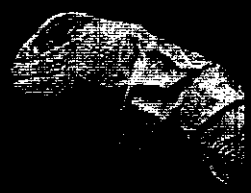
The First Egyptian-International Conference on Protected Areas and Sustainable Development

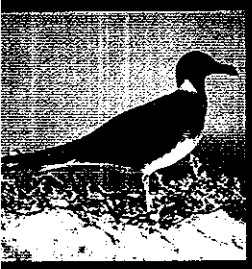
October 23 -26, 2002, Sharm El-Sheikh, Egypt

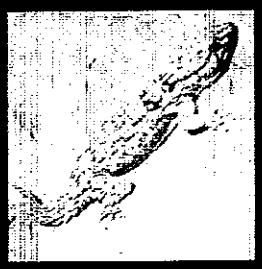
Abstracts











Introduction

The importance of protected areas as an effective tool in preserving our global natural heritage has become increasingly evident. In more recent years the potential role of protected areas as a tool for sustainable development has attracted much attention. Today the design and management of protected areas has become a well-established science, with many different approaches and techniques.

Our gathering in Sharm El Sheikh is intended to stimulate further discussion on the role of protected areas in the development of the modern state, and in advancing the global conservation agenda at large. This conference also seeks to highlight achievements made in the field of conservation in Egypt and the adjacent region, and to instigate further advancements through dialogue, contacts and information exchange.

The many important contributions summarized in this volume represent a valuable resource for those concerned with protected areas and the sustainable use of natural resources. The number and diversity of contributions reflect the increased interest in and understanding of conservation issues on the regional and national levels. This indeed is a promising sign for the future.

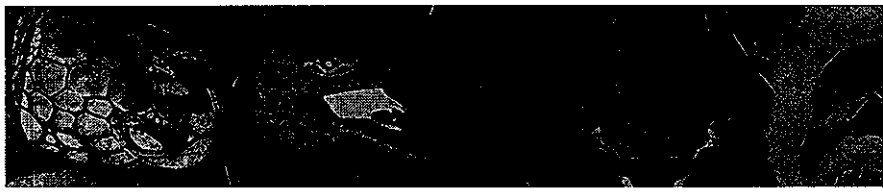
I wish all the participants, contributors and organizers of this unique event a fruitful and successful time.

Cairo, 15 October 2002

Mohamed A. Kassas

M Kassas

Professor Emeritus
Faculty of Science,
Cairo University.



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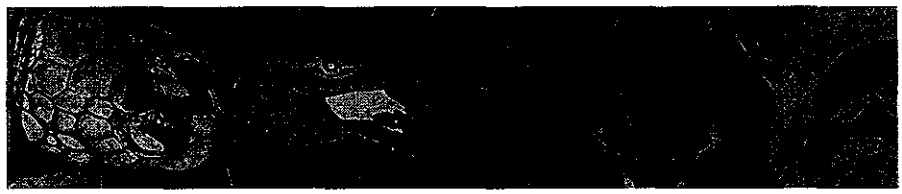

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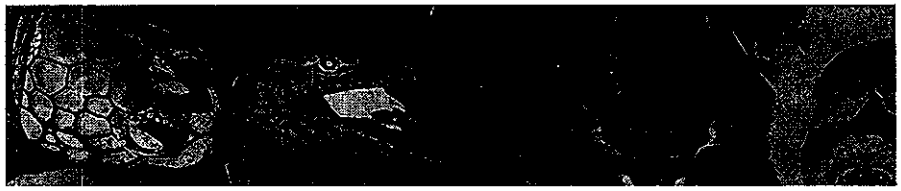

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BIODIVERSITY CONSERVATION AND DEVELOPMENT IN AFRICA

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Protected Areas in Context Most Protected Areas (PAs) in Sub-Saharan Africa were initially established as hunting reserves or for watershed protection, but have since come to have biodiversity protection and tourism as their main objectives. This creates new management challenges, as does the growing rural population and increasing land pressure. African PAs have typically followed an exclusionary model, but in recent years this has come to be recognized as ineffective from both an ecological and enforcement standpoint. However, the popular alternatives of involving local communities through "revenue sharing," "co-management," and "Integrated Conservation and Development Projects" also have limitations and have yielded few real successes. Neither approach is sufficient on its own: a successful strategy must address both protection and participation, while improving the implementation of each. Urgent issues for PAs include improving the coverage of under-represented ecosystems, meeting recurrent costs and striking a balance between local and national or global interests. Outside formal PAs we need to provide real and lasting incentives to private and communal landowners to maintain biodiversity on their land. Overall, the greatest challenge is to move beyond compartmentalization and bring together PAs and non-PAs through an Integrated Ecosystem Management approach.

BIOLOGICAL DIVERSITY, SUSTAINABLE DEVELOPMENT AND PROTECTED AREAS

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Biological diversity encompasses the variety of the natural world — its ecosystems, the species that inhabit them and the genes that make those species distinct. Biological diversity is essential to sustainable development and poverty alleviation. It is central to agriculture and the maintenance of a reliable food supply. It is the source of both modern and traditional medicines, and meets the energy needs of millions of people, especially the poor. It also has a key role to play in maintaining air and water quality and in mitigating the effects of severe weather events, such as floods. The diversity of species gives ecosystems the resilience to recover from external shocks, while the genetic diversity allows species to adapt to survive change. As a result, the natural world can continue to supply a wide range of invaluable goods and services—from food to timber, from pollination to water purification. The economic value of these goods and services is

enormous, particularly in agriculture and medicine. By way of example, forty United States crops, with a total value of $40 billion, are completely dependent on insect pollinators; biological pest control has an estimated annual value of $100-200 billion; microbial nitrogen fixation has an estimated annual worth of $50 billion; and the value of plant-derived drugs for medical purposes in the industrialized world amounted to $43Êbillion in 1985, while the market for herbal drugs stood at some $47Êbillion in 2000.

With escalating human impacts on natural resources and processes, however, the ability of ecosystems to deliver those goods and services is being gradually eroded. The threat to sustainable development posed by this loss of ecosystem functioning was recognized at the recent World Summit on Sustainable Development, where biodiversity was selected as one of the key areas on which progress could and should be made, together with water, energy, health and agriculture. The commitments in the Johannesburg Plan of Implementation reinforce the importance of biological diversity and of the need to pursue the efforts initiated under the Convention process to ensure its conservation and sustainable use, as well as the equitable sharing of benefits derived from the utilization of genetic resources. For that to be done, protected areas are needed more than ever. They represent one of the most powerful tools for the maintenance of the goods and services provided by biodiversity, whether as reservoirs of biodiversity, sources of clean air and water, buffers from storms, or sinks for carbon. Nearly every country has passed protected areas legislation and has designated sites for protection. In all, by the year 2002, some 44,000 sites met the IUCN definition of a protected area. They cover nearly 10 per cent of the land surface of the Earth. At the same time, understanding of what is meant by a "protected area" has evolved, from being an area simply for biodiversity conservation to one from which economic benefits can be obtained through certain uses. Marine protected areas provide opportunities for the unimpeded reproduction of living marine resources and can thus play a critical role in regenerating depleted stocks, thereby ensuring the sustainability of fisheries. In both terrestrial and marine protected areas, there is a potential for tourism and related income-generating activities, which can help raise the living standards of local people and provide incentives for biodiversity conservation and sustainable use.

Under the Convention on Biological Diversity, an Ad Hoc Technical Working Group on Marine Protected Areas has already completed its work and its recommendations will be considered by the Convention's Subsidiary Body on Scientific, Technical and Technological Advice in March 2003.

The overall issue of protected areas will then be discussed in depth at the seventh meeting of the Conference of the Parties to the Convention on Biological Diversity, to be held in 2004. A series of activities will be undertaken in the period leading up to that event with a view to:

- Developing the scientific basis for international coordination of protected areas required in order to facilitate the conservation and sustainable use of biodiversity at the global, regional and national levels;
- Fostering the development and adoption of best management principles, tools and practices;
- Identifying options and priority actions for the effective establishment and management of protected areas;
- Fostering improved sharing of information and experience;
- Promoting the coordination of the actions of international agreements and programmes that are concerned with protected areas
- Providing a framework for the management of transboundary ecosystems consistent with the objectives of the Convention.

The results will be consolidated into a multi-year programme of work on protected areas, which is expected to include measurable targets along the lines of those set in the Strategic Plan for the Convention, adopted by the Conference of the Parties at its sixth meeting.

THE IMPORTANCE OF IRRATIONAL CONSIDERATIONS

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Whatever the basis in science of plans for "sustainable development" and "conservation of biodiversity", socio-economic factors -- particularly when neglected -- can influence the "planned outcomes" for both biodiversity and development in unexpected ways. Among the hazards of planning without socio-economic assessment: lack of clarity and consensus about what (whose vision) is to be sustained, unacknowledged trade-offs of competing values (e.g., trade enhancement at the expense of biosafety), lack of meaningful involvement of local peoples, communities and experts leading to lack of intimate knowledge of appropriate baselines (and targets) for ecosystem flows, constituents, and remediation, lack of capacity building and technology transfer by investors leading to long-term dependence on foreign investment, and adoption of inappropriate (and even destructive) strategies for conservation and development. The unintended outcomes of conservation planning without socio-economic consideration: waste, alienation, ecosystem destruction, and loss of cultural incentives to conserve.

PROTECTED AREAS: CAN WE AFFORD TO LIVE WITHOUT THEM?

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The total area of land and sea designated as protected for biodiversity conservation grew throughout the 20th Century, yet biodiversity continues to be lost at an increasing rate. Recently, there has been considerable criticism of protected areas as being seen as "part of the problem, not part of the solution" to biodiversity conservation. This presentation reviews the growth of protected areas globally and in the North African/Middle East Region and assesses the adequacyof protected areas to meet the immediate challenge of protecting endangered species, as well as the future challenge of allowing the conservation of ecological and evolutionary processes.

Abstracts

PROTECTED AREAS AS IMPORTANT ECONOMIC ASSETS: IDENTIFYING AND CAPTURING VALUES TO PROMOTE SUSTAINABLE DEVELOPMENT

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There is increasing recognition that protected areas, in addition to their vital role for ecosystem and biodiversity conservation, should also be seen as important economic assets that can be a major source of economic benefits for countries. The identification and "capturing" of some of these economic benefits has an important role to play in promoting economic development, generating funds for sustainable management of protected areas, and providing benefits to both national and international visitors. Examples from around the world will be used to emphasize these points, and the opportunities of increasing net economic benefits for the country will also be explored. One danger from poor management is that these economic benefits will be "dissipated" and no one will gain--neither the visitors, the country nor the protected areas themselves. A particular emphasis of the presentation will be placed on both coastal/ marine protected areas, as well as the special case of historical/ cultural sites.

PROTECTED AREAS: ENSURING THE WORLD'S CONSERVATION JEWELS ARE IN A SHINING CROWN

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Achieving global sustainable human development will depend on how well Earth's ecosystems are managed and maintained. Ecosystems are complex open systems, interweaving biological diversity with ecological processes to produce a host of services for the planetary biosphere, including human society. Protected Areas have been seen as key to ensuring survival of functioning ecosystems. But is this assumption correct?

Some key challenges in the environment for the next century include:

- Climate changes
- Alien species invasions
- Loss of bio-cultural identity
- Degradation of semi-arid landscapes
- Reduction in availability of freshwater, and changes to wetlands

All of these are problems related to the management of people and their activities, and all are major challenges to the integrity of the world's Protected Areas.

So, will there be National Parks in another decade? A question that might leave people aghast, yet National Parks are a relatively recent phenomenon – most of the worlds protected areas are less 50 years old, many less than 30. At the close of the 20th Century, there were more than 44,000 Protected Areas, in 6 IUCN categories. But many of these areas lack sufficient action and investment to ensure their survival even under current pressures and threats. Since the UNCED conference in Rio de Janeiro in 1992, the Convention on Biological Diversity (CBD) has brought a different focus to nature conservation and the way we view landscape. It emphasizes the conservation of biological diversity, the sustainable use of the components of biological diversity, and the equitable sharing of benefits from the use of biological diversity. Of course, the Convention to Combat Desertification also arose from UNCED, and it has a specific mandate to reduce land degradation inter alia in arid and semi-arid areas.

The CBD has put special emphasis on the Ecosystem Approach and implementation of this Ecosystem Approach will be critical in developing and managing the worlds protected areas. The Approach, will form part of new paradigms for establishing, planning and managing Protected Areas. In this way we can promote better awareness amongst protected area managers, and protected area agencies, of the need to establish, understand and manage protected areas in the context of the surrounding landscape/seascape matrix.

TAXONOMY AND THE GTI IN THE DEVELOPMENT AND MAINTENANCE OF PROTECTED AREAS

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In the context of protected areas it is important to monitor the biodiversity within them, and thus be able to assess the impact on genotypes, species, habitats and ecosystems of different levels of access, usage and anthropogenic and non-anthropogenic changes. With appropriate models it is possible to predict the impact of climate change on the distribution of species and therefore take steps to ensure continued protection of key species. These capacities require identification of the biota to an appropriate level. Such identification may be at genetic, species or higher level, and

requires the integration of taxonomic expertise and resources into protected areas management strategies. Mechanisms to determine national, regional and global capabilities, and priorities for taxonomic work, have been agreed through the Global Taxonomy Initiative of the Convention on Biological Diversity. Within the Egyptian context these can be developed and modified, in concert with national and subregional initiatives and institutions, to help the sustainability and management of protected areas.

THE FUTURE OF BIOSAFETY, INTERNATIONAL REGULATION AND TRADE

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As a result of increased migration and trade around the planet over the last several centuries, humanity has opened up the Pandora's box with the transboundary movement of biological organisms. One of the first serious consequences was the spread of plant and animal pathogens for which populations had no immunity, resulting in catastrophic illness and disease. Similarly, all over the world, invasive species have been introduced that have devastating effects on ecosystems, whether they be rabbits in Australia, Eurasian millfoil in North American freshwater lakes or eucalyptus in South America.

Now, with the release of Living Modified Organisms into ecosystems over the last several years, the potential negative consequences pale those resulting from human migration. Trade has become the primary conduit for further environmental decay, and the exportation of western models into non-western states - the keepers of the world's biodiversity - threatens all organisms on the earth.

The ratification of the Biosafety Protocol will be one important measure to protect the earth's living resources, but what should the global community do if one or more countries refuse to adhere to or adopt such protections? Is the contamination of the center of biodiversity by patented LivingÊModified Organisms a crime against humanity, and if so, should such an offence be tried by the International Criminal Court? These and many other urgent considerations need to be made to ensure the sustainable use and development of natural resources and to limit the deleterious effects of human activity on the environment.

TOWARDS DOCUMENTATION OF BOTANICAL DIVERSITY FOR CONSERVATION INITIATIVES: LESSONS FROM THE SABONET PROJECT

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The Southern African Botanical Diversity Network (SABONET) is a donor-funded capacity-building project supported by the GEF/UNDP and USAID/IUCN. Ten southern African countries make up the network and include Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. Participating institutions in these countries are involved in compiling national plant checklists, producing botanical inventories for centres of plant diversity, conducting regional and national plant collecting expeditions, computerising herbarium specimens, supporting postgraduate studies in systematics, conducting biodiversity research projects, attending regional and national training courses and workshops, implementing threatened plants programmes in botanical gardens and compiling Plant Red Data Lists. Regular monitoring and evaluation is an important part of the Project. Over 70 botanists have been appointed as SABONET contract workers at 15 of the participating herbaria and eight of the participating botanical gardens in all ten countries. Since the inception of the Project in 1996, SABONET has made a significant contribution to the networking and capacity building of botanists in southern Africa and approximately 500 botanists have contributed to or trained through the Project. All these efforts have contributed positively towards providing baseline information for the in situ and ex situ conservation of the flora of the southern African region. This presentation looks at the lessons learnt during the implementation of the Project up to June 2002 and outlines the contribution SABONET has made towards providing baseline information for conservation initiatives in southern Africa.

THE MEDITERRANEAN ENVIRONMENTAL TECHNICAL ASSISTANCE PROGRAM (METAP)

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The Mediterranean Environmental Technical Assistance Programme (METAP) is a partnership between donors and 15 developing countries, which was launched in the Mediterranean region in 1990. The fourth phase ofEMETAP includes a component on Integrated Coastal Zone

Management (ICZM) which is being implemented together with the Mediterranean Action Plan (MAP) based on a the METAP ICZM strategy approved by the 15 participating countries at a regional workshop in Tunisia in November 2001, and by the donors in December 2001. The METAP ICZM component addresses issues such as environmental assessment, tools and methods for policy development, legal framework, economic instruments and financial mechanisms, pre-feasibility studies for investment projects.

THE GULF OF AQABA PROTECTED AREAS NETWORK, SOUTH SINAI, EGYPT

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Recognising the close linkage between coral reefs, reef associated marine environments and its ambitious tourism development objectives for Southern Sinai, the Government of the Arab Republic of Egypt decided to establish a network of marine and terrestrial protected areas to conserve critical natural resources and thereby supporting national economic development policies. The declaration of networked Protected Areas along the Gulf of Aqaba has in effect established a Large Marine Protected Area (MPA) covering Egypt's Gulf of Aqaba littoral in its entirety. Government objectives supported by the Commission of the European Union are being realized, coral reefs and associated marine ecosystems on the Gulf of Aqaba are now fully protected, zero discharge policies are strictly enforced, coastal alterations are prohibited, artisanal fisheries are regulated and consensus on land and sea management issues with resident communities has been achieved. The Gulf of Aqaba Protectorates Development Programme owes its success to strong legislation, unwavering Government support and to the establishment of functional partnerships with the local community.

The Gulf of Aqaba Protectorates declared periodically since 1983 have become established as a driving and regulatory force for all economic and tourism development activities in Southern Sinai. Through a gradual process that has successfully informed key decision makers and line ministries within the Government of Egypt, the Egyptian Environmental Affairs Agency (EEAA) has managed to implant the concept of resource conservation, protectorates management and intergenerational equity as key elements of national policy. This short note describes mechanisms that have permitted the government to adopt this visionary position given the immediate economic and planning realities presented to any state with a population of over sixty million and clearly divergent priorities to accommodate their needs.

The Gulf of Aqaba Protected Areas consist of a network of distinct units linked by protected coastlines thereby creating a large Marine Protected Area (MPA) on the Gulf of Aqaba. These protected areas are stretching from Taba (international border with Israel) to the Ras Mohamed (southern extremity of the Sinai peninsula) covering approximately 260 km of coastline and extending North in the Gulf of Suez for about 30 km.

THE EGYPTIAN ITALIAN ENVIRONMENTAL CO-OPERATION PROGRAM

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The Egyptian Italian Environmental Co-operation Program (EIECP) is implemented under the Scientific and Technical Co-operation agreement between the Egyptian and Italian Governments signed in 1975. A key element of the program is to develop long-term environmental policies and action programs which would address Egypt's key environmental issues in a comprehensive and coherent way, based on the experience of other countries as well as on the experience gained in implementing specific projects in Egypt. The main objective of the program is to contribute to EEAA and other institutions capacity building endeavours towards the efficient implementation of the National Environmental Action Plan (NEAP).

The program completed the first phase of its implementation in June 2001, and is currently formulating a second phase to be started early 2003. The program in its first phase was designed to address 4 important policy areas; these are nature conservation, water management, management of cultural heritage sites, and community participation to the development and in environmental initiatives. The projects correlated with these major intervention areas are; Support to the Wadi El Rayan Protected Area, Decision Support system for water Resources planning based on Environmental balance, Risk Map of Saqqara Archaeological site, and Environmental Amelioration of Siwa Oasis, respectively. The projects are implemented by NCS/EEAA, the Supreme council of Antiquities, the National Water Research Institute/Ministry of Irrigation and Water Resources, and Matruh Governorate; respectively. The Egyptian Environmental Affairs Agency (EEAA)/Ministry of State for Environmental Affairs is the executing agency of the whole program. The four projects are completed with successful results that encouraged both the implementing and executing agencies to agree with the Italian Co-operation on the need for a second phase of environmental co-operation program.

The Second phase program will include in additions to the projects of first phase, other policy area components which include, institutional and legal framework component, solid waste management component, a support to Gebel Elba protected area component, support to NCS/EEAA component and a cultural heritage component.

The funding sources for the proposed second phase program will be secured from the DGCD contribution earmarked during the bilateral agreement signed between Italy and Egypt on Feb. 2002, and partly from the Debt for Development Swap agreement between Italy and Egypt signed on Feb. 20001. The process for the second phase is in its final stages and it is expected to start hopefully within the first quarter of 2003.

THE RED SEA MARINE PROTECTED AREA CONSERVATION PROJECT

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Egypt's Red Sea is undergoing rapid tourism development, in response to government policy, acting through the Tourist Development Authority, to create nodes of infrastructure along an 800 km coastal strip from El Gouna in the north to Ras Banas in the south. The rate of development is unprecedented in scope, geographic extent and compressed timescale, and is being viewed by some development planners as the precursor to the long-range objective of urbanizing Egypt's Red Sea coast. The degree to which tourism becomes a successful engine of growth for this giant enterprise, hinges on safeguarding the environmental assets upon which the industry is founded.

As Egypt's premier conservation entity, the Nature Conservation Sector (NCS) of the EEAA is in the forefront of efforts to ensure that Red Sea natural resources are used in a sustainable fashion. To this end, it has developed "The Red Sea Marine Park Conservation Project", which is jointly supported by EEAA/NCS and USAID. The objective of the project is to manage and conserve Red Sea coral reefs, islands, and linked ecosystems of importance. How does one implement such a daunting task, in the face of developments capitalized in the billions of Egyptian Pounds.

The measures that have been adopted by the EEAA/NCS exemplify "conservation policy...with practice":

- To develop the institutional and technical capacity within National Parks of Egypt' corps of Red Sea rangers to manage and protect the Red Sea;
- To develop revenue generation and funding mechanisms for the Red Sea to ensure future financial sustainability;
- To create a new protected area in the southern Red Sea at Wadi El Gemal-Hamata, which will safeguard Egypt's most outstanding coastal and marine environments;
- To develop a conservation management plan (CMP) for the south, including a mooring buoy strategy, for selected high priority coral reef, island and terrestrial areas

Future activities will include: broadening the skills of NCS Red Sea staff to reflect the diversity of issues; improving outreach capabilities with stakeholders and the public; dealing with new threats—as well as providing faster response times for incident management; creating operational partnerships with key stakeholders such as the dive industry; and in the long-term, shifting from an emphasis on managing tourism to the larger task of managing conservation along an urbanized coastal zone. Finally, a paramount requirement will be to devise a stable financial mechanis that will allow the Red Sea NCS to effectively meet its management obligations.

AN OVERVIEW OF THE MEDWETCOAST PROJECT ACHEIVEMENTS IN EGYPT

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The MedWetCoast is a regional project aimed at conserving biodiversity of global and regional importance in 6 countries/authority in the Mediterranean basin. The overall GEF–funded Wetlands and Coastal project includes six countries/ authority, namely Albania, Egypt, Tunisia, Morocco, Lebanon, and the Palestinian Authority.

The project is based around three distinct and complementary actions:

- Local level: Implementing sustainable and intersectoral management in 15 pilot sites (threatened wetlands and coastal areas).
- National level: Developing innovative legal frameworks for removing the causes of biodiversity degradation, reinforcing the institutions involved in the management of natural resources and promoting coordinated policies.
- Regional level: Strengthening capacities through training and technical assistance, developing and sharing the Mediterranean experience through networking.

Three important existing protected areas were chosen to be the focus of the project in Egypt, namely Zaranik, Burullus and El Omayed.

Close links between the project and EEAA was ensured from the project onset. The Director of NCS is the project's focal point. Members of the National Biodiversity Unit (NBU), NCS have also been well integrated in the project. They are involved in the GIS (Geographical Information System) process and are expected to take on this process once the project is complete. In addition, the project's training coordinator was recruited from EEAA to ensure sustainability of the project.

With sustainability in mind, the project has activated advisory committees at the local and national levels, ensuring close coordination and involvement of all relevant stakeholders in the decision-making. Recommendations of these committees are well integrated in the project work plan.

The project has completed a very important milestone by concluding the site diagnosis phase; finalizing the thematic site diagnosis reports, MedWet inventory data sheets, consolidated reports and preliminary legal studies. Now, the management planning process has been initiated and first draft management plans for the three sites are underway.

Necessary equipment for the sites was acquired through the project resources. Construction of Burullus visitor's center is expected to be completed by October 2002. A socio-economic initiative and a public awareness campaign were launched, towards mobilizing people at the local and national level and integrating them in the planning process. Training plans at the regional and national level were developed. The national component has actively participated to all national and regional meetings, training sessions and seminars.

OPPORTUNITIES FOR ECOTOURISM IN THE ST. KATHERINE PROTECTORATE, SOUTH SINAI, EGYPT.

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This paper describes early attempts to promote eco-tourism activities in the St. Katherine Protectorate in south Sinai, Egypt. The Saint Katherine Protectorate is one of Egypt's largest protected areas and includes the country's highest mountains. This arid, mountain ecosystem supports a surprising biodiversity and a high proportion of plant endemics. The Protectorate contains religious and culturally significant sites, including Mount Sinai and the Monastery of Saint Katherine. Seven thousand Bedouin from six tribes live in or around the Protectorate

South Sinai is one of the world's fastest growing resort areas with most of the facilities for mass tourism centred on the coastal areas where recent development pressure has raised concerns for the future of the natural resource. However the area has other attributes; it is richly endowed with a unique natural, cultural, historical and religious heritage that offer various opportunities for developing alternative forms of tourism that are culturally sensitive and environmentally sustainable.

An integrated management plan is under development in order to conserve the area's natural and cultural heritage and ensure community participation while expanding opportunities for sustainable tourism. In partnership with local people the Protectorate has constructed a model Bedouin ecolodge by refurbishing some abandoned traditional houses and gardens. This model ecolodges seeks to bring about a broad involvement of the local community in the enterprise and spread the benefits and awareness of conservation. The Protectorate has also developed a series of interpretative trails with accompanying guidebooks for half to full day walks in the area immediately around St. Katherine. Together they represent an itinerary for a walking holiday based in the area.

ECOUTOURISM AND ITS REQUIREMENTS IN EGYPT: BIRDWATCHING TOURISM AS A CASE STUDY

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Ecotourism is a popular form of tourism these days, as countries around the world seek ways to make tourism more environmentally sound and sustainable, involve local communities and generate economic benefits from biodiversity conservation. While there has been a number of

initiatives to develop ecotourism in Egypt and it has been embraced by the government as valuable means to diversify their tourism industry, ecotourism remains an under developed market in Egypt. There are a number of significant reasons for this that will be discussed. Red Sea diving and desert safaris are the largest nature based tourism industries in the country, but tend to be more adventure and recreation rather than ecotourism oriented. There is a small, but growing market for birdwatching and other speciality tours. Of the above, birdwatching is probably among the most eco-friendly and closest to the definition of ecotourism, although it too faces a number of major constraints. The potential for ecotourism development in Egypt is great and will be explored along with the requirements to develop such a market here. Birdwatching tourism will be utilized as a case study. The role of biodiversity conservation and Protected Areas as vital requirements for ecotourism both to protect the attractions that brings the tourists and as centres of ecotourism will be addressed.

TOUR OPERATORS INITIATIVE FOR A HEALTHY ENVIRONMENT

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According to the Egyptian Ministry of Tourism, taking into account the continued development of hotels and holiday resorts and the improved infrastructure of airports, roads and railways, it is estimated that by 2017, Egypt will be able to accommodate 11 million visitors.

A number of important issues should be considered:

- What will be the impact of a growing number of visitors on the natural surroundings that have been designated Protected Areas in Egypt and how will it influence and affect the future of tourism in these areas?
- Do Tour Operators and Tour Guides working in and around Protectorates understand the importance and value of protected areas and the regulations and guidelines governing these areas.
- How are Tour Operators and Tour Guides being informed and trained to understand the importance of 'responsible tourism', 'sustainable tourism' and 'ecotourism'

There is an urgent need for an environmental awareness campaign specifically aimed at those people whose livelihoods depend on the continuance of the tourism industry, namely the Tour Operators and Tour Guides working in and around the designated Protected Areas.

SIWA SUSTAINABLE DEVELOPMENT INITIATIVE

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Siwa is an oasis inhabited by an indigenous community that has recently emerged from a long history of isolation. The development initiative aims to direct private investment in commercial ventures towards sustainable development that respects Siwa's rich natural assets and revitalizes its unique cultural heritage. EQI has drawn on the local community's traditional skills, knowledge and creativity, as well as its special value system that the world, in many places, has lost, to create an example of sustainable development that would be a source of inspiration to the world at large.

The centerpiece of the initiative is Adrère Amellal Oasis. Using the same traditional techniques and materials applied in the oasis some 2,500 years ago, this world-class facility for travellers was built from *kershef*, a material made of rock-like salt that maintains moderate indoor temperatures, eliminating the need for air-conditioning. The project has created hundreds of jobs for the local community. It has promoted Siwa worldwide as a special destination for environmentally sensitive and culturally minded travellers. It has also offered local government and the world community an alternative approach to development.

To complement the Adrère Amellal activity, EQI is setting up a Fund aimed at alleviating poverty through partnerships with the local community in sustainable development investments. Current investments are focusing on reviving traditional handicrafts produced by women and improving the processing and marketing of agricultural products. The initiative was structured to be a for-profit investment. It has benefited the local community by creating environmentally and culturally sustainable employment and income-generating opportunities that draw on materials and expertise available locally. Additional economic benefits are expected as the Fund begins to partner with Siwans.

The initiative has renewed Siwans' pride in their heritage, revitalizing traditional handicrafts and centuries-old systems for managing the environment. These were being abandoned in favour of modern but inappropriate technologies. EQI is working to upgrade the quality of traditional handicrafts produced by Siwan women and has recently introduced selected products through its outlets in Europe. EQI has also introduced improvements to Siwa's traditional building systems, addressing soil bearing capacity problems and improving foundations and building techniques.

The project also relies on biological systems free of any mechanical parts for the conveyance and treatment of sewage. The constructed wetland system introduced for the first time in Egypt has succeeded in providing treatment levels far superior to those of conventional mechanical systems applied elsewhere in the country.

Abstracts

EXISTING AND PROPOSED PROTECTED AREAS AND THE POTENTIAL ROLE OF ECOTOURISM IN SAUDI ARABIA

Saad Mohammad Al Qahtani

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The Kingdom of Saudi Arabia has a wide variety of physiographic regions, and a great diversity of landscapes, habitats and wildlife.

Since its creation the National Commission for Wildlife Conservation and Development has been charged with the protection of wildlife in Saudi Arabia through the establishment and management of a network of protected areas. In preparing and updating Saudi Arabia's protected area system plan, several existing and proposed protected areas have been singled out as offering especially high potential for ecotourism. These areas are likely to become the country's most important sites for measured in terms of social benefits to both visitors and local communities, economic viability, environmental sustainability, appropriate laws and regulations, effective public awareness, visitors' facilities and training of personnel.

ECOTOURISM AS A TOOL FOR SUSTAINABLILITY FOR PROTECTED AREAS

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If ecotourism is properly implemented it has the potential to sustain the economic development of some countries at both the local and national levels. Development pressure, illegal human activities, and cost of maintenance and management are the main problems confronting protected areas at the moment and challenge nature conservation managers. Many studies mention that introducing eco-tourism activities in protected areas increases their economic potential, which is a major component of sustainability of protected areas. However, few studies emphasize how to ensure the protectorates sustainability, which future ecotourism depends on. Through the identification of appropriate eco-tourism activities, and offering of services or facilities, economic viability is enhanced, which has direct positive impacts on the sustainability of the protected area.

The major problem posed in protected areas in relation to tourism is resource protection versus mass tourism activities. In sum, nature tourism is potentially privately profitable as well as socially beneficial, in that it can allow for both conservation and economic development objectives to be

met at the same time. Yet, it must be remembered that not ALL conservation problems can be solved by nature tourism, because some protected areas cannot sustain direct use. For the protected areas that have zones that could be used for tourism purposes, ecotourism can contribute enormously to the conservation and management of such protected areas.

On a national scale, responsible ecotourism operations ideally may encourage governments to reexamine their tourism policies especially in protected areas and may stimulate further commitment to conservation and rural development, and influence public policy on these issues. This could be particularly beneficial to protected areas as a tool that would support these areas from levies on the tourism industry and user fees. While protected areas are major destinations for ecotourism, tourist's private enterprise is playing an increasing role in the ecotourism sector. In addition, ecotourism is a major vehicle for releasing tangible benefits of conservation for local communities with ecotourism populations occurring on their land.

An example of projects, which can help protected areas to sustain their resources, generate funds for management and employment for local people is ecolodge development. A potential ecolodge case study will be presented, in addition to a list of recommendations for introducing ecotourism in protected areas.

DESIGNING ENVIRONMENTAL AWARENESS CAMPAIGNS FOR CHILDREN

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Mona Abou El Nasr will present ways of targeting children in public awareness campaigns, and particularly about television as a powerful tool in reaching children. She is the creator of the popular "Bakkar" cartoon series in Egypt, and is currently working on the public awareness campaign with the Red Sea Rangers. The Bakkar character is currently being used to promote Reading Programs sponsored by H.E. Mrs. Suzanne Mubarak. Her presentation will include a "sneak preview" of the upcoming episodes of Bakkar dealing with environmental issues in the Red Sea, and featuring the Rangers. Materials such as stickers, posters, games, and an activity booklet for children featuring a new character are being developed for distribution in Red Sea schools, and will serve as examples of tools for the Rangers or other representatives of similar programs to use to reach children.

ECOTOURISM IN CHINA'S PROTECTED AREAS

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The number of nature reserves in China has increased rapidly, from 34 in 1978 (0.13% of total country area) to 1276 in 2000 (12.44% of total area). Since 1990s, more and more governments, including China, have recognized that nature reserves should develop in a sustainable way. Both protection and development should occur simultaneously in order for nature reserves to survive, and to ensure conservation of nature resources.

Ecotourism, which has received a great deal of attention in recent years, is an effective way to ensure sustainable development in nature reserves. In China, tourism has been developed in about 80% of the nature reserves since early 1990s. Of the reserves that have developed tourism, 15.9% have more than 100,000 visits annually. It is estimated that the total number of visits was about 2.5 million in 1995, and the annual income generated was about US$63 million. In the past 5 years, the number of reserve visitors has increased rapidly as a result of national economic growth. Our questionnaire survey showed that in some nature reserves the average increase of visitors from 1995 to 1998 is 87.8%, while during the same period the increase of visits in nationwide is 37.0% for foreign visitors and 10.3% for domestic visitors, respectively. Nature reserve tourism is then developing more rapidly than other types of tourism.

There is no question that ecotourism represents one of the most environmentally friendly alternatives for economic use of natural resources compared with mine, hunting, oil refinery and etc. However, ecotourism can lead to degradation of natural resources on which it depends, especially if management is poor.

In this paper, the background of tourism development in China's nature reserves is presented, and the status in quo, including management institutional arrangement, financial input and tourism output and community participation, is analysed. Finally, the experiences and issues are proposed, which hopefully cold be used as references for other countries, especially those less developed countries.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AS A TOOL FOR SUSTAINABLE TOURISM

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The presentation will portray the challenge for tourism developers and operators and is to develop the tourism industry in a way, that conserves its natural resources and natural heritage base and minimizes any negative environmental, ecological, social and cultural impact on the coastal resources of the Red Sea.. The main theme is to discuss the role Environmental Impact Assessment can play within the context of sustainable tourism development in Egypt, and particularly coastal development, and presses questions of why and how to develop an approach that is environmentally and socially responsible, while a the same time, workable and manageable through both government and self-regulation. Coastal tourism development must be if the Egyptian tourism industry is to remain profitable in the long term, and if the nation is to retain its diverse and unique ecosystems.

The presentation will also describes examples from the regional Red Sea Sustainable Tourism Initiative that illustrate a multi-disciplinary approach to various aspects of sustainable tourism development along the Egyptian Red Sea coast. Although some of the measures presented are in the early stage of adoption, they illustrate useful environmental management and planning considerations or issues that can be applied to other tourism developments facing similar environmental challenges around the world. Key features of this initiative deal with environmental policy issues, environmental impact assessment (EIA), and environmental monitoring and auditing, as well environmental management systems (EMSs) for various types of tourism developments.

PLANNING FOR SAUDI ARABIA'S SYSTEM OF PROTECTED AREAS

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Saudi Arabia's protected area system plan, originally published by the National Commission for Wildlife Conservation and Development (NCWCD) in 1990, aims to serve as a rational basis to ensure that protected areas will maximized their potential for conservation of biological diversity and bring equitable and sustainable benefits to local communities.

In updating the protected area system plan, the NCWCD has placed emphasis on:

- Developing partnerships with governmental agencies and local stakeholders.
- Using international agreements such as the Man and the Biosphere and World Heritage programs, the Convention on Biological Diversity, and the Ramsar and Bonn Conventions are frameworks to raise the standard to protected area planning and management.
- Incorporating traditional practises relevant to conservation, and
- Environmental recreation and eco-tourism

The NCWCD's criteria for selection and prioritisation of sites have been refined and the following ecological and socio-economic criteria have been adopted:

Ecological Criteria include:
- Representation of the country's terrestrial and marine ecosystems
- Conservation of the country's most productive biological sites , and
- Conservation of key plant and animal taxa

Socio-Economic criteria include
- Incorporation of traditional and local conservation initiatives
- Value for rural development , through sustainable use of natural resources, and
- Value for Environmental education

Saudi Arabia's existing protected area system is analysed on the basis of these criteria, as well as the future protected area system as envisaged after proclamation of the country's high priority protected areas.

Abstracts

MASTER MANAGEMENT PLAN FOR RAYDAH PROTECTED AREA (ASIR, SAUDI ARABIA)

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Forest Conservation is one of the most globally important international issues. In the Kingdom of Saudi Arabia, Juniper *Juniperus procera* forests stand on the Asir Mountains range. These woodlands are indispensable biodiversity, natural ecosystem and landscape conservation resources in the kingdom.

NCWCD has established the Raydah Protected Area in 1989. We are currently trying to elucidate a mechanism for woodland conservation to clarify the status of biodiversity of the forest ecosystem. It is hoped that the prepared master plan can promote its growth and strengthen environmental education in the kingdom. Consequently, it encourages more applied research, sound sustainable forest preservation and better environmental management. The present paper throws more light on these issues.

STATUS OF BIOLOGICAL DIVERSITY IN SAUDI ARABIA

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This paper will focus on the status of terrestrial, marine and freshwater biodiversity in Saudi Arabia and threats affecting its existence. Relevant legislation, institutions and mechanisms pertaining to the conservation and management of biodiversity in Saudi Arabia are emphasized.

SYSTEM OF PROTECTED AREAS OF SAUDI ARABIA

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In 1986 Saudi Arabia succeeded in establishing the NCWCD, which in turn prepared a system of Protected Areas amounting to slightly over 100 sites, equivalent to 10% of the overall area of the Kingdom. Declaration and announcement was possible for only 15 sites (or 4%), priorities of applied meaures included the factor of biodiversity richness, and the possibility of using the site for rehabilitation and re-introduction of some endangered taxa. Each site is governed by rules, laws, and regulations and is under constant monitoring and administrative plans, local communities are involved and several problems were tackled, some solved, some awaiting solution. The present paper throws some light of the interesting and difficult issues entailed.

PROTECTED AREAS IN KARST OF CHINA

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Karst covers 22million km² in the world, i.e. about 12% of the world's land surface. It enjoys a lot of scenic attractions, but is also regarded as a fragile ecosystem. It is fragile because of leakage of water and thin soil as a result of intensive karstification, and the development of underground drainage system.

There are about 3.34 million km² of karst area in China, including 907,000 km² of exposed karst, concentrated in its southwest part. Southwest China Karst has 2836 underground streams with a total length of 13,919 km. It is frequented by drought and flood, because of seasonally uneven distribution of the monsoon rainfall. Under population pressure and malpractice in land use, soil erosion and rock desertification takes place. Under such conditions, vegetation is characterized by petrophile, xerophile and calciphile, and the biodiversity constrained.

For the rehabilitation of deteriorated karst and the protection of species, several Nature Reserves in karst areas have been established in China. For example, in the National Maolan Karst Reserve of Libo County, Guizhou province, which covers 193,700 ha, there are 801 species of vascular plants, 757 species of angiosperm, 13 species of gymnosperm, and 31 species of pteridophyte. For ecological education and scientific research, a small typical area of the Reserve has been opened for ecological tourism.

The Jinfo Mountain Karst Reserve in Chongqing city covers 441 km², and was designated as a National Forest Park in 1991. It enjoys more than 5000 species of plants, and more than 500 species of wild animals. The biodiversity shows clear vertical variation from subtropical one at the mountain foot (600m above sea level) to temperate one on its top (2200 m asl). Moreover, there are *Cathaya argyrophylla* between 940m and 1870m asl. It is a living fossil, which used to be widespread in northern hemisphere during Cretaceous and Tertiary time, but now only remains in 3 points in China, including the Jinfo Mt. Another precious species, the *Liriodendron chinese* which is distributed between 1200m-1800m asl is supposed to be one of the indicators of continental drift, being now alive only in China and north America.

The Longan North Tropical Karst Forest, Niming county, Guangxi province covers 100.78 km². It has 1282 species of plants, and 123 species of animals, including the world endangered *Presbytis leucocephalus* (a white-headed leaf-monkey), and *Presbytis francoisi pousargues* (a black leaf-monkey). The Karst Nature Reserves demonstrate harmonic relationship between ecosystem and economic benefits, thus increases people's interest in biodiversity protection.

CONSERVATION EFFORTS OF MARINE TURTLES & MANGROVES IN SAUDI ARABIA

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Marine turtles are classified by IUCN as endangered species. There is currently an active program on the conservation of these creatures along the Red Sea and Arabian Gulf coasts, headed by NCWCD, but initially started by MEPA (Meteorology & Environmental Protected Agency) in 1985. Ras Baridi is an internationally recognized site for marine turtles along the Red Sea. Researches carried out led to the formulation of a monitoring plan and a conservation strategy, both are outlined in brief here. Future research plans are also mentioned.

Mangroves of Saudi Arabian Coasts along the Red Sea and the Gulf are surveyed. Deteriorated sites were identified and measures to halt the causal factors applied. Some areas were replanted with mangrove seedlings in collaboration with the Ministry of Agriculture and Water. Examples include Kho Frasan, Segaid Island, and some areas in Gizan. Currently is running a special program extending for three years to carefully surveying the status of this important ecosystem. The present paper gives more information.

THE BIODIVERSITY AND PROTECTION OF LITTORAL WETLAND IN THE NORTH OF CHINA

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China has 18,000km coastlines. Along them, there are 21,000 km^2 littoral wetlands, most of which are distributed in the north of China. They are tidal mud flats or river deltas in the north of Yangtze River estuary. Among of them, the Northern Jiangsu tidal mud flat, the Yellow River Delta and the Liaohe Delta are the largest three littoral wetlands, and there located three national natural reserves. The total areas of these regions are 14,700 km^2, out of which, 6,500 km^2 areas are wetland. They are stop stations of the bird migration network of East Asia with high biodiversity. This paper choose these regions as the research areas, investigated species diversity and landscape diversity, including phytoplankton, higher plants, invertebrates, fishes, birds etc.. Especially, the author studied the habitat diversity of key species such as red-crowned crane and black-billed gull. The regions are also the bases of oil and agricultural development of China; so, in the paper the authors studied the effect of human activity on the waterfowls' behaviour, and proposed the regionalisation of the reserves and the conservation measures.

SUSTAINABLE DEVELOPMENT IN THE FIELD OF PROTECTED AREAS: CEDAR & FIR FORESTS IN SYRIA AS A CASE STUDY

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There can be no doubt that the concept of sustainable development of natural resources has become an obsession, which should be dealt with in high responsibility. Yet, the degradation in these resources has surpassed their abilities to repair themselves by far. The Syrian experience in this field is still in its first steps thus giving considerable significance to the project of Conservation of Biodiversity and Protected Areas Management– Cedar and Fir. The project aims principally at protecting the rare and threatened cedar and fir forests because of local communities

practices such as cutting, severe grazing, fires, and urban expansion of tourist housing in the coastal mountain region on the eastern coast of the Mediterranean Basin. This has been carried out with the cooperation of the GEF within the field of conserving biodiversity of national and global significance. The sustainable development scenario in the field of natural resources should take into consideration the following two concepts: Ecotourism and the role of local communities.

Ecotourism is considered one of the most important aspects of developing public environmental awareness from one hand and a principle resource of self-financing for protected areas from the other hand, especially that the issue of financing the protected areas is considered a hard burden to carry by the governments of the developed world.

The role of local communities is the second issue that the scenarios of sustainable development of protected areas should take into consideration is the support of local communities in the management of natural resources. Through creating mechanisms that connect the economical, cultural, and social interests for these communities with the protected areas and enhancing their environmental awareness in addition to developing alternative livelihood for local communities through giving true and new work opportunities and new production resources and guaranteed marketing conditions.

We considerably count on the settling of local communities and their participation in the management of resources through lifting up the level of their public awareness; reducing the pressures they face to be a positive partner in the administration and also the first beneficiary of the sustainable development of protected areas.

THE PROTECTED AREAS OF EGYPT: VALUABLE NATIONAL ASSETS AND CORNERSTONES OF SUSTAINABLE DEVELOPMENT

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The origin and history of protected areas is examined and discussed in the context of the four ages of man, and the imperative for man to set aside protected areas as he moved from the hunter-gatherer age through the agricultural and industrial ages into the present age of information technology. It is shown that the idea of setting aside protected areas started in the agricultural era to safeguard certain key natural resources as illustrated by practices such as the *hema* system in Arabian countries, but this was on a relatively small scale. In the industrial age the worldwide need for setting aside areas as protected areas became acute due to the rapid destruction of the natural environment and the concept of each country setting aside examples of the natural landscapes for the benefit and enjoyment of current and future generations grew into a worldwide phenomenon.

The wide variety of benefits of protected areas to society is highlighted and the concept of sustainable development is examined in terms of the ecological features of equilibrium, regeneration, linkages, limits to growth and thresholds.

The science and practice of protected area management is discussed and the nature of the protected area management function is shown to make protected areas good examples of the principles and practices required in sustainable development. Protected areas can also serve as important experimental areas for studying the elements of sustainable development for implementation outside of protected areas in the rest of the county.

It is strongly recommended that the government of Egypt together with all governments having bilateral development agreements with Egypt view the protected areas of Egypt as national assets in their own right, and also as sites that can play a vital role as cornerstones of sustainable development in the country. The development of protected areas should be given top priority on the national agenda.

A PROPOSAL FOR AN EGYPTIAN-SUDANESE TRANSBOUNDARY PROTECTED AREA (ELBA-NUBIA)

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The protected areas that meet across international borders (border parks, transfrontier parks, international peace parks, international parks, transnational parks transfrontier protected areas) have aims to confirm, strengthen or re-establish good relations with neighbouring States; to prevent escalation of border disputes; and to improve the management of a shared ecological unit or migratory species. They can provide ecological models as well as political symbols of effective conservation. Border parks have three main functions: 1) the promotion of peace, 2) the protection of the environment and the improvement of resource management, 3) the preservation and enhancement of cultural values, especially the protection of transboundary people.

The proposed area for establishment the transboundary park is the southern Egypt – northern Sudan border, from Lake Nasser east to the Red Sea at latitude: 21°-23° N longitudes 31°-37° E. This area comprises four important eco regions (ecosystems) shared by both countries: 1) inland water: Lake Nasser - Lake Nubia; 2) dry rivers (desert wadis) Wadi Allaqi basin; 3) mountains: Gebel Elba and 4) marine: Red Sea.

Each of the four eco regions described in this presentation (lake, mountains, watershed and sea with reefs) comprise a single entity in many respects, including its biodiversity components and minority indigenous peoples (mainly Bishari tribe) who nomadically live on both sides of the border. On the Egyptian side, there already exist two protected areas: Gebel Elba region; and Wadi Allaqi. Both join the frontier with Sudan. The later one is a Biosphere Reserve within the UNESCO MAB network. There is also strong transboundary cooperation existing between Sudan and Egypt in the management of Lake Nasser and Lake Nubia.

The main objectives for the establishment of Egypt-Sudan transboundary park given bellow as following: conservation of biodiversity and particularly increasing protection for migratory species which regularly cross the international countries boundary; improving protection of internationally shared water recourses, both inland and marine: Lake Nasser-Lake Nubia, Red Sea; protection of indigenous minority peoples; promotion of a fuller and easier enjoyment of recreation experiences. Main benefits of this transboundary reserve and beneficiaries are discussed at the end of presentation.

SPIDERS AND SCORPIONS IN COASTAL PROTECTED AREAS OF EGYPT

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Most studies in protected areas in the world are devoted to vertebrate animals. Invertebrate animals are mostly neglected, in spite of their huge number of species/individuals and their great influences on the surrounding habitats. Arachnids, especially Spiders, constitute a considerable ratio of invertebrates with great ecological importance. They have a very important role, as predators, in biological balance.

During the preliminary study of Arachnids in protected areas of Egypt on the Mediterranean Sea and Gulf of Aqaba in South Sinai, it was possible to identify several taxa and to collect specimens of species, which are new to science. This study leads us to state that it is necessary to make continuous seasonal survey of all arachnid species in the coastal protected areas of Egypt to elucidate their importance in their environment.

Abstracts

METEOROLOGICAL DATA IN JUNIPER FORESTS IN ASIR AREA, SAUDI ARABIA

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Juniper forests growing in the highlands of the Asir Mountains of Saudi Arabia are of particular importance t the Arabian Peninsula as a whole. The distribution of Juniper Forests is not only horizontal but also vertical in the Arabian Peninsula, for this reason detailed analysis of the climate is indispensable, particularly so in identifying the causes of die-back and die-off phenomena. However, most of the available meteorological data are old and not recording true climatic conditions within juniper forests. Recent meteorological data using a meteorological observation tower and three poles are installed in Raydah Protected Area where juniper forests are included along vertical altitude or slope gradient where dieback phenomenon is observed. For the analysis of these distributional characteristics, the information of environmental conditions on smaller scale range becomes important. Therefore small-sized data recorders with sensors recording air temperature and humidity were employed to obtain the required information on the meteorological conditions. In this paper the results are reported and discussed.

SENSITIVITY MAPPING FOR OIL SPILL CONTINGENCY PLAN IN EGYPT

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Sensitivity mapping is a key element in an Oil spill Contingency Plan. Sensitivity maps provide Oil Spill Combat Team with essential information like:

- Locations of Ecologically Sensitive Areas
- Locations of Economically Important resources
- Priority Areas for Protection and Clean up

A Geographic information system (GIS) has been developed for the NOSCP and all collected data have been stored in the system.

Taking this into consideration, EEAA took into consideration a variety of issues in preparing the GIS system:

- Identify Arc/Info as a powerful GIS Tool
- Beach survey results
- Human Development
- Physical & biological characteristics
- Occurrence and quantities of equipment and their location
- Identify potential sources of pollution
- Risk assessments of each source
- Define Priorities
- Visualize all the above in properly managed GIS

BIOACTIVE MARINE NATURAL PRODUCTS OF THE RED SEA: THE UNCOVERED TREASURE

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The exploration of the Red Sea as a potential source for novel bioactive substances has received relatively little attention compared to the enormous efforts that have been spent on the detection and isolation of natural products of terrestrial plant origin. Marine animals have been reported to contain a series of biologically active substances not found in terrestrial. Moreover marine algae and invertebrates may contain special defence mechanisms that differ from those of the immune system of higher vertebrates. The marine environment, comprising approximately half of the total global biodiversity, offers an enormous source of novel and biologically active compounds. Marine sources have the highest probability of yielding natural products with unprecedented carbon skeletons and interesting biological activity. The tools used to identify marine metabolites are constantly improving in scope and sensitivity, allowing the marine organisms to be explored. In this presentation several topics concerning marine natural products will be discussed as follow:

- Current knowledge of natural products of the Red Sea
- Specificity and selectivity (i.e. pesticidal, antiviral, antiHIV, antimalaria, drugs, and toxicity).
- Quantitative Structure Activity Relationship (QSAR) and Molecular Design.
- Recent Technology for isolation and identification of bioactive compounds.

Conservation and sustainability of marine life use in the search for bioactive marine natural products is emphasized.

EXTRACTION OF SALTS FROM LAKE QARUN, EGYPT: ENVIRONMENTAL AND ECONOMIC IMPACT

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Lake Qaroun is situated in the northern part of Fayoum Governorate, southwest of Cairo. Drainage water coming from the cultivated land of Fayoum Governorate feeds the lake. Its water depth ranges from 1m to 8m and covers 215 km^2 in surface area. History of Lake Qaroun witnessed several drastic changes affecting its ecological role and economic potential. The main reason is the salinity gradient continuous rise formulating the main issue to extract economic salts. Continuous evaporation and absence of any fresh water supply caused its deterioration, shrinkage in area and rarity of its fish population.

Chemical analyses of the lake waters proved the presence of considerable amounts of sodium sulphate in addition to sodium chloride. Magnesium and other salts also present in appreciable quantities.

The lake area was declared a protected one by the prime ministerial decree No. 943 of 1989.

For salt extraction an area of 5 km^2 was cut from the lake and divided into 4 evaporation ponds. The lake water total dissolved solids, which is approximately 34 gm/l, was concentrated in these ponds to about 340 gm/l by solar energy. The percentage of salts concentrated in pound 4 brine is as follows:

1.	Sodium Sulphate	12% of the TDS
2.	Sodium Chloride	68% of the TDS
3.	Magnesium Salts	16% of the TDS
4.	Others	4% of the TDS

The brine of pond 4 is pumped to the sodium sulphate plant, where it is cooled down to -1°C in stages. At this temperature sodium sulphate decahydrate (Glauber's salt) crystallizes out. It is then separated from mother liquor by a centrifuge. The other salts remain in solution. To economize energy consumption this cold liquor is used to cool the new incoming ambient temperature.

The design capacity of the sodium sulphate plant amounts to 100 thousand tons per year. By the end of year 2001 exceeded 700,000 tons, and consumed mainly in detergent industry. Harvested and accumulated raw salts reached more than 500,000 tons. This raw salt is the feed for the sodium chloride plant, which is washed and purified in the sodium chloride plant.

DIVERTING PRESSURE FROM CORAL REEFS ARTIFICIAL UNDERWATER THEME PARKS AS TOOLS FOR REEF CONSERVATION

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Diving tourism still belongs to the booming branches of the business. The economies of many countries with reef-lined coasts depend on high numbers of dive tourists; the resulting degradation of reefs by overuse is tolerated due to the short-term gain from the tourism business and due to the lack of suitable concepts. Many activities of recreational diving do not essentially require natural coral reefs - any varied three-dimensional structure could be sufficiently attractive. The conflict between the needs of nature conservation and the economic interests of diving tourism can be mitigated by alternative underwater attractions such as artificial theme parks to serve as substitute settings for recreational diving activities. Thus an exclusion of diving activities from sensitive areas can be enforced without anticipating tourism.

Structures of the theme park can be made by electrochemical deposition of calcium minerals from the seawater in situ on a template of any desired shape. After transplantation of living coral fragments (e.g. from ship groundings or farmed specimen) a diverse community can develop.

Beyond diving purposes, environmental education as well as reef rehabilitation goals can be performed by the park structures. Within an integrated management concept a theme park consisting of different structures might be an adequate and efficient facility to function as a DAD (diver aggregation device) and therefore preserves natural reefs by diverting diving pressure to artificial facilities.

DIVERSITY AND DISTRIBUTION OF GROUND BEETLES IN SINAI PENINSULA

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The ground beetle fauna was investigated in Sinai Peninsula for the first time during many expeditions and field trips since 1996 until 2002. A total of 97 species was collected from different habitat in Sinai including the protected areas. Sinai Peninsula harbours 7 endemic species out of 43 in whole Egypt. The carabid fauna was compared with the total fauna of Egypt (45% of Egyptian fauna) and its different geographical regions. Moreover, the fauna of protected area were analysed and compared to the whole fauna.

The possibility of using carabid beetles as bio-indicator for soil characters was also examined. The result indicates *Lebia arcuata* can be used as indicators for conductivity of the soil and organic content. *Bembidion atlanticum megaspilum*, *B. schmidti moses*, *Brachinus latipennis*, *Chlaenius canariensis*, *Ch. obscurus*, and *Egadroma marginata* are confined to the soil characterized by a higher percentage of gravel and coarse sand than the other studied sites, in addition to the water stream which offers a favourable habitat to these species.

FLORISTIC NESTEDNESS ON LAKE BARDAWIL ISLANDS (NORTH SINAI): IMPLICATIONS FOR CONSERVATION

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Lake Bardawil is the only oligotrophic hypersaline lagoon along the Mediterranean coast of Egypt. The environmental impacts in the lake are not limited to physical alteration of resources, loss of biodiversity and habitat damage, but will extend to the new land use systems through the entire length of the lake by North Sinai Agricultural Development Project (NSADP). Therefore, it is important to prioritise areas for conservation in these threatened habitats. This study quantified nestedness for plants on 14 islands based on island area and habitat richness. The species-presence matrix ordered by area was significantly more nested than the matrix ordered by habitat richness.

The overall patterns of plant distribution were strongly influenced by island area and habitat richness. Both succulent and non-succulent distributions exhibited significant nestedness with a mean matrix temperature of 7.2^0 and 6.6^0 respectively. Nestedness degree was higher for glycophytes (6.84^0) than for halophytes (8.81^0). However, halophytes on the examined islands, as indicated by row order in the packed matrix, was not correlated with habitat richness, suggesting that habitat related factors alone cannot account for this pattern. For the different life forms, the mean matrix temperature ranged from 0.08^0 (geophytes) to 9.74^0 (hemicryptophytes). Our results show that island area was the most significant factor in determining floristic nestedness in Lake Bardawil and that the protection of large islands is critical for the conservation of its biodiversity. In addition, our results support the hypothesis that sets of assemblages of biota that are strongly nested are more likely to have greater species richness on one or a few large sites than on several smaller sites of equivalent total area that is, to fall forward the "single large" side of the "Single Large or Several Small" (SLOSS) continuum.

TRANSPLANTATION OF CORALS AS AN APPROACH TO REHABILITATE THE DEGRADED REEFS IN THE EGYPTIAN RED SEA

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The coral reefs of Egypt are currently under threat of degradation due to the rapid expansion of tourist development. Many reef areas along the Egyptian coast suffered from the related human stress such as boat grounding on reefs and reefs reclamation. Most of these reefs did not recovered after more than 15 years. The present work is a part of a unique opportunity raised by one of the tourist resorts in Hurghada, to create underwater scenery by artificial reefs as a tourist attraction project. About 412 whole coral colonies were removed and transplanted on the artificial reefs between 5m and 9m depths. The transplanted corals were belonging to 12 genera including hard and soft corals. In situ mortality, survivorship, and growth of corals were monitored over 16 months and the percentage of survival for each genera and species were calculated. Overall survivorships of corals were 88% and 84% after 9 and 16 months from transplantation, respectively. The survivorship rate was varied between genera with lowest percentage of 63% for *Acropora* and *Seriatopora* spp. and highest percentage of 95% for *Favia* spp. Mortality of corals was mainly due to sponge and algal growth, which overgrown the living colonies. The growth of the survived colonies showed healthy indications with increasing of branches length, colony diameter, and new budding and polyps. Survival of transplants is compared with results of other studies in other areas.

The present work gives an approach to rehabilitate the degraded reefs by coral transplantation, but taken in consideration that certain coral species are significantly amenable than others to transplantation, considerable loss of transplanted colonies is likely to happen, transplantation should be undertaken only if the natural recovery is unlikely, and great care should be given to the donor areas to sustain the natural communities.

THE DOCUMENTATION OF EGYPT'S NATURAL HERITAGE (THE NATURAL HISTORY MAP OF EGYPT)

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"The documentation of Egypt's Natural Heritage" is one of the programs carried out by The National Centre for documentation of Cultural and Natural Heritage (CultNat), which forms part of the Ministry of communication and information technology. The program involves the collection of all information available on the habitats, Flora, Fauna, Geology and Geomorphology of Egypt as well as those related to specific sites or protected areas including cultural features, ethno botanical data etc. The data is organized in the form of searchable, user-friendly databases associated with a GIS-mapping to create what is called "The Digital Natural Map of Egypt". The project aims at the dissemination and communication of the information via a series of publications, books, CDs and on the Internet.

The presentation will include an overview of the program, its objectives, work plan, and potential users as well as a demonstration of the various outputs:

- Databases
- Geographic Information System and some of the components of the natural map of Egypt
- Publications
- And future plans.

BACTERIAL STATUS IN MANGROVE ECOSYSTEM

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The current investigation was carried out to study the distribution and densities of certain microbiological groups in root rhizosphere, soil of mangrove plant *Avicennia marina* and water from near shore. Samples were collected from Nabq Protected Area located 35 km north of Sharm El Sheikh, South Sinai, Egypt.

The location and density of trees suggested that fresh water infiltration reduced the salinity to levels tolerated by the growing species (16 & 24 g% total soluble salts in soil and water respectively). The bacteria most commonly found in rhizosphere, soil and water are Gram negative rods (extreme halophiles), usually included halobacterium and halococcus. Extreme halophiles percentages relative to total bacterial counts in the rhizosphere, soil and water were 80.91 and 97% while moderate hatophile percentages were 16.3 and 8.7 % respectively. The Rhizosphere/Soil (R/S) values for extreme and moderate halopiles were 13.7 and 19.4 respectively.

Nitrogen fixers (Azospirellum, Azotobacter, Clostredium) account for only a small fraction of the total bacterial counts (seldom exceed 0.2%), cellulose-decomposeres (aerobic and anaerobic) (0.1%) and sulphate–reducing bacteria (0.4%), which cause the greyish colour of black soil. Bacterial Groups increased in the rhizosphere more than in the soil.

X-ray diffraction analysis of both soil and heavy mineral fraction revealed the presence of pyrite mineral in trace amounts, while pyrolusite mineral (MnO_2) in present in reasonable amounts.

COST BENEFIT ANALYSIS FOR INDUSTRIAL WASTE MANAGEMENT PROJECTS IN EGYPT

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The study is concerned with testing the economic viability of industrial waste management projects in Egypt. Both direct (to the investor) and indirect (to the society) costs and benefits are identified and quantified. This includes the effect on health, quality of service, style of life etc. The stream of benefits and costs over the expected life of the project are discounted at the social opportunity cost of capital , I order to arrive at the economic value of the proposed project. Both value-added effect and employment effect of the project are also estimated.

The study is concluded by suggesting investment requirements and the expected economic value of the proposed project, i.e. the value to the Egyptian Society.

INTERNATIONAL COOPERATION ON BIODIVERSITY CONSERVATION IN SAUDI ARABIA

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NCWCD has established strong links with various Governmental and non-Governmental organization, involved in Biodiversity issues. To quote only few examples:

- IUCN: Cooperation with this body continued for almost twelve years, on technical and advisory matters. The outcome was the System of Protected Areas which consists of 103 sites, 15 of which are established, monitored and managed . Some will be described later.
- JICA: The Japanese International Cooperation Agency is actively working with NCWC in several Marine and terrestrial wildlife conservation issues, some of these will be discussed in the present paper.
- Kew Botanic Garden: Concentration in on the vegetation side and the establishment of seed and gene-banks, e.g. the millennium seed bank, this will be tackled in brief in this paper.

- European Group: Gulf oil pollution of 1991 is a classical example international cooperation. As a result, an important marine protected areas has been established at Jubail. Results of oil pollution combat will be briefly stated.
- Conventions: Kingdome of Saudi Arabia has singed several Conventions such as Biodiversity Convention, CITES, Man and Biosphere Program, and Desertification, the Kingdom is considering others such as World Heritage.
- Funding Channels: Fund-raising is a everlasting problem , however, support was obtained from the Islamic Bank to enable arranging some Seminars and Conferences, dealing with all the above-mentioned issues.

BIODIVERSITY AND CONSERVATION PRACTICE IN EGYPT

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Harvesting animals and plants for commercial purposes is an issue, which was discussed at a number of meetings and conferences at the local regional and international levels. The world exerted efforts in order to face this problem, and accordingly several laws were issued to organize and control the exciting practice of over-harvesting (e.g. CITES).

During a recent workshop held by the "Egyptian British Biological Society" with support of "Global Environmental Facilities, Small Grants" and with the cooperation of the Environment and Community Service Sector of the Suez Canal University and the Nature Conservation Sector (NCS), it was clarified that the issue of over-harvesting plants and animals for educational and research purposes in Egypt was an important one. It is an important issue because it negatively affected the ecosystem, and affects the existence and the reproduction of certain species, which are considered fundamental key species for the food chain in the ecosystem. Lectures given at workshop explained that there are various constraints on certain species used for both educational and research purposes such as frogs, lizards, scorpions and snakes. Continuous harvesting of such big numbers will cause the extinction of some species, thus causing destruction of ecosystem. This destruction will damage and weaken the environment giving the change to other destructive species to increase and spread. Examples are crayfish, palm beetle, water hyacinth, mosquitoes, flies, parasites affecting honeybees and other beneficial organisms.

The workshop clarified that the problem has became more complex due to a number of factors: lack of developing either theoretical or practical curricula at scientific faculties in Egypt to cope with new trends and modern methods of scientific thinking. This lack of curricula development caused the continuous dissection of the same species using the same old methods that had been used long ago with no observation of the change taking place in the surrounding environment the opening of new scientific faculties both governmental and private, as well as the increase in the number of students and professors, the matter which gave rise to a growing demand for plants and animals either for teaching or research.

Scientific institutions in Egypt never thought of satisfying demand for animals and plants by establishing their own farms and surrounding breeding habitats. Instead institutions still depend

on the classical method of field harvesting which continues for 9 months every year. Most of the families who used to have a monopoly on providing animals and plants to Egyptian scientific faculties left the field and started to work in other more profitable activities such as exportation and working with Arab universities. The field was left to other families who don't have financial resources to establish breeding farms, and who depend mainly on filed harvesting.

Suggestions and recommendations are given and discussed in details in the paper to help conserving the biodiversity of the country.

INSECT-PLANT COEVOLUTION IN THE MOUNTAINS OF SINAI

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We present a review of what is known about: the relationship between the highly localized plant *Alkanna orientalis* (L.) and its main pollinator, the endemic solitary bee *Anthophora pauperata* Walker. The interaction between the Sinai Baton Blue Butterfly *Pseudophilotes sinaicus* (the smallest butterfly in the world) and its host-plant, the very rare and localized Sinai Thyme *Thymus decussatus* Benth. (Labiatae), that only occurs at elevations above 1500 m.

Both examples have been studied in the mountains of St Katherine Protectorate, Sinai, Egypt. Evidence is presented for the occurrence of micro-coevolutionary processes in adjacent wadis in the St Katherine Protectorate, Sinai. We have discovered that an apparently straightforward relationship is not at all simple, requiring several years of effort to establish even fairly 'obvious' features of the system. The St Katherine Protectorate is important to Egypt and to the world: the Protectorate authority must succeed in preserving the environment of the mountains of southern Sinai for future generations to enjoy. We hope we have shown through this review in just one way that southern Sinai is an environment worth preserving, with systems worthy of study for their ability to shed light on the operation of natural selection.

Abstracts

BEDOUIN-OPERATED WILDLIFE RESOURCE MANAGEMENT PROGRAM IN THE QATTARA DEPRESSION, WESTERN DESERT

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EQI is developing an integrated plan for the management and sustainable utilization of the wildlife resources of the northern region of the Egyptian Western Desert. The plan aims to protect the biodiversity of the area, including highly threatened, globally important habitats and wildlife, while maximizing the economic gains to be made by the local Bedouin community through the regulated and sustainable exploitation of these resources. The local Bedouin communities are developing the plan, with technical assistance provided by EQI. It will be based on a detailed assessment of the wildlife resources of the area, and their present and potential utilization patterns. An in-depth investigation of selected, high priority areas for biodiversity protection will provide a basis for the identification of protected area boundaries and management zones, type of protection, as well as equipment, infrastructure and manpower needs. A public awareness campaign, along with a training package tailored to meet training needs of Bedouins and other stakeholders, will prepare them to take an active role in the development and implementation of the plan.

NATURAL HABITATS OF EGYPT: DIVERSITY AND MANAGEMENT CONSIDERATIONS

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Accurate identification of types, distribution and characteristics of habitats is crucial to the effective management and conservation of our national biodiversity heritage. Traditionally, habitats of Egypt are classified on a purely geographic basis, i.e. Western Desert, Eastern Desert, Sinai and the Nile Valley, with each geographical region being divided into several sub-regions. Major geomorphologic features that distinguish these vast geographical regions also support this type of classification. However, ecological features of different habitat types are determined by a multitude of factors that go far beyond the mere geographical location and geomorphologic setting. Ecologically similar habitats are often found in far apart localities in different geographical regions. In this presentation, an attempt is made to develop basis for the classification of habitats of Egypt taking into account the multitude of factors that seem to control the ecological setting of each habitat type and hence its characteristic biota. Characteristics, distribution and conservation status of basic habitat types occurring in Egypt are discussed.

MARSA ALAM COASTAL ZONE MANAGEMENT PLAN, RED SEA, EGYPT

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Most of the government assigned tourist development areas in the Red Sea are located within the coastal zone. A rapid growth in tourist development now threatens reefs throughout the Red Sea. The city of Marsa Alam is facing new tourist development. If not managed and controlled properly, the natural resources will be depleted within a few years and will not be able to withstand any kind of impact.

The coastal management plan proposed by this document will serve as a framework to protect and enhance the values of the natural resources, as well as protect the tourism investments. The approach of environmental sustainable tourism is adopted. Site analysis is described in details in terms of different disciplines. Impacts on the coastal and marine resources are defined. The existing national management strategies are analysed and discussed; some are modified to suit the needs and issues of the city. This study suggests some environmental solutions for the complex environmental settings, such as wide back reefs, embayments, and mangrove stands. The study provides alternatives to re-direct the diving attraction of the Red sea to other natural, and/or cultural and human resources.

ESTABLISHING A PRELIMINARY SYSTEM PLAN FOR THE PROTECTED AREAS OF EGYPT

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The designation of protected areas in Egypt has largely been based on a case-by-case approach. This has brought about many management disadvantages such as the lack of integration among protected areas. It has also resulted in uneven distribution of protected areas all over the country, which means that many ecosystems remain unprotected causing representational gaps to exist in different eco-regions.

The sector of protected areas of Egypt is currently reviewing the existing management strategy in order to adopt a modern systematic approach. Thus, proposing a system plan for protected areas in Egypt is an important step in that direction.

The objective of this proposed plan is to suggest a system of protected areas that represents all the eco-regions of the country, encompassing at least 10% of the total area of each eco-region. To do so the major eco-regions were identified based upon terrestrial biogeographical criteria. These eco-regions were compared with the existing system of protected areas in order to discover the representational gaps. Institutional constraints were also recognized and referred to as a part of the proposed system.

WORKING WITH LOCAL COMMUNITIES AS A MEANS TO SUSTAINABLE DEVELOPMENT: EARLY LESSONS FROM THE ST. KATHERINE PROTECTORATE

PAMU, St. Katherine Protectorate

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The primary lesson learnt during the implementation of the St. Katherine Protectorate development project has been the absolute imperative to involve and benefit local people and to win their active support for conservation activities. If protected areas anywhere are to succeed they must have the support of local people who must also be prime beneficiaries. From the project's outset it was accepted that local people, tourists and native biodiversity could coexist and be mutually beneficial and that one of the most effective ways to direct benefits to local people would be through sustainable tourism thereby making conservation an attractive option to rural people. A second guiding principle has been that the people most dependent and associated with the Protectorate's resource base are the best stewards for these resources and, as such, should be enabled to manage their own resources locally.

The most significant lessons have been:

- Community participation is a long-term commitment and often cannot be successfully accomplished in the relatively short period of most conservation projects.
- Tangible benefits to local communities must be sustained after the project's end so an undue dependence on project related employment should be avoided.
- Traditional responsibility of local people as the resource managers in the area should be acknowledged and exploited.
- Effective integration between tourism, local economic development and protected area management the expansion of nature-based tourism can direct economic benefits to remote rural areas and increased incentives for conservation in state protected lands.
- Conservation projects can help to catalyse associated rural development activities by other agencies.

THE BEDOUIN SUPPORT PROGRAM IN THE ST. KATHERINE PROTECTORATE

PAMU, St. Katherine Protectorate

PAMU, St. Katherine Protectorate, St. Katherine, South Sinai, Egypt.

The St. Katherine Protectorate is inhabited by 6 Bedouin tribes that constitute a total population of about seven thousand. These communities live in scattered settlements many in remote areas. The protectorate established a sustainable multifaceted program to support the Bedouin and to uplift their communities. The major interventions centre on primary health care, veterinary support, selective employment and income generation activities. The PAMU has introduced a primary health care project; this project is provided by a four-wheel drive ambulance with the necessary equipment and managed by PAMU doctors; local community health workers are being trained and children's growth monitored. Veterinary surveillance programmes are in place and domestic animals are treated on demand. The Protectorate has recruited local 30 Bedouins, selected by their own communities, as Community Guards; local people constitute some 70% of the Protectorate's staff.

Besides direct employment local people now generate income from a women's handcraft business and a model Bedouin eco-lodge that have been developed by the park. The community's infra structure is also supported; the tracks were improved, the wells and dams were built and/or enhanced. These efforts have constructed strong bridges of trust between the protectorate and the local people, and that was remarkably reflected directly and indirectly on protecting the environment.

GIS: INTEGRATING ENVIRONMENTAL INFORMATION FOR PROTECTORATE MANAGEMENT

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The GIS tool is a powerful tool for data integration and building visual databases for the wide-ranging programs and activities within the Protectorate. Geographic information systems are nowadays indispensable in many different fields of applications to assist in the decision-making process and resource management planning. Most decisions are influenced by some facts of geography. What is at a certain location, where are the most suitable sites, where, when and which changes took place etc. For example:

- In land use planning, GIS is used to evaluate the consequences of different scenarios for development of an area.
- In geology, GIS is used to find the most suitable places for quarrying and mining, or determining areas subject to natural hazards.

In order to be able to make the right decisions, access to different sorts of information is required. The data have to be maintained, quality controlled and updated to be useful for problem analysis and for decision-making.

To facilitate this process, full cooperation now has been established between the protectorate and the centralized EEAA GIS in order to integrate local, regional and national databases, unify the format and allow ready access and exchange of data with the other protectorates and programs. The GIS database in Saint Katherine is being applied to help structure the Protectorate's emerging management plan. Much of the data from the various monitoring and research programs have been folded into the data tree structure of the GIS so that data can be viewed visually as map themes to better understand their relationships. In addition, picture sets for the ongoing programs can be added to the database and hot-linked to all the geographical and tabular data throughout the GIS.

CAMERA TRAPS: A NON-INVASIVE SAMPLING TECHNIQUE TO REDEFINE THE LARGE MAMMAL FAUNA OF SOUTH SINAI

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The large mammal fauna of Sinai have been investigated through the 19th & the 20th centuries with many species added through different workers. However, lack of contemporary, well-documented records of many of the species listed in the literature is an outstanding problem for every body addressing the conservation of these species.

The current work is an initial approach to tackle the problem of recording large mammals of south Sinai using photographic documents. Camera trapping involves a camera connected to an infra-red triggering mechanism integrated with a memory unit that records time and date of pictures and events. Many parameters such as species distribution, relative frequency of occurrence and habitat use and activity patterns can then be determined for these elusive mammals of southern Sinai. In addition the sampling effort is precisely measured in time units. The ultimate aim is to define the contemporary large mammals fauna of Southern Sinai.

POPULATION MONITORING OF A 'FLAGSHIP SPECIES': DORCAS GAZELLE IN SOUTH SINAI, EGYPT.

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The Dorcas Gazelle *Gazella dorcas* has experienced a recent and serious decline in its population and range in South Sinai. It is important as a flagship species and is of potential charisma to draw public attention to conservation efforts. To this end a monitoring programme has been established to provide information about the Dorcas Gazelle population in two regions (the Qa'a plain and the littoral plain and wadis of the Nabq Protected Area) of South Sinai, Egypt. Changes in dung density, estimated using distance sampling, are used as an index of changes in population size.

The two regions were divided into low and high-density strata using the results of earlier surveys. Parallel transects were arranged in a regular pattern to ensure the maximum survey effort was allocated to the high density strata while keeping a representative cover of the low density ones. DISTANCE® 4.0 software was used to model the probability of detecting dung using half normal and hazard rate functions and habitat and terrain types were incorporated as covariates. The effects of biases caused by observer behaviour on the detection function were investigated. Five plots in the Qa'a plain were monitored for 15 months to estimate the annual decay rate of the Dorcas Gazelle dung using local regression.

In addition, camel dung encounter rate was used as an event along with the gazelle dung encounter rate to compare variations in the spatial distribution of the two herbivores. These studies have identified core population areas and key habitats for gazelles and will inform interventions for the conservation of this flagship species.

ACACIA REHABILITATION PROJECT: A CASE STUDY OF PROTECTING A KEYSTONE SPECIES AND ECOSYSTEM RESTORATION IN ST. KATHERINE PROTECTORATE

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Acacia is a keystone species in South Sinai of vital ecological and cultural importance. In recent years Acacias have been subjected to overgrazing, cutting and other threats and recruitment to the population has been seriously compromised. A programme for the rehabilitation of this species was initiated in 1999 with the co-operation of local people. A two-phase strategy has been adopted, which involves the artificial propagation of seedlings and interventions to enhance natural regeneration.

Artificial propagation. Following experimental germination and irrigation trials around 35000 Acacia seedlings, grown by local Bedouins, have been planted out in 30 sites in selected wadis in the southern part of the St. Katherine Protectorate. All seedlings are protected with open palm boxes (ghafaz), about 10% of the seedlings were inoculated with a culture of natural *rhizobia* bacteria to encourage nodule formation and about 5% of the seedlings are irrigated through underground pipes. The seedlings are cared for and irrigated by local Bedouins and to date survival rates are good.

Natural regeneration. Vigorous mature trees growing near the heads of drainage areas were selected as 'mother trees' and fenced to prevent seeds being consumed by livestock; it is anticipated that this will help increase the seed soil bank and promote natural regeneration following rainfall as flood waters wash the seeds downstream. Monitoring enclosures have also been established for long-term studies of the growth of Acacia and response to release from browsing.

In tandem with the rehabilitation work a study on the age structure study of Acacia populations within the Protectorate has been undertaken in co-operation with Suez Canal University. This has revealed the skewed population structure with predominantly adult trees and little recent recruitment and the urgent need for interventions to conserve the Acacia as a keystone species in the south Sinai wadi ecosystem.

STUDY OF GRAZING PATTERNS IN THE HIGH ALTITUDE MOUNTAIN AREA OF THE ST. KATHERINE PROTECTORATE FOR FLORA CONSERVATION MANAGEMENT

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The high altitude area of the St. Katherine Protectorate is of great biological interest; it has been recognized by IUCN, as one of the most important regions for flora diversity in the Middle East, and it contains about 44% of Egypt's endemic flora. Out of 33 endemics species of Sinai, 19 endemic species are present restricted to a small geographical area. Along with this fact, Bedouins have inhabited the area for hundreds of years. Bedouins normally keep herds of goats and sheep to exploit the sparse range resources. In the past, grazing rotation or range-land management was not of such a problem because the Bedouins were either nomadic thus shifting grazing pressure ranges or enforced traditional rangeland conservation practices such as *dahkl* or *heilth*. Due to socio-economic changes Bedouins have now settled and traditional grazing patterns and range plant conservation practices have been largely abandoned.

The current study is aiming to address three main issues concerning the question of grazing patterns in St. Katherine. The first is to quantify the grazing pressure in terms of time and area units. The second is to define the spatial parameters of rangelands through estimating the area of the rangeland and predicting the spatial heterogeneity of the grazing pressure over this range. The third aim is to define the palatable plant species for both goats and sheep and quantify the consumed biomass and the specific consumed biomass in terms of dry weight. It is anticipated that this study will assist with grazing management specifically by identifying pressure points so that specific plant conservation measures and general rangeland management interventions can be implemented.

HURGHADA AS AN AREA BETWEEN DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT: AN OPTIMISTIC MITIGATION PLAN

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Hurghada is one of the fastest growing cities on the Egyptian Red Sea coast. The city limits extended from 7km to 21km during the last 15 years. This extension accompanied by many non-environmental practices such as land filling, dredging, illegal fishing etc. These practices caused severe damage to the natural resources of the area. The Egyptian Environmental Affairs Agency (EEAA) declared some of the Islands around Hurghada as a protected area. Such approach for protection does not mean obstructing the coastal development but it could be put in a way that allows the achievement of environmentally sustainable development. The present work includes analysis of the problems in hand, demonstration of the achievement of the current system. In addition, an optimistic overview of what could be done for protection of what is left of the natural resources of the area using a "Multiple Use Protected Area" (MUPA) concept as management system.

RATIONALE FOR THE ESTABLISHMENT OF A NEW PROTECTED AREA IN THE WADI EL GEMAL – HAMATA REGION

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Egypt has declared its commitment to enhancing environmental quality and the promotion of the sustainable use of its natural resources as a strategic choice for the future of the country. The Government of Egypt has adopted a National Biodiversity Strategy and Action Plan, which call for the establishment and maintenance of a representative Protected Area Network in the country.

The protected area model has proven to be one of the most effective resource management tools in the Egyptian context, and in several cases have proven to be an essential asset to regional development (as is the case in South Sinai). Excellent partnerships have developed between protected areas and various compatible users, the tourism industry in particular. This has shown that protected areas are not merely closed areas, which do not contribute to the national economy, but indeed are valuable assets, which can be highly productive if appropriately managed.

The Egyptian Red Sea coast has undergone a largely unplanned transformation during the past decade, driven primarily by a boom in coastal resort construction. This was carried out with little concern towards the natural environment (including ecological, biological and landscape aspects), the very resources upon which the tourism industry in the Red Sea depends. Coastal resort development has been assessed on a site-by- site basis, without examining the larger picture from a strategic and national perspective, which calls for rational and diversified land use.

The proposed Wadi El Gemal - Hamata Protected Area aims at facilitating the maintenance of habitat and biological diversity in the region, through ensuring that existing and future pressures on the area's natural values are managed within an ecologically sustainable framework, maintaining the traditional and characteristic culture of the local population and acting as a regional planning tool to diversify land use along the Red Sea coast and, thus, enhancing the robustness of future economic output in the region.

The Protected Area encompasses a great diversity of habitats in a uniquely compact setting, representing a complete terrestrial / marine ecosystem characteristic of the Red Sea coast. The region is of phenomenal natural beauty and outstanding value for biological diversity.

ROLE OF GIS IN THE MANAGEMENT OF RED SEA PROTECTED AREAS

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The GIS Unit in Hurghada was created under the EEAA-USAID Egyptian Environmental Policy Program (EEPP) to meet the needs of the Nature Conservation Sector to manage the natural resources of the Red Sea. The planning, management and daily operations of the Red Sea Protected Area rangers requires substantial geographic information, much of it portrayed as maps and satellite images. The data acquired is used to define areas of high biodiversity (marine and coastal habitats), special sites for faunal and floral preservation, as well as other areas of lower conservation priority that are suitable for development. Delineation of new protected areas and management zones relies upon accurate and timely GIS imagery.

Data are collected from interpretation of satellite images, field surveys, and by reviewing results of previous work. The data are processed using our software and hardware capabilities that include: computer systems, differential GPS with 5m-accuracy, ERDAS imagine 8.5 and ArcGis 8.1. The most important component of any operational GIS unit is the availability of trained staff, and we have pursued an aggressive on-going training program. Training that has been conducted for the GIS unit rangers during the past 6 months comprises: (a) Visual Basic software; (b) introductory and advanced GIS; (c) Mapping Methodology; (d) Mapping with GPS; (e) advanced GIS application programming (Visual Basic for ArcGis 8.1); (f) short-term visit to the EEAA/Canadian GIS Data Project.

Four examples of the type of work done by the Hurghada GIS unit are:

- Depicting the proposed boundary of Wadi El-Gemal – Hamata protected area.
- Demarcation of mangrove of Hamata–Wadi El-Gemal using Global Positioning System (GPS) and Landsat TM-images.
- Constructing a bathymetric map for the offshore area at Wadi El-Gemal-Hamata using Admiralty chart data and Landsat TM-images enhanced for water penetration.
- Developing a GIS-database application to manage the mooring sites for dive boats along a 700 km coastal strip from El Gouna in the north to Wadi Lahmi in the south.

THE CHALLENGES OF SINGLE SPECIES CONSERVATION: THE CASE OF THE EGYPTIAN TORTOISE *TESTUDO KLEINMANNI*

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The Egyptian Tortoise *Testudo kleinmanni* is a globally endangered species, which has become extremely rare in Egypt, due to habitat destruction and intensive collection for the pet trade. "TortoiseCare" initiative was launched with the aim of securing the future of the species. Initially the effort focused on *ex-situ* measures, such as captive breeding, veterinarian care and health profiling. However, the complexity of the issues at hand soon became apparent and other ecological, socio-economic and logistical dimensions, which needed to be addressed, became apparent.

Recently a very small population was discovered in Zaranik Protected Area, which became the central theme of this multidisciplinary conservation program. Natural habitat preservation and restoration emerged as the top priority as a result. Today, the program focuses involving local Bedouin in the conservation effort. For example, one of the field activities, which entail monitoring the wild animals using radio telemetry and other traditional tracking methods, is almost exclusively carried out by local community guards working with the Protected Area.

The program also includes a unique handy craft component, which uses the tortoise and other wildlife of the Protected Area as themes for traditional handy craft products. This activity has been carried out with good success over the past five years. This encourages local support for Tortoise conservation (and for the PA at large) through bringing significant and direct economic benefit to the local inhabitants of the Protected Area.

Public education and information are also very important components of the "TortoiseCare" initiative.

TRAINING RANGERS FOR SCIENTIFIC DIVING IN THE RED SEA MARINE PARKS

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Coral reefs, seagrass beds and other coastal habitats in the Red Sea may be subject to adverse impacts from natural events (Crown-of-Thorns) and from fishermen, the dive industry, damage from boat groundings, accidental spills and other happenings. In some specific locations, these habitats have sustained noticeable damage that reduces their capability to support marine flora and fauna.

Part of the management response by the EEAA/NCS involves conducting underwater fieldwork using Red Sea Rangers trained in SCUBA. During the past three years, the Rangers have received training by the USAID-sponsored EEPP/PSU to safely undertake diverse tasks related to scientific-diving, as distinct from recreational diving. Their tasks are to evaluate and prevent further damage, assign cause (for subsequent legal action), assess the prospects for restoration, and monitor rates of recovery. Other tasks include managing special sites important for marine mammals, such as dolphin nurseries and safeguarding coral reefs used by the dive industry by checking the manta-ray mooring systems. Finally, some of the rangers periodically assist in Crown-of-Thorns removal and conduct applied research, such the collection of venomous fishes.

Experience has shown that the ranger-divers involved with marine resources management should have appropriate university training (biological and physical sciences are useful) and be physically fit and prepared to acquire practical water skills. Our Ranger training includes: (a) swimming, (b) water safety, (c) snorkelling, (d) SCUBA diving, (e) advanced diving, and (f) underwater photography. Subsequently, they learn additional skills related to establishing underwater transects and quadrates.

Lessons learned from the last 3 years indicates that:

- Teaching swimming is not easy for persons over the age of 25 years.
- Ranger-recruitment should specify that candidates already have basic swimming skills.
- Training that focuses on SCUBA—without the need for swimming–will save time, money, and effort
- Rangers who were born and raised near a coast are more willing to work in the sea.
- As the rangers become more proficient in diving, future training will introduce them to use of Nitrox to extend the time they can work underwater.
- Training in use of underwater scientific survey and monitoring techniques is best achieved by use of local experts, with life-long experience.
- Diving is potentially dangerous and insurance is recommended for Ranger divers to pay for the high cost of decompression treatment, long-term injury and death.

Abstracts

YIELD, EFFORT AND CATCH PER UNIT EFFORT OF THE *LETHRINUS NEBULOSUS* FISHERY AT RAS MOHAMED

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"Shour" *Lethrinus nebulosus* is amongst the most important commercial species caught from coral reef areas along the Egyptian Red Sea coast. The fish are known to aggregate to spawn at two sites in the northern Red Sea, one of these being at a site known as Jackfish Alley, within the Ras Mohamed National Park. The spawning aggregation at this site has been heavily exploited during the last 8 years. In this study the catch was monitored for 3 years. It was found that the catch peaks during the middle of the lunar cycle over two successive months between April and June. Between 1995 and 1998 a total of 72 tons of fish were taken, corresponding to approximately 42.7 thousand individuals. Over the same period the total seasonal yield catch and catch-per-unit effort declined by 40% and 50 % respectively. There was also a marked shift in population structure with a reduction in the proportional contribution of fish exceeding 50 cm. Further, fishermen interviewed reported that these figures represented a noticeable reduction in total catch and mean fish size compared with earlier years. In addition, a significant by-catch was found to be associated with the fishery, including a total of 30 species, dominated by Lethrinidae and Serranidae. The mean sizes of the most vulnerable species (*Variola louti, Cephalopholis miniata and C. hemistiktos*) were found to be smaller among fish caught on the spawning ground than among those caught on adjacent reefs.

VACCINATION AGAINST RED SEA VENOMOUS FISH

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Red Sea reefs are among the most beautifully developed reefs in the world. Although very attractive, the Red Sea reefs are not without their dangers. Visitors to reef areas in any part of the world need to be cautious. Divers may see sharks and barracudas, but they are far more likely to encounter dangerous fish that rely on venomous stings for defence and aggression. Stonefish, scorpion fish and lionfish, of the family Scorpaenidae, are bristling with sharp venomous spines in the dorsal, anal and pelvic fins. The danger with these fish is that it will be stepped on or touched by accident. Wounds from their venomous spines are painful and deaths have been reported, especially due to stonefish. In order to fight the toxic effects of the venom, a suitable antivenin (vaccine) must be taken as soon as possible. But, there is no vaccine against the Red Sea venomous fish species.

Thus, this work is designed to produce vaccines against the venomous fishes of the Red Sea, in accordance with the Egyptian Organization for Biological Products and Vaccines (VACSERA)

and Nature Conservation Sector of the Egyptian Environmental Affair Agency (EEAA). These vaccines are produced for the first time for the Red Sea fish and for the second time in the world, after Australian vaccines.

Venomous fish in the Red Sea water were surveyed, at Hurghada and Sham El-Sheikh, and collected by hand nets during scuba diving. The venom of each fish species was obtained and dried. In the laboratories of VACSERA, the toxicity of the venom and the production of its vaccine were experimentally carried out on albino rats.

ESTABLISHMENT OF A NETWORK OF NO-TAKE FISHING RESERVES IN NABQ, SOUTH SINAI, EGYPT; EFFECT ON CORAL REEF FISH STOCKS & SUSTAINABILITY OF THE FISHERY

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The establishment of the no-take reserves appears to have played a key role in maintaining the sustainability of the fishery in Nabq. During 1994, in collaboration with local Bedouin fishermen, five no-take fisheries reserves were established within the Nabq Natural Resource Protected Area, South Sinai, and Egyptian Red Sea. The abundance, size structure and catch of commercially targeted groupers (Serranidae), emperors (Lethrinidae) and snappers (Lutjanidae) were investigated before the establishment of these reserves, then in 1997 and again in 2000. By 1997, these fish had shown a significant increase in mean abundance within two of the no-take reserves. By 2000 each family and three individual species (*Lethrinus obsoletus*, *Cephalopholis argus* and *Variola louti*) had increased in abundance inside the reserves. Further, there were significant increases in mean individual length of the serranids *Epinephelus fasciatus* and *C. argus* and of the lethrinids *L. nebulosus* and *Monotaxis grandoculis*. Meanwhile, mean recorded catch per unit effort (CPUE) within the adjacent fished areas increased by about two-thirds (P <0.05) during the 5 years.

The involvement of local Bedouin and fishermen in the co-management of fisheries resources was critical to the success of this initiative.

AQUATIC FAUNA DIVERSITY IN BURULLUS PROTECTED AREA: FROM SITE DIAGNOSIS TO MANAGEMENT PLANING

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One of the main values of the Protected Area is its role in conserving the biodiversity resources found within its boundaries. Burullus Protected Area encompasses a wide array of habitats in a relatively small area that supports an equally diverse fauna and flora.

During the last two decades Lake Burullus has become more dulcitude and eutrophic ecosystem, owing to the remarkable increase in the amount of discharging agricultural drainage water, loaded with nutrients, into the lake via the southern drains. The change in the lake level has become positive all over the year; that means water in the lake is in continuous movement toward the sea, and the Mediterranean water never enters into the lake.

Decreasing salinity and nutrients loading led to a significant influence on biodiversity and abundance of aquatic fauna in Lake Burullus, where many marine species have disappeared completely. In the fish community, six marine species have disappeared from the catch during the last five years, while *Tilapia* dominated the fishery of the lake. All marine species of zooplankton (13 species) and macrobenthos (7 species) also have disappeared in the lake, and even opposite the inlet area. Zooplankton and benthic eutrophic indicator species have dominated their communities, indicating slight signs of organic pollution.

A management plan has been proposed to restore the diversity of aquatic fauna by decreasing the amount of drainage water discharged into the lake, and at the same time treatment of this water to decrease the amount of nutrients input into the lake.

PHYTOECOLOGY OF EL OMAYED PROTECTED AREA

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El Omayed Protected Area has a peculiar landscape of alternating ridges and depressions that extends along a 20 km N-S transect and ending by a vast inland plateau. This heterogeneity leads to differentiate 7 main habitats (coastal sand dunes, saline depressions, non-saline depressions, inland ridges, inland plateau, inland siliceous deposits, and rain fed farms), each of characteristic flora and vegetation. The recent monitoring process (Autumn 1998 to Summer 2000) led to record 251 plant species (131 perennials and 120 annuals) belong to 169 genera and 44 families.

Among these species, one is endemic, 40 are rare (23 perennials and 17 annuals), 19 are noteworthy species and are 11 threatened species. Fifty-eight species are woody plants (mainly shrubs) contributing about 23.1% of the total species (10 phanerophytes and 48 chamaephytes). One hundred and twenty nine species (51.4% of the total species) have at least one aspect of the potential or actual economic uses. The grazing and medicinal uses are the most popular. Forty-one plant communities were identified: 8 in coastal sand dunes, 4 in non-saline depressions, 3 in rain fed farms, 4 in salt marshes, 8 in saline depressions 11 in inland ridges, and 3 in inland siliceous deposits. From ecological and vegetation viewpoints, we can conclude that the site of El Omayed Protected Area is an ideal site to represent the Mediterranean Desert ecosystems in Egypt. Its flora approximates 30% of the total flora of the Egyptian Mediterranean region (the richest phytogeographical region in Egypt).

CURRENT STATUS OF THE FLORA AND VEGETATION OF BURULLUS PROTECTED AREA

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Lake Burullus is the least polluted lake in the northern Nile Delta, Egypt. It has an oblong shape extends for a distance of 47 km along NE-SW axis. Its width along NS axis varies between 5 and 15 km with a total area of 410-km square. The total number of plant species recorded in this lake and the sand bar separating it from the Mediterranean exceeds 200 species, 3 of them are endemic and 40 are extremely rare in Egypt. These species are distributed among 10 types of habitat and 13 plant communities. From the species diversity viewpoint, the most important habitats are islets (26 unique species), sandy habitats and salt marshes (12 unique species for each one of them). In addition 141 species (> 70% of the total species) have at least one aspect of economic uses such as grazing, fuel, human food, medicine, timber and traditional uses: 10 species of them have at least 4 economic uses (i.e. multipurpose species) and could be considered as noteworthy species. Outlines of suggested management and monitoring plans for the conservation of this interesting site are indicated.

Abstracts

STATUS OF MARINE TURTLES NESTING SITES IN THE EGYPTIAN RED SEA

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This study was conducted between summer 2000 and summer 2002, aimed at determining the identity, distribution and abundance of marine turtles nesting along the Egyptian coast from Ras El Gemsa, 50 km north of Hurghada to 60 km south of Shalateen, and also on some of the Red Sea islands (El Meiteen islands, Giftun Kabeer, Giftun Sagheer , Wadi El Gemal, Sernaka and Zabargd islands). This study also aimed at identifying and classifying nesting and potential nesting sites according to the presence or absence of nests, the number of nests and the overall suitability of each site. The existing and potential human impacts on the nesting sites were also assessed.

Results indicated that the study areas are classified into four classes: Important active nesting sites (Zabargad Island, Sernaka Island, Wadi El Gemal Island, Syal Island, Ras Bughdadi, Torfet El Mashaekh,Wadi Um El Abas); suitable sites with old and sporadic nests (Giftun El Kabeer Island, Giftun El Sagheer Island, Ras Honkorab); suitable sites without new or old nests (e.g. El

Meiteen islands, El Esh area, Marsa Egla) and non-suitable sites, which represents the majority of the coastline, which is largely rocky.

The most important threats to turtle nesting sites are the loss of nesting sites due to tourism development, disturbance of nesting sites by tourists and fishermen, egg collection by fishermen, predation of eggs by feral dogs and foxes and oil and solid waste pollution on some beaches.

CORAL MONITORING IN HURGHADA AREA USING IMAGE ANALYSIS TECHNIQUE

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This study was carried out in order to assess the impact of various mooring on the reef health at diving site in the Red Sea around Hurghada islands, also to evaluate the carrying capacity of diving sites. The study aimed to provide data that helps in tacking proper management actions to protect the dive site reefs. Ten sites were selected, nine of them are divining sites and one is a control site with relatively low impact. 45 quadrates were made and 15 of them were used for collecting visual estimation data. Each of the selected sites was located on area map using GPS and compass. Underwater mapping was performed for each site, the spots selected for the quadrates within each site were marked on the map.

A permanent quadrate method was used to monitor changes in the macrobenthos community through time. A series of photographs were taken periodically of the quadrate using an underwater camera which mounted in the frame. These photographs are combined to form a photo composite of the quadrate. Data collected was: photographs of the quadrates, visual estimation data on underwater sheets and notes on species and status. Image-pro software photographs were analysed to detect changes over time.

The study showed that the control site at Dishet El Dabaa has the lowest damage, with less than 4%, of which 2% is dead coral, and the rest is in the form of partly dead colonies most probably due to construction activities in the area. The rest of the sites have damage percentages varying between 7.2% and 23.3% at Abu Ramada and Ishta respectively. This percentage represents almost all types of coral damage identified in different publications. Coral breakage was slightly high within heavily used sites; there was no detectable difference in tissue abrasion within sites or depth categories. The highest percentage of damaged genera was *Acropora, Pocillopora and Stylophora.* Preliminary results also show that the number of dives per year is exceeding by three folds the carrying capacity of some diving sites.

IMPACT OF TOURISM ON MARINE HABITATS

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Tourism along Red Sea area has increased rapidly through the last decade, reaching its peak during the year 2000. This increased popularity has led to a rapid growth in coastal resort development.

Economic benefits of tourism can easily be observed and priced, but on the other hand the impact of tourist activities on natural habitats, which has grown dramatically due to the increase in the number of tourists, is difficult to price or assess economically.

Damage to Red Sea coral reefs is increasing exponentially. Length of damaged reefs was estimated at about 19 % of the total Egyptian Red Sea reefs in 1998, reaching, about 30 % in 2000 and more than 30% today.

Some of the most important factors leading to this extensive damage are the following:

- Unregulated impacts of coastal development during construction and operation phases: Such as uncontrolled rubbish dumping, sediment and dust from construction sites, increasing sewage infiltration, desalination by-products, irrigation, etc.
- Over fishing of reef fishes and other important marine organisms.
- Uncontrolled diving and snorkelling cause clear damage to the reefs.
- Unregulated mooring also causes severe damage in some areas.
- Solid waste dumping from tourist boats as well as from on-shore facility.

The Government of Egypt should more strongly recognize the close links between coral reefs, reef associated eco-system and the growth of tourism industry, and implement more vigorous conservation measures.

Abstracts

DISTRIBUTION OF BORON IN SOME EGYPTIAN AQUATIC ENVIRONMENTS

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Concentrations of boron in seawater (at four sites along the Alexandria coast, subjected to land disposal), brackish water (Lake Edku) and drain water (e.g. El-Umum Drain) were determined during the period from February to August 2000. Boron was determined spectrophotometrically by a modified curcumin method.

For Lake Edku, boron fluctuated between 0.253 and 1.129 mg/l. There are several factors affecting the concentration of B in the Lake water: (a) effect of the drainage water via El-Khairy and Barsiek Drains, (b) utilization of boron by hydrophytes, and (c) water exchange through the sea-lake connection. It may be concluded that the level of boron in the Lake water can't be considered as a substantial hazard to the Lake organisms. Boron varied from 4.230 to 5.640 mg/l in seawater samples and from 1.520 to 4.951 mg/l in the sites of mixing between the drains (El-Umum Drain and El-Noubaria Canal) and the seawater. Boron concentrations exhibit simple chemically conserved water mixing behaviour. The broader variation of boron (mg kg^{-1}) /chlorinity (Cl ‰) ratios for seawater samples (0.207-0.269) may be due to that the samples were collected from the upper seawater layers, where contributions from land run-off, atmospheric precipitation and differences in the biota.

FLORA AND VEGETATION OF ZARANIK PROTECTED AREA, NORTH SINAI, AS REGULATED BY EDAPHIC AND BIOTIC FACTORS

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Zaranik Protected Area was established in 1985, and is thus the second oldest protected area in Egypt. It encompasses representative samples of a diversity of wetland and terrestrial habitat types, which support a wide range of species of indigenous fauna and flora. In addition it provides protection to several globally endangered and endemic species and their habitats.

The flora and vegetation types of Zaranik were surveyed. A total of 165 flowering plants species and one Gymnospermae *Ephedra alata* were recorded (74 annuals and 90 perennials). The life forms ranged from few numbers of macrophytes in the open water (3 sea grasses) to phanerophytes (5.26%) with the dominance of therophytes (41.45%), and chamaephytes (25.66%), followed by hemicryptophytes (15.13%) and geophytes (10.53) in the terrestrial habitats.

A data set of 160 stands was analysed using multivariate procedures (TWINSPAN, and DCA), to classify the vegetation in the lake, and to define the habitat types. The classification and ordination resulted in a clear demonstration of six vegetation groups associated with six habitat types. These are: open water (OW), wet salt marshes (WSM), dry salt marshes and *nebkas* (SS), white (young) sand dunes (CSD), stabilized (old) dunes (SSD) and mobile dunes (MSD).

The first axis of DCA-ordination separates the salt marshes and *sabkha* stands from those of sand dunes along the soil salinity gradient, soil moisture gradients and CaCO3. Disturbance factors (grazing, cutting, etc.) showed highly significant correlation with the second axis of DCA that was important predicator of psammophylic species distribution.

The status of floral diversity in Zaranik Protected Area is provided based on field studies. Rare, threatened, and endemic species are identified, and their geographical location is documented on grid maps using Global Positioning System (GPS).

Management and conservation procedures for Zaranik's flora are proposed.

THE NATIONAL BIODIVERSITY UNIT: AN INTERACTIVE REPOSITORY OF BIODIVERSITY DATA

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The National Biodiversity Unit (NBU) is an information gathering, sorting and analysis hub for all matters related to biodiversity in Egypt. The NBU provides raw data and digested information to help responsible decision makers at the Nature Conservation Sector (NCS) of the Egyptian Environmental Affairs Agency (EEAA) make informed decisions. One of the important roles of the NBU is to provide information for public awareness purposes.

The principle resource of the NBU is an electronic database formed of several interconnected databases housed at the NCS headquarters in Cairo. The data accumulated initially to launch the NBU was collated by an extensive collection of national experts, within the framework of the CBD Biodiversity Country Study. The database is flexible and is updated and maintained on a regular basis. Today the NBU is the main repository of all information related to all aspects of biodiversity in Egypt. It can provide raw data, reports, photographs, graphs, statistics, maps and public awareness material. An Environmental Common Information System (ECIS) at the central level of the EEAA plays a role in providing an infrastructure to ensure data standardization, integrity, and interoperability.

Abstracts

POLYCHLORINATED BIPHENYLS (PCBS) AND CHLORINATED PESTICIDES CONTAMINATION IN CORAL REEF SKELETON FROM THE EGYPTIAN RED SEA

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The residues of 17 organochlorine pollutants in coral reef skeleton (*Acropora* sp.) collected from 20 different locations in April 1999 from the Egyptian Red Sea coast were analysed by GC. The pollutants studied were -, -, -hexachlorocyclohexane (HCHs), Cyclodienes (heptachlor, aldrin, dieldrin, heptachlorepoxide) as well sum DDT (*p,p'*-DDE, *p,p'*-DDD, and *p,p'*-DDT) and seven individual polychlorinated biphenyl (PCBs) congeners. The concentrations of sum DDT were in a range from 1 to 12 ng g^{-1} with an average 6 ng g^{-1}. The highest DDT concentrations were recorded at Sharm El-Maya (St. No. 11), whereas the PCB levels ranged from 6 to 48 ng g^{-1} with an average 19 ng g^{-1} and HCHs level ranged from 0.8 to 14.5 ng g^{-1} with an average 4 ng g^{-1}. The PCBs were dominant in most studied locations. The present results indicate low to moderate PCB and pesticides contamination in the most studied coral reef samples.

DETERMINATION OF HYDROCARBONS IN MUSSELS FROM THE EGYPTIAN RED SEA

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Mussel (*Brachidontes Sp.*) was collected in April 2000 from the Egyptian Red Sea in order to determine the contamination by hydrocarbons. The study included 11 sampling stations scattered over about 650 Km of the coastline. The analyses were performed by gas chromatography. Total concentrations of 20 aliphatics (average 0.105 ng g^{-1} of wet weight) and sixteen polycyclic aromatic hydrocarbons (PAHs) (average 5452 ng g^{-1} of wet weight) were generally lower in comparison with those reported for some of the published monitoring studies of coastal areas from various parts of the world. This study reports data on an area not previously monitored. These results suggest that the coastal area in the Red Sea of Egypt might be considered relatively unpolluted.

DETERMINATION OF HYDROCARBONS IN MUSSELS FROM THE EGYPTIAN MEDITERRANEAN

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In order to assess contamination of aliphatics and polycyclic aromatic hydrocarbons, two Mussel species were collected in April 2000 along the Mediterranean Coast of Egypt from El Mex to Lake Bardawil (about 500 km). The results showed concentration of total aliphatics (average 180 ng g^{-1} wet weight) and PAH's (average 8180 ng g^{-1} wet weight) were generally lower than other reported from some of the published surveillance and monitoring studies of coastal areas from various regions of the world. PAH's in mussel samples from most station were mostly of pyrolytic sources likely grass fires (20 million tons per year) and exhaust gases from cars, whereas PAH's in other stations (El Borg, Ras El Bar, El Gamil (west), Romana) were mainly of petrogenic sources. However, other pollution sources are involved.

THREATENED SEA CUCUMBER SPECIES IN THE GULF OF AQABA

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The Gulf of Aqaba has a diverse fauna of sea cucumbers distributed in the sea along its coastlines The environmental parameters in our marine habitats are suitable for the existence of many species. The availability of food, suitable substrates and the small numbers of natural enemies favours the existence of sea cucumbers.

However, as a result of a new trend of unsustainable harvesting of sea cucumber species, which started six years ago, the stock of sea cucumbers in Egypt has reached a dangerous level. Not only is the species density starting to dramatically decrease, but also there is a possibility of elimination of some species from the marine environment. The depletion of sea cucumber stocks from other places of the world has forced traders to search for new grounds to collect from in the Egyptian Red Sea. The lack of awareness from local fishermen, the shortage of old data for sea cucumber populations in the area, as well as the absence of proper management of collection and trade of sea cucumbers in Egypt, are among many factors working together to make the situation very serious.

What we need to maintain our crop of sea cucumbers is sufficient regulation of harvesting procedures, also to obtain enough data for the different Egyptian species. An ecological survey was carried out during August, 2002 at two areas of the Gulf of Aqaba, one inside Abu Galum Protected Area, which is managed by the NCS / EEAA, the other at Dahab area where there are no controls and heavy fishing of sea cucumber. Four sites were visited, two at each area and the data collected compared with an old data set recorded in 1995, before sea cucumber collection started. A total of 14 species of sea cucumber were recorded. There was an enormous decline in the species richness and density at the two Dahab sites (Wad Quny and Al-Asla), some species even disappeared from these sites. In the Abou Galum area, the data was in the normal range, and there were insignificant difference between the data recorded in 1995 and in 2002.

WADI EL RAYAN: A MANAGED RESOURCE PROTECTED AREA

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Wadi El Rayan protected area is one of the most popular protected areas in Egypt. Recent records indicate that the number of yearly visitors to the area jumped from 25,000 to 150,000 during the last couple of years. This is due in one hand to its proximity to the densely populated Fayoum, Beni Suef, Giza, and Cairo cities, and in the other hand to the various ecosystems that are well represented within the area and rarely can be found together. Another important and paramount factor that led to the popularity of the WRPA are the educational, recreational, and management infrastructures that were developed under the cooperation between the Italian and Egyptian experts with the financial support from the Italian co-operation and the technical support from the IUCN.

The efficient control over the economic activities currently active in Wadi El Rayan is now satisfactory more than ever before. A strong and permanent existence of well trained rangers, community guards and other support staff, each knows his task in the management system quite well, led to the stable and hopefully sustainable development for the protected area and its ecosystems.

A plan for management of the WRPA taking into consideration the sensitive ecosystems and development challenges, and the available resources and future needs, is prepared by the Support to WRPA project; with enthusiastic involvement of the WRPA staff. This management plan is considered to be the first for all protected areas in Egypt.

The future of the Wadi El Rayan protected area development is foreseen within a collaborative management perspective where the local community and the stakeholders will have a bigger role in the management of the protected area especially in the Wadi El Hytan and the Spring's area. The educational and ecotourism infrastructures and activities in general will receive more resources and a system for financial autonomy will be developed during the Support to Wadi El Rayan Protected Area Phase II.

MOLECULAR BIOLOGICAL TOOLS TO MONITOR ENVIRONMENTAL STRESS ON CORALS

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The environmental stresses on coral reefs as well as the molecular biological tools to monitor the environmental stresses were reviewed. Among the environmental stresses are the storm-generated waves, predation by crown-of-thorns starfish *Acanthaster planci* and by fish like parrot fish, sedimentation, thermal pollution, sewage, oil pollution, as well as human impacts like over-harvesting of reef organisms, collection of corals and the impacts coming from the recreational activities. These impacts and stresses make it easy for corals to be infected by diseases which can in turn lead to massive coral mortality.

Among the biomarkers used to monitor and to predict the environmental stresses are: the heat shock protein (hsps) marking temperature stress; lipid peroxidase and glutathione marking the oxidative stress; ubiquitine marking the fast protein degradation and marking also the individual fitness; heme oxygenase marking the impacts of the ultraviolet radiation as well as the oxidative stress; Cu/Zn and Mn superoxide dismutases which are major defence against oxidative stress and biomarkers for it; steroids marking some pollutants like polychlorinated biphenyl, pesticides and the petroleum products which harm the functions of the reproductive hormones. The biomarkers were also used in restoration strategies as selection criteria for asexual recruits to be transplanted. The probes and cDNAs to monitor the environmental stresses were reviewed. Among these probes are the hsp90 gene marking the temperature stress, histone H4 cDNA which is used to monitor the cell proliferation, cDNA encoding the UVR related proteins which is an indication for the extent of exposure to ultraviolet radiation, testis enhancing gene which can monitor the compounds affecting the sexual hormones, fructose-1,6-biphosphatase marking the state of nutrition, fibrillar collagen marking the growth activities, succinate dehydrogenase marking the oxidative stress and the strand scission factor marking the degree of separation of the DNA strands after the stress.

Abstracts

CONTAMINATION OF CORAL REEFS BY HEAVY METALS ALONG EGYPTIAN RED SEA COAST

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A determination of five heavy metals in the skeleton of coral *Acropora* sp. in 20 sites along the Egyptian Red Sea Cost (about 1300 Km) indicates low to moderate level of pollution in the most studied locations and are indicative of a relatively unpolluted environment. The entire coast is influenced by many of tourism city, oil production and transportation along the coast, which may carry the heavy metal to affect the coral reef. Red Sea Coastal areas are currently exposed to a larger range of metal pollution (natural and anthropogenic) as a result of increasing environmental contamination from sewage discharges, oil spills (from refineries and tankers) together with the agricultural chemicals and fertilizers.

The concentration of Zn recorded was the highest level at Quseir (st.2), Ras Mohammad, Nakhlat El-Tel and Nuweiba (st.17) (11 mg/kg of dry wet) where the Cu recorded the maximum level at Quseir (st.2) (18 mg/kg). Cd recorded a low levels at all the locations studied (0.5~2.6 mg/kg of dry wet). On the other hand lead was recorded the highest concentration level at Safaga (st.6) (34 mg/kg of dry wet). The results explained that, most of the locations studied might be recorded as non-polluted with heavy metals.

CONSERVATION OF THE ENVIRONMENT IN AGRO-SYSTEMS

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The present work discusses the potentials of resources in agro-system environments and lists the tremendous problems related to the application of many agricultural chemicals. The degradation in the system quality has been related to intensive cultivation of genetically improved plants. application of various pesticides and the accumulation of several toxic residues. Chemical fertilizers have been discussed in depth indicating the urgent need to reduce their amount to minimum. The study suggested elimination of any toxic substances from the system, yet, support and encourage the replacement and application of environmentally accepted compounds. On the top of the list: bio-agents, pesticides and organic fertilizers. The study also indicated the necessity to explore the great potentials of natural enemies for the control of various agro-pests. Examples and recommendation for the utilization of natural enemies and organic fertilizers in Egypt have been given as a module for quality yield production in a conserved agro-system environment.

OPTIONS FOR FINANCING THE EGYPTIAN RED SEA MARINE PARK

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The Government of Egypt has already declared a Marine Protected Area covering the coral reefs around a number of the islands of the Red Sea, offshore from the Red Sea Governorate. It has established Marine Park Ranger offices in the towns of Hurghada, Quseir, and Marsa Alam. Now it is considering greatly expanding both the boundaries of the Park and the number/operations of the Rangers, in order to more adequately protect and manage the Red Sea's important coral reefs, mangroves, seagrass beds, wildlife, etc. But a key question remains of how to provide financial resources of the magnitude needed to support such expansions on a sustainable basis for the decades ahead. Donor assistance will clearly be needed and appreciated for some time, but its magnitude and sustainability are question marks. For that reason, USAID and the Egyptian Environmental Policy Program have supported research to help EEAA-NCS develop options for increasing revenues from various sources that could be devoted to these purposes. The presentation will summarize the findings of FOUR (4) studies recently completed by the EEPP-Program Support Unit:

- Statistics on the scale of marine tourism in the Red Sea Governorate, and current revenues generated, will be presented. •
- The results of a major "Survey of Tourists' and Tourism Operators' Willingness to Pay for Coral Reef Conservation" will be summarized.
- Major options for revenue-raising mechanisms will be reviewed.
- Several scenarios for the potential amounts of revenue that could be generated from a few major options will be presented.

NATURAL HERITAGE AWARENESS: FROM FIELDWORK TO PUBLICATION

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Egypt has a tremendous wealth of cultural and natural heritage. Although its cultural heritage – specifically the Pharaonic era – is well documented and fills volumes in various media, public knowledge and awareness of its natural heritage, especially terrestrial habitats and wildlife, has much lagged behind.

The production of various public awareness projects, either in film, CD-ROM or printed material, has necessitated extensive travels in the Egyptian wilderness for photography, shooting of video films and collecting of field observations. In one case, we discovered a small population of the endangered Barbary Sheep *Ammotragus lervia* in the Eastern Desert. This animal was thought to be extinct.

We travelled the land and the sea and flew in gliders to collect new and unique images. Our main goal was to provide public awareness material, which is entertaining, informative and interactive. For this we used high quality photographs, sought the expertise of and consulted with the most prominent experts in various fields and performed cutting edge artwork using state-of-the-art computer software.

BIODIVERSITY CONSERVATION AND SOCIO-ECONOMIC DEVELOPMENT IN JORDAN

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Jordan is pioneering new approaches to biodiversity conservation in the Middle East that are helping to alleviate poverty in rural communities and promote popular support for the philosophy and practice of nature conservation. Focused on the country's protected area network, and stimulated by GEF projects, these approaches involve the development of eco-tourism and other small nature-based businesses as engines of income generation and alternative livelihoods. Uniquely, the government of Jordan is encouraging the non-government sector to take the leading role, with consequent benefits in targeting resources and building grassroots support. While the early results of these initiatives are very promising, both the Government and the NGO sector realise that habitat degradation and species loss are still major problems and that further efforts need to be made to mainstream biodiversity conservation into development programs.

THE GLOBAL ENVIRONMENT FACILITY AND CONSERVING BIODIVERSITY THROUGH PROTECTED AREAS

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The importance of conserving the earth's biological diversity has been the subject of a great deal of discussion and has become increasingly apparent in recent years. So has the increasing rate of extinction of species that are important to maintain the world's genetic resources. Although we cannot be sure what further use - possibly of survival value - mankind will find for yet unresearched plants and animals, on a different level we can be convinced that the richness of the natural world is a heritage that is our duty to preserve for posterity. We have no right to cause or allow the extinction of species and communities that will almost certainly be valued more highly by future generations than ours. Over the centuries, the natural world has been protected from the most disruptive human influences by cultural/ecological factors such as taboos preventing overexploitation, religion which designated certain areas for worship, tribal warfare which kept wide areas as wilderness " buffer zones" between groups, land ownership by ancestors or lineage rather than individuals, relatively sparse human populations and so on.

But during the last few generations, economic growth based on conversion of fossil fuel has spurred such rapid expansion of human numbers that new approaches to conservation have become necessary. One such an approach has been the establishment within the last 100 years of explicit government policies aimed at ensuring that wild living resources are conserved, usually through the designation of particular ecologically sensitive areas as national parks or other sorts of protected areas. Today, most countries have national parks or national legislation promoting conservation and are parties to the international conventions that promote conservation of biodiversity. In support of such efforts the GEF is the world's largest financier of protecting the global biodiversity in developing countries and economies in transition, with projects executed on the ground by some 167 participating governments, over 600 non-governmental and community based groups and a growing number of business and private enterprises.

Over the last ten years, the GEF has grown to be the principal partner of countries in taking real action to achieve sustainable development, mainly by aligning its portfolio with national biodiversity programs and country priorities. GEF was established to forge international cooperation and finance actions related to biological diversity, climate change, international waters, and the ozone layer. It also works to stem the pervasive problem of land degradation. Since its establishment in 1991, the GEF has allocated more than US $ 1.48 billion to 541 biodiversity conservation and sustainable use projects in 160 developing countries - the single largest funding worldwide. These projects have leveraged an additional $ 2.94 billion in government counterpart commitments and in co-financing from bilateral and multilateral agencies and the private sector.

GEF's impact on conservation of biodiversity is even more evident in its support for protected areas. Some 671 protected areas in 106 countries, covering over 889 million hectares, over one-half of identified globally significant biodiversity sites, receive GEF support. 70% are forests and 29% are priority wetlands and coastal areas. More than one half of priority biodiversity sites in the Global 200 List of the Earth's Distinctive Eco-regions classification by WWF are supported by GEF through 86 projects. Through its support to the Critical Ecosystems Partnerships Fund

the GEF is helping to conserve 60% of the earth's land based life in 1.4% of the world's land area, which includes globally significant eco-regions and the Meso-American Biological Corridor. GEF projects cover 80% of the home range of the top ten most threatened and endangered plant and animal species according to the IUCN Red Book.

GEF is giving support to the 5th World Parks Congress, which will be taking place in Durban South Africa in September 2003. The World Parks Congress meets every ten years as the major global forum for protected areas and this is its first meeting in Africa. Like the World Parks Congress, GEF shares concerns of the conservation community, that matters of spirit and culture are equally important to matters of science, politics, economics and education in natural resource issues. In this respect, more than $ 81.2 million in grants has been allocated to projects, which conserve outstanding sites linked to the cultural patrimony of mountain indigenous communities. Over 60% of the total number of World Natural and Cultural Heritage Sites are now conserved through GEF funding of more than $270 million to 40 projects.

The meeting of the 5th World Parks Congress in Africa should also be seen in terms of Africa's contribution to the global conservation movement. The African continent, although currently confronted by various socio-economic challenges, has the potential to contribute considerably to the global conservation movement through its people and through the broad range of rich cultural and natural landscapes. Africa is currently a recipient of $396 million in GEF grants in support of conservation. In this respect, the region is second only to Latin America.

ENVIRONMENTAL MANAGEMENT, BIOLOGICAL DIVERSITY AND SUSTAINABLE DEVELOPMENT

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Environmental Management and conservation of biological diversity has been in many instances handled in isolation from mainstream economic policy. There has been a misconception that achieving sound environmental management and conservation of natural resources should be viewed as an end itself and not as a means to achieving sound economic and sustainable development. Achieving environmental objectives is still seen in many countries as a luxury, which can only be afforded by developed countries and not a necessity for developing countries rich in natural resources.

Mainstream economic theory is based on the basic assumption that natural resources are infinite and that the environment has unlimited assimilative capacity. It is also based on the premise that there is full substitutability between natural and human made capital. In other words economic development and growth models are based on the assumption that technological, knowledge, and trade advances can replace or substitute degraded or depleted natural resources. The latter were also treated as a free good with no price tag attached to them.

Ecological and environmental economists, in contrast, believe that natural capital is an asset which has to be treated as human made capital, and its depletion can limit the potential growth of the global economy. They reject the idea that technology and resource substitution can continuously outrun depletion and pollution. We have entered a new era in which the limiting factor in development is no longer human made capital but the remaining natural capital.

Increasing attention is placed on the need to internalise environmental and social externalities in any development project or activity. It is essential that in order to achieve sustainable development, environmental and social considerations should be integrated in the development of projects, plans and policies. A number of tools and methodologies have been developed and may be applied to achieve this end.

Egypt is country rich in natural resources and biodiversity. Such resources if properly managed can effectively contribute to both economic development and environmental protection. The sound management of natural resources and biodiversity can sustain and contribute to the sustainable development of different sectors of the economy such as agriculture, industry, and tourism. The latter is one of the important and leading sectors in the Egyptian economy. It directly and indirectly creates employment opportunity for a large segment of the work force in the country, generates foreign exchange earnings, and promotes the development of other support services and activities in the country.

GLOBAL CHANGE AND PROTECTED AREAS: A CHALLENGE FOR AFRICAN NATIONS

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Throughout much of the 20th Century, African countries made tremendous efforts towards safeguarding important segments of their biological heritage by creating protected areas covering a total of more than two million km^2. These protected areas have contributed in many ways to sustaining cultural and social dynamics among the African people, while at the same time generating economic benefits to nations across the continent. Despite the myriad of challenges associated with their management, protected areas in Africa today represent the most important tool for sustaining the natural environment and ecosystem processes that are valuable for human livelihoods. However, whereas government commitment towards strengthening protected areas is likely to increase in the coming decades, global scale changes associated with climate, globalisation, and governance will increasingly pose new and complex challenges for protected area agencies and managers. In this paper, I highlight the need for strengthening scientific understanding of species distribution and representation in protected areas to minimize extinction risks in the face of such global scale changes. I will specifically draw on emerging lessons from climate change research and modelling in Mediterranean ecosystems such as those occurring in Egypt and North Africa.

Abstracts

INSECT DIVERSITY IN ZARANIK PROTECTED AREA, NORTH SINAI, EGYPT

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Patterns of species diversity and community organization in insect fauna were studied in 4 sites in Zaranik Protected Area, North Sinai, Egypt. Local communities of insects included 187 species and subspecies belonging to 49 families and representing 15 orders; 25 of these species were very rare and seem to be threatened. Five of the collected species were recorded for the first time from Egypt. The insect diversity and abundance showed differences among different sites. Faunal similarity and diversity measures and species composition suggest the division of the insect fauna of Zaranik Protected Are into 2 main communities; one occurring at the area surrounding the rest building, 10 km away from the sea shore and the other community at the sea shore including some nearby small islands. The present study may constitute a basis for any attempt to include insects in any conservation assessment.

CAPACITY BUILDING IN EGYPTIAN PROTECTED AREAS: FUTURE PERSPECTIVES

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The current situation of the twenty-three Protected Areas in Egypt and associated Visitor Centres is assessed. One case study relates to the Nature Conservation and Management Training Centre in Sharm El Sheikh, South Sinai. The author describes her own experience as it relate to the Egyptian/ Danish Project in Zaranik Protected Area and Jordan's Royal Society's sustainable practices at Dana Reserve. The behavioural process of attitudinal change from knowledge, self-developmental and feelings/emotions to capacity building and skill development is discussed.

Future Perspectives for sustainable development, where the main goal in the short-term would be to describe the suggested tools and techniques for environmental awareness campaigns. The long-term goals would include non-formal environmental education packages to mainstreaming methods in various Government and non-government sectors. This is especially critical as Egypt is facing the challenge of population explosion where the younger groups are reaching over 40% of the total population, and the illiteracy average rate is 50% according to 2001 estimates. Also the behavioural process of attitudinal change within the framework of operational capacity building and skill development to reach realistic sustainable development.

RED SEA MANGROVES

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Mangrove forests of the Egyptian Red Sea are significant not just biologically, but also in an historical context. The shoreline morphology and climate of the Egyptian Red Sea, especially south of Hurghada, favour the growth of mangal vegetation. Approximately 23 stands of mangrove were recorded along the coast of the Red Sea Governorate from El Gouna (20Km north of Hurghada) to the extreme south of Egypt. All the stands north of Shalateen are composed purely of *Avecinnia marina*. South of Shalateen, *A. marina* was found to be mixed with *Rhizophora mucronata* as a co-dominated. The stand sizes ranged between tenth of meters to several km. The largest stand of the *A. marina* is occurred in the area of Hammata while for *R. mucronata* is recorded at Marsa Sha'ab (50km south of Shalateen).

The following important roles of the mangrove forests in the Red Sea must form the basis for establishing a conservation plan:

- Coastal zone stabilization: Mangrove roots and trees break up the wave energy and consider as a trap for sediment. These areas are very valuable on coast dominated by eroded shore type such as the Egyptian Red Sea Coast.
- Spawning, nursery and feeding ground for marine animals: Because of mangrove stands always represented as net producer ecosystems and sheltered, therefore they plays very important role in the spawning and early stage of many marine species as shelter and as feeding ground. The mangrove areas in the Egyptian Red Sea are very limited comparing with other areas all over the world, therefore any level of damage suppose to be significant and expected to negatively effect its ecological roles.
- Wildlife sanctuary: Besides marine life mangrove support birds mammals and insects.
- Importance to the native population:
    - Mangrove associated with fisheries of the Egyptian Red Sea as fishing and nursery ground for many valuable commercial fish. In total, 35 species of fish are catching from the mangrove areas. In addition, approximately 35% of fishermen villages on the coast using mangrove as destination and fishing ground. The annual catch and potential of the mangrove in fisheries resources are not known.
    - Source of wood: The native population is using wood products of the mangrove as firewood, charcoal and roof building. However, they prefer Acacia wood in building rather than mangrove wood, which reduce the impact on the mangrove.
    - Grazing ground principally for camels and goats.

The main threats for the Red Sea mangrove included: destructive of the mangrove forest for urban development; urbanizing the wadis and changing the flooding pathway as a result reducing the loading of sediments and freshwater to the mangrove stands; wood cutting and animal grazing; lack of public awareness towards mangrove; pollution especially solid wastes and oil spills; diseases; over fishing.

The action needed to minimize these impacts included: Demarcation of all mangrove stands along the coast and establishment of boundaries and buffer zone for each stand; preventing urbanization in the wadis areas; supplying of substitute materials for building and restricting for grazing; raising of public awareness; establishing a control program for continues cleaning of the mangrove stands based on local population through schools, tourism projects and NGOs; monitoring and rehabilitation of mangrove trees; regulating fishing activities in the mangrove areas.

ASSESSMENT OF MANAGEMENT AND SUSTAINABLE USE OF NATURAL PROTECTORATES IN THE ARAB COUNTRIES: EXTANT, FUTURE PROSPECTS AND IMPLEMENTATION

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The establishment of protected areas does not, in itself, guarantee their protection and sustainable use. They are rarely self-contained ecological units that can be isolated and maintained in a pristine condition. This study aims at assessing the current situation and identifying the challenges and approaches for the future plans in the Arab countries. Data and information were collected through questionnaires, interviews and field visits to some Arab countries. The data were analysed in the light of: (1) overall policy and legislation; (2) management; (3) funding sources and mechanisms; (4) challenges; (5) services offered by the protected areas; (6) information gaps; (7) priority issues and (8) future plans.

Management assessment of the current situation covered the different categories of protected areas, evaluation and follow up, zoning and boundaries, database and legislation. The expected steps of management plans and practices are reviewed in the light of the three expected scenarios.

Management pf protected areas is essential if they are to be protected in perpetuity. The effective management approach as defined by the progressive acquisition of knowledge at protected area level need to be based on the sequence of evaluation-planning-execution monitoring is particularly useful in situations such as the Arab countries, in which little information are available and management decisions can't be delayed until all required information are provided by research and monitoring programs.

As a strategy for protected areas, the Arab countries need to share a common vision for regional network of protected areas. This vision should reflect the evaluation of the region cultural and heritage values, the political supports and the growing public understanding of the environmental threats. The national leaders in concert with private groups and individuals should adopt and promote a regional vision that will harness the instinctive response of people to their natural heritage, and capture their desire to contribute to national/ regional/ global conservation. It is essential to make peace with the land resources and to preserve the heritage before vanishing the available opportunities.

Abstracts

SIGNIFICANCE OF DEMOGRAPHY AND REPRODUCTIVE ECOLOGY IN MANAGEMENT OF *ACACIA* TREES IN SAINT KATHERINE PROTECTORATE

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A field study was carried out on demography and dynamics of *Acacia* trees in Saint Katherine Protectorate during the period 2001/2002. A total of six populations were monitored for variation of size and life span stages. Four populations demonstrated continuous recruitment and two populations were declining. The average population age is around 150 with extreme old individuals reached 614 years old. About 50% of the trees have an age range from 10 to 50 years. Life table and fecundity schedule analysis showed that the total annual seed output by a single population was computed to be *c.* 3769000 seeds. About 0.30% of the seeds had the potential to germinate in soil, and out of these germinable seeds, about 48.99% gave seedlings. The juvenile plants comprised 0.035% of the seedlings, while 80% of the juveniles reached a mature reproductive stage. The survivorship curve, of the investigated population reflected high mortality of seeds and seedlings. Juveniles and adults up to age 10 years showed high expectation of future life. The net reproductive rate was 0.275, indicating continuity of the population to attain 'positive' growth and reproduction. The estimated intrinsic rate of increase was 0.00339 per capita year^{-}. The average generation time of the species was 380.85 years.

The findings of this study suggests an effective management plan to conserve and sustainable use of the *Acacia* trees as based on life table and fecundity schedule data analysis.

LAND USE AND LAND USE PLANNING FOR THE ZARANIK PROTECTED AREA

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The land use systems and the economic activities in and around Zaranik Protected Area are closely linked to its physiographic units. These "natural" land covers can be roughly divided into: The Zaranik lagoon as a shallow 1 - 1.5 m depth high saline lagoon with small inlets, mudflats and areas of halophytic vegetation, separated from the Mediterranean Sea by a narrow sandbar with two narrow connections (*bughaz*) which are only seasonally open and the sand dune area that is covering the southern part of the reserve.

There are six major land use activities within the boarders of the reserve: grazing, rain feed agriculture, fishing and hunting (during migration time), commercial activities (El-Nasr Salt factory) and tourism. These different land use activities have on the one hand very negative effects to the protection and reservation of the protected area e.g. the over-grazing lead to the loss of natural land covers and consequently accelerates the degree of desertification.

Present day sources of conflicts in Land Use Planning include traditional rights of local communities versus the need of expanding urban and industrial centres. Zoning Zaranik Protected Area

is increasingly considered as an essential management tool, because it allows the fine-tuning of regulations to meet the particular requirements of the various types of areas included in the reserve. Therefore zoning becomes necessary to separate these zones from those in which stricter rules apply. As a result, the protected areas no longer appear as massive entities where all land was subject to the same restrictions.

It is recommended to have a special land use in two specific areas on the eastern and south-western boarder of the reserve. These areas could be used for compatible activities as a buffer zone e.g. establishing the "Bird land-Park" Project. These buffer zones are important for the preservation of the area from harmful outside influences.

The proposal for the "Bird land-Park" project, which is promoted in cooperation with the German Hans-Seidel Foundation, is proposed to be part of the Management Plan of the Zaranik Protected Area. This "park" could include artificial lagoons and wetlands, the local natural habitats for migrating and resident birds, a modern information centre, with an integrated local handy craft centre and possibly activities such as camel and horseback riding. In a skilful planning of the trail in the terrain, the distances between the animals and the visitors could be selected in such a way so that the illusion of a natural observation of the animals could be given to the visitor. This has already been achieved in other projects and ideas from other areas could be used and adapted to the local situation. With such a project, any further demands toward expanding development into the protected area, would be discouraged. Furthermore, by this artificial landscape in which one is able to see the attributes scattered within the protected area, it is possible to upgrade the attractiveness for the regular visitor of the protected area. Furthermore, such an investment could create jobs for the Bedouins, including their existing abilities with additional training. In a further development phase, an observatory with a ringing station for birds and other facilities required by many agencies could be integrated.

The development of a comprehensive land use plan can only be implemented in a slow and transparent process. The integration of local inhabitants and especially decision-makers is essential for the success of the protection measurements. The different zones or zoning system and the development and creation e.g. of the "Birdland-Park" Project should be implemented on the local level to guarantee maintenance, understanding and the feeling of integration and therefore responsibility.

UTILIZING THE CONTROL OF PLANT GENE EXPRESSION TECHNOLOGY TO CONTROL EXOTIC INVASIVE PLANTS: A NEW APPROACH

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New advances in biotechnology have made it possible to consider novel approaches to deal with exotic invaders such as noxious weeds. A 1998 United States patent was published on the ' Control of Plant Gene Expression'. The patent described a method to produce a transgenic plant that contains a seed maturation specific gene encoding a protein that prevents subsequent germination of the seed within which it is expressed. This 'germination disruption gene' is not activated until the application of a chemical signal that results in the physical formation of the germination disruption gene. This generates a transgenic plant that can grow and produce seed but the seed is generated is incapable of germination. Thus, in effect halting the production of future generations of that plant. Moreover, the transgenic plant in which the germination disruption gene has been activated also produces pollen that carry the activated germination disruption gene thus causing a seed produced from the transferred pollen incapable of germination.

Using this system to control exotic invasive weeds is being described as Induced Self Control (ISC). Field-testing this concept to control yellow-star thistle, (*Centaurea solstitialis* L. a serious invader of rangelands in western United States) is being under favourable consideration by agencies and research institutions in the USA.

INTRODUCTION TO THE CONVENTION ON MIGRATORY SPECIES

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The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is one of a small number of intergovernmental treaties concerned with the conservation of wildlife and wildlife habitats on a global scale. Since the Convention's entry into force on 1 November 1983, its membership has grown steadily to include 80 (as of 1 September 2002) Parties from Africa, Central and South America, Asia, Europe and Oceania. Parties to CMS work together to conserve migratory species and their habitats by providing strict protection for the endangered migratory species listed in Appendix I of the Convention; by concluding multilateral Agreements for the conservation and management of migratory species listed in Appendix II; and by undertaking co-operative research activities.

CMS has a unique role to play in focusing attention on and addressing the conservation needs of around 90 endangered species presently listed in Appendix I - including, inter alia, the Siberian crane, White-tailed eagle, Hawksbill turtle, Mediterranean monk seal, Damascus gazelle, Fin whale and Sperm Whale.

Appendix II lists migratory species that require or would benefit significantly from international co-operative Agreements under CMS. These may range from legally binding treaties to less formal memoranda of understanding. The more formal Agreements should provide for co-ordinated species conservation and management plans; conservation and restoration of habitat; control of factors impeding migration; co-operative research and monitoring; and public education and exchange of information among Parties.

Several Agreements have been concluded to date under the auspices of CMS. They aim to conserve:

- Bats in Europe;
- Cetaceans of the Mediterranean and Black Seas and near Atlantic;
- Small cetaceans of the Baltic and North Seas;
- Seals in the Wadden Sea;
- African-Eurasian migratory water birds;
- The Siberian Crane;
- The Slender-billed Curlew;
- Marine turtles;
- Albatross and petrels from southern Pacific.

A Secretariat under the auspices of the United Nations Environment Programme (UNEP) provides administrative support to the Convention. The decision-making organ of the Convention is the Conference of the Parties (COP) which held its Seventh Meeting in Bonn in September 2002. A Standing Committee provides policy and administrative guidance between the regular meetings of the COP. A Scientific Council consisting of experts appointed by individual member States and by the COP, gives advice on technical and scientific matters.

AN INTRODUCTION TO THE CHINESE NATIONAL GEOPARK PROGRAM

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A Geopark is a dedicated area enclosing special features of geological significance, rarity or attractiveness.

As early as in 1985, the Geological Society of China proposed the conception of establishing national geoparks in order to protect significant geological heritages. In August 2000, approved by the Chinese government, and also backed by the Division of Earth Science, UNESCO, a national steering committee for protecting geological heritages / geoparks was founded. In the same time, a national academic panel for geoheritages / geoparks was also established, with 21 members in various fields such as geology, geography, paleontology, environmental science, and management.

In 2000 and 2001, totally 80 proposals for candidate national geopark have been submitted from local governments, and 44 were approved after strict assessment. These include important peculiar fossil sites, places where the standard stratigraphic units were named, rare minerals or rocks were discovered, or the significant geological events were recorded, etc.

The main significance of geopark program in China is: 1) to improve the protection of geological heritages; 2) to provide better platform for relevant scientific research; 3) to foster dissemination of geological knowledge; 4) to promote the rehabilitation of geological environment; 5) to enhance scientific and technological content in tourist industry; 6) to increase opportunities for the development of local economy.

Abstracts

PROVIDING PROTECTED AREAS IN EGYPT WITH *PHOTO-VOLTAICS (PV)*

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Solar System p.v. (photovoltaics) consists of solar module-charged regulator-battery-inverters that provide complete solutions for power supply using solar energy. In general, the system can be used to provide electricity to remote locations were grid is not available.
Photo-Voltaics are environmentally friendly because they are silent, cause no pollution or residues, have a low operation and maintenance cost, can be used in any environment, can be tailored to actual energy requirements, operate without fuel, and have no moving parts to wear out.

It has been scientifically proven that the break-even point of the solar system is after 3 years when compared to diesel generators considering only fuel, spare parts & replacement.

There are 15 solar stations in Ras Mohammed national Park, Nabq, Abu Galum, Taba, and St. Katherine Protected Areas.

Obstacles preventing the expansion of PV technology will be discussed.

THE CLEANER WRASSE LABROIDES DIMIDIATUS IS A KEY ORGANISM FOR LOCAL REEF FISH DIVERSITY AT RAS MOHAMED NATIONAL PARK, EGYPT

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Individual cleaner fish have small territories ('cleaning stations') where the majority of reef fish species visits them. The cleaners inspect the surface, the gills and sometimes the mouth of their 'clients' and remove parasites, dead or infected tissue and also mucus and scales. Individual clients visit cleaning stations about 5-30 times per day, and cleaners have more than 2000 interactions per day. They eat more than 1000 gnathiid isopods per day. Therefore, it has often been assumed that cleaner fish are important for fish health and local reef fish diversity. However, good evidence was missing. I investigated this question at Marsa Bareika, Ras Mohammed National Park. I regularly sampled 46 reef patches, varying in volume between 0.8 and 22.5 m3. I recorded all species present. Natural variation in cleaner fish presence or absence and experimental manipulation revealed that that the presence of a cleaner fish causes a 20% increase in local reef fish diversity. Introducing a cleaner has profound effects within 14 days. The removal of a cleaner has no effects in the short term but diversity decreases after 5-20 month. Interestingly, not just the diversity of client species but also the diversity of species that do not visit cleaners was influenced by the presence of cleaners.

SUSTAINABLE ENVIRONMENTAL AND ECO-TOURISM DEVELOPMENT OF LAKE NASSER

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The natural environment is defined as a group of Natural Historical and cultural elements which affects the human and in his living and his coping with other living beings whether these are animals or plants in a natural or artificial environment which saves reasons for eternity, organic health and psychological health, and then achieving coordination and natural equilibrium.

This definition lead us to discover the range of strong binding between the tourism and environment where the natural and good environment is regarded as an essential source on which the development of the tourism areas relay on, and activating the local and International tourist movement. On the other hand, the excessive exploitation of the Natural and Environment sources with no due restriction may cause a severe deterioration of these resources, which damages the tourism industry. Therefore, the environment is a product, which can be depleted, difficult to repair, and difficult to recover in many occasions, If the environment is not kept and maintained after the event of the unplanned tourism expansion, the environment deterioration will become a reality.

Traditionally, the tourism in Egypt was always cultural, and historical. Because of the abundance and presence of cultural resources, and the remnants of old Egypt focused on the Nile Valley and South of the Valley. But since approximately ten years, new areas were included into the map of Egyptian tourism, such as the Red Sea coast, Sinai Peninsula, The Western Desert and lake Nasser including it's variant oasis, and it's attraction, it's greet nature and it's variant resources, it could achieve for Egypt many Social and Economical Advantages.

The aim of the research is to study the possibilities of sustainable environmental, and tourists development of Lake Nasser, by presenting ideas and priorities for the Environmental and tourism development of sites according to their importance, and to achieve equilibrium between the tourism development and conserving the Environment in such a way that allows making use of the natural resources of the area. And responding to the idea of the sustainable environmental and tourist development under the umbrella of the ecological planning and eco-lodge ideas.

THE CONSERVATION OF THE MARSA ALAM - HAMATA SECTOR OF THE EGYPTIAN RED SEA COAST: A LANDSCAPE PLANNING STUDY

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The Red Sea coastal strip extending from the town of Marsa Alam southwards to the small fishing village of Hamata represent one of the most attractive, and until recently most pristine areas along the entire Egyptian Red Sea coast. Spectacular land- and seascapes, healthy coral reefs, extensive mangrove stands as well as wild desert mountains and wadis place this sector in a very special position among natural areas in Egypt. The mostly intact coral reefs, which fringe the coastline and the few nearby islands, support some of the highest biodiversity in the entire country, and possibly the world. The islands of Wadi El Gemal, Hamata, and others provide breeding grounds for marine turtle as well as a number of bird species. The extensive mangrove stands and mudflats, which extend from the delta of Wadi El Gemal to Hamata, support a high diversity of marine life and birds. Several wadis drain the lofty mountains in the area into the Red Sea support a wealth of desert fauna and flora. Most important among these is Wadi El Gemal, which drains a huge area in the Eastern Desert and forms an extensive delta.

Despite its very high conservation value, the area has been targeted for tourism development threatening not only the critical habitats and wildlife of the area, but also its main tourist attractions. Within the framework of the GEF funded "Egyptian Red Sea Coastal and Marine Resource Management Project" a landscape planning study was carried out to preserve the unique qualities of the area and at the same time allow certain level of development that will not impact its natural resources. An extensive multidisciplinary survey of marine, coastal and desert habitats of the sector was carried out, covering geological, geomorphological, ecological, faunal, floral and social aspects. Based on the results of this survey a detailed land use plan was developed for the sector. The plan included the definition of areas to be declared as Nature Protectorates, their manageable boundaries, service and visitor approaches, as well as the preliminary design of visitor centres and other public service facilities. Management structure and the role of local tribesmen were also covered.

MOLECULAR BIOLOGICAL TOOLS TO MONITOR THE ENVIRONMENTAL STRESS ON CORALS

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The environmental stresses on coral reefs as well as the molecular biological tools to monitor the environmental stresses were reviewed. Among the environmental stresses are the storm-generated waves, predation by crown-of-thorns starfish Acanthaster planci and by fishes like parrot fish, sedimentation, thermal pollution, sewage, oil pollution, and human impacts like over fishing of reef organisms, collection of corals and the impacts coming from the recreational activities. These impacts and stresses make it easy for corals to be infected by diseases and leading in turn to massive coral mortality. The diseases infecting corals were also reviewed in that article. Among the biomarkers used to monitor and to predict the environmental stresses are the heat shock protein (hsps) marking temperature stress, lipid peroxidase and glutathione marking the oxidative stress, ubiquitine marking the fast protein degradation and marking also the individual fitness, heme oxygenase marking the impacts of the ultraviolet radiation as well as the oxidative stress, Cu/Zn and Mn superoxide dismutases which are major defence against oxidative stress and biomarkers for it, steroids marking some pollutants like polychlorinated biphenyl, pesticides and the petroleum products which harm the functions of the reproductive hormones. The biomarkers were also used in restoration strategies as selection criteria for asexual recruits to be transplanted. The probes and cDNAs to monitor the environmental stresses were reviewed. Among these probes are the hsp90 gene marking the temperature stress, histone H4 cDNA which is used to monitor the cell proliferation, cDNA encoding the UVR related proteins which is an indication for the extent of exposure to ultraviolet radiation, testis enhancing gene which can monitor the compounds affecting the sexual hormones, fructose-1,6-biphosphatase marking the state of nutrition, fibrillar collagen marking the growth activities, succinate dehydrogenase marking the oxidative stress and the strand scission factor marking the degree of separation of the DNA strands after the stress.

Abstracts

ECONOMIC VALUATION OF MARINE PROTECTED AREAS: BACKGROUND AND RECENT EXAMPLES FROM AROUND THE GLOBE AND SOME IDEAS FOR EGYPT

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In most tropical countries, coral reef ecosystems provide many goods and services to coastal populations. A variety of anthropogenic practices threatens reef health and therefore jeopardizes the benefits flowing from these services and goods. These threats range from local pollution, sedimentation, destructive fishing practices and coral mining to global issues like coral bleaching.

Economic valuation can help to shed light to the importance of the services and goods by "getting some of the numbers on the table" and by showing the costs of inaction. The presentation will highlight this through four case studies to illustrate these points. Besides, the presentation gives some background to economic valuation (Total Economic Value, Cost Benefit Analysis) and will briefly discuss the current joint GOE-USAID effort on economic valuation of coral reefs in Egypt.

Case 1: Economic Valuation of the Coral Reefs of Hawaii: This recent study shows both the total economic value of coral reefs in Hawaii and presents outcomes for three sites where detailed research has been carried out regarding ecologically sound mass tourism, aquarium fisheries and loss of property value due to algae nuisance related to nutrient problems.

Case 2: Economic Valuation and Cost Benefit Analysis for Marine Protected Areas: The Total Economic Value is given for the Portland Bight area (Jamaica) together with a Benefit Cost Analysis for establishing a Protected Area. Establishing a marine protected area (MPA) is a costly affair and a government needs to be well-informed about the pros and cons of an additional MPA.

Case 3: Cost Benefit Analysis of Blast Fishing in Indonesia: Destructive fishing imperils the food security and income provided by traditional reef fisheries in Southeast Asia. Costs and benefits of blast fishing are discussed and a stakeholder analysis of winners and losers of destructive fishing is given.

Case 4: Estimation of the Costs of Coral Bleaching in East Africa: The coral bleaching event of 1998 has devastated coral reefs in parts of East Africa and the rest of the Western Indian Ocean. This case assesses the costs of coral bleaching to the tourism industry and to fisheries.

THE CONSERVATION OF THE SAHARAN CHEETAH IN EGYPT: THE PROPOSED RAS EL QATTARA NATURE PROTECTORATE

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The Saharan Cheetah (*Acinonyx jubatus*) is one of the rarest and most critically endangered mammals in the world. A very small population escaped illegal hunting and habitat destruction and is taking refuge in remote and inaccessible areas of the Qattara Depression. However this small population is still threatened by the continuing loss of prey species like the Slender Homed Gazelle (*Gazella l. leptoceros*), Western Dorcas Gazelle (*Gazella d. dorcas*), etc. Within the framework of Community Developed Biodiversity Resource Management Plan Project a proposal for the establishment of a special protected area in Ras El Qattara has been developed. The proposed protected area will provide protection of the remaining cheetah population in its natural habitat within the Qattara Depression, along with its prey species This paper presents main features of the proposed protected area, its boundaries, plan for the required management structure, and an outline of monitoring and patrolling activities.

PHYTOPLANKTON DYNAMICS IN ABU QIR BAY, ALEXANDRIA, EGYPT

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Monthly investigation was conducted at five stations in the south-western part of Abu Qir Bay from December 1999 to November 2000. The study area acts a recipient of Considerable amounts of discharged agricultural, industrial and domestic wastewater from different land-based sources. The nature of the variable pollutants and their dispersion had the major impact on the temporal and spatial variability of the water quality, phytoplankton standing crop, community structure, species composition and the accompanied chlorophyll a content; the area had its own uniquely characteristic conditions. Extraordinary manifestations of eutrophication could be observed. Although the southwestern part of the bay was well oxygenated in general, hyperoxic condition at the surface and very low concentrations over the bottom were measured. The near-shore stations, particularly that in front of Boughaz El-Maadiya, which receives its water from Lake Edku, sustained the higher nutrient concentrations. Ammonia, phosphate and silicate were at their minimum levels during May, while the reverse was true for nitrate (7.05 µM). The surface ammonia concentration was highest in August (9.17 µM), phosphate in January (5.38 µM), and silicate in January (40.13 µM), and it was relatively lower in December and October (31.13 and 25.23 µM, respectively). The major phytoplankton peaks triggered at most stations in

May (average of 2.5x106 cell L-1, surface). The spatial phytoplankton distribution, generally, showed the eastern area to be more productive and a gradual density decrease was seen extending towards inshore. The western offshore station near Abu Qir headland was always poor (annual average 0.29x106 cell L-1). The phytoplankton community was well diversified (239 species, diatoms representing 46% to the total). Yet, less than a dozen species were responsible for the massive phytoplankton occurrence at the different stations. The diatoms, *Asterionella glacialis, Skeletonema costatum, Rhizosolenia fragilissima, Leptocylindrus minimus, Chaetoceros* and *Nitzschia* species were of major contribution, as well as the dinoflagellates, *Prorocentrum triestinum* and *Scrippsiella trochoidea*. The occurrence of the dinoflagellate species (*Alexandrium minutum, Gymnodinium catenatum* and *Prorocentrum minimum*) known toxic, despite of their lower numbers can affect, in future, the marine processes that alter the natural dynamic equilibria and the biotic composition of Abu Qir Bay ecosystem. These effects, in turn, have undesirable consequences for the economics of this region of which the sea represents a valuable resource, as well as for the public health. It is recommended that man-made eutrophication in the bay must be controlled through the reduction of the amount of discharged waters and/or water treatment.

TRANSPORT PROCESSES IN A HEAVY EUTROPHIC MARINE BAY, ALEXANDRIA, EGYPT: APPLYING ENVIRONMENTAL IMPACT ASSESSMENT (EIA) MODEL

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Autogenous and allogenous control of the phytoplankton standing crop and biomass was proved in Mex Bay, west of Alexandria (Egypt). Among the clear signs of eutrophication are the heavy visible blooms, which became regular events, at intermittent periods during the warm seasons. The causative organisms progressed differently, the dinoflagellate, *Gymnodinium catenatum*, is well known toxic species. The Environmental Impact Assessment model (EIA) was applied to Mex Bay. It is a three-dimensional water quality and flow model, based on the three interacted dimensional: longitude, latitude and depth, calculations of time and space variations. The model deals with processes that affecting the water quality. It was initiated with measured field data and load input. The model was used to simulate phytoplankton biomass transport and ambient nutrient concentrations (nitrate, phosphate and ammonia). The model results and the field measurements are compared in order to fit the model. Generally, the calculated flow and concentrations corresponded well with observations. Deviations are attributed to several reasons. A notable influence of the main outfall on the concentrations, particularly in the near shore area, as well as, on the seawater quality was detected. The spatial distribution of the phytoplankton standing crop coincided clearly with the accompanied chlorophyll a concentrations calculated by the model. The results stressed the need to reduce load input into Mex Bay, in order to counteract eutrophication in Alexandria waters. Nitrogen reduction is more important for the whole area, while phosphorous reduction is more effective in the bay.

TAPPING TOURISM FOR PROTECTED AREA MANAGEMENT

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This paper will explore ways in which tourism can play a role in managing protected areas. It will review the history of visitation to national parks in the U.S., and how entrance fees, in-park concession sales and promotion within gateway communities have generated much needed revenues for management of protected areas. Next it will look at nature based and eco-tourism as fast growing segments of international tourism market, including recent events during the Year of Eco-Tourism. Finally, I will present some new initiatives to link tourism development and biodiversity by the United Nations Environment Program and the Centre for Environmental Leadership in Business.

AUSTRALIA'S EXPERIENCE IN MARINE PROTECTION : AN ARGUMENT FOR BIODIVERSITY PROTECTION AND SUSTAINABLE ECONOMIC VALUE.

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Australia has a bold program to manage its EEZ sustainably while developing the economic potential of its oceans, yet protecting high seas areas of high conservation value. Australia also hasÊe extensive experience in inshore marine parks. It is Australia's experience that marine protected areas add major value to the national economy, while systematic management of our EEZ can ensure the sustainable use of these areas into the future. To meet this objective it will be necessary to reconcile the traditional approach of the fishing, transport and petroleum industries with the threefold values of environmental, social and economic sustainability.

Abstracts

DYNAMICS OF FISH ABUNDANCE ACROSS BOUNDARIES OF A NO-TAKE ZONE IN NABQ MANAGED RESOURCE ROTECTED AREA, SOUTH SINAI.

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Underwater visual census counts were conducted across a small no-take zone (NTZ) and its adjacent open fishing zones in Nabq with the aim of analysing fish abundance and size distribution across boundary areas. Although fishing pressure from the artisanal Bedouin fishery is considered moderate, differences in fish abundance since reserve creation have been found and this study provides a more detailed examination of the reserve dynamics. The families Serranidae (groupers) and Lethrinidae (emperors) displayed higher abundance in the no-take zone over all depths whereas Acanthuridae (surgeon fishes) showed the reverse pattern of increased abundance in the open areas. Gradients of abundance from the centre of the reserve outwards were also influenced by depth, with Siganidae (rabbit fishes) showing a decrease in abundance from the centre of the NTZ in the lagoon but an increase at 3m and 10m. Four species showed greater average size in the NTZ with only one non-commercial species showing a length decrease. Habitat differences coupled with differential fishing pressure (both between depths and areas), the small size of the no-take zone and additional management regulations have lead to varying dynamics across this no-take zone.

DEGRADATION OF A RED SEA REEF FLAT CORAL COMMUNITY AND STRUCTURE AS A RESULT OF INTENSIFICATION OF VISITOR USE.

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It is well established that trampling by visitors on reef flats damages corals, a pioneering study being that undertaken by Hawkins and Roberts (1993) at Ras Um Sidd, a popular fringing reef site at Sharm El Sheikh, South Sinai, Egypt. We undertook a study at the same site 15 years later during which time the number of visitors to the site has increased by a factor of almost 10. We compared 5 stations at locations extending from close to the headland itself, where installation of new steps has only recently encouraged visitor access to the reef, south-west towards the adjacent beach which is now crowded with visitors on a daily basis. The five stations showed a sequence of events linked to increased frequency and extent of trampling, the numbers of visitors walking across the reef flat ranging from a mean of about 70 per day at station 1 to 280 per day at station 5. At station 1 the coral community is diverse with a moderate coral cover (about 20%) and

very few broken branching corals. At station 2 coral cover is still high (about 17%) but breakage of branching corals is frequent. Station 3 has a coral cover of about 18% and the coral community is dominated by massive coral genera (*Goniastraea, Porites*) that are less susceptible to trampling. At station 4 there is negligible coral cover (8%) but the reef flat is still intact, whereas at station 5 the structure of the reef flat itself is extensively fissured and eroded, and it appears that rates of framework dissolution are exceeding rates of construction. The data suggest that intensive trampling of reef top habitats by large numbers of visitors may not only degrade the coral community but promote erosion of the reef framework. Fish abundance and diversity assessment at the 5 stations shows that reef flats under high trampling pressure still support a diverse and abundant fish community with increased abundance of herbivorous fish species and decreased abundance of obligate corallivorous fish species.

OVERCOMING THE TAXONOMIC IMPEDIMENT TO SUSTAINABLE DEVELOPMENT: BIONET-INTERNATIONAL, THE GLOBAL NETWORK FOR TAXONOMY

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Bio NET-INTERNATIONAL is the Global Network for *capacity building* in taxonomy for sustainable development. Taxonomy (or biosystematics) is the basic underpinning science of all biology - and thus of all environmental management. Without sound taxonomy, no knowledge is available on living organisms - and if you don't know what you have, you cannot determine how to manage, conserve or sustainable use biological resources. The Global Network is comprised of a number of inter-linked regional LOOPs (Locally Organised and Operated Partnerships) of developing country institutions, supported by a consortium of developed country institutions. Its purpose, through South-South co-operation and North-South partnerships for institutional strengthening and human resource development, is to enable developing countries to achieve self-reliance in taxonomy to support regional and national programmes for eradication of poverty via sustainable agricultural development and use of natural resources and full implementation of the Convention on Biological Diversity.

The networks' success is attributable to two key components. The first is local ownership of the process, including governmental endorsement of the need for such a capacity building network whereby needs are identified and prioritised by member countries themselves. The second is a tried and tested mechanism whereby a lack of individual country capacity is overcome by pooling, optimising and sharing regional capacity on a reciprocal basis between member countries. It provides a very useful model for other capacity building initiatives in developing countries, as well as for North-South and South-South collaborative partnerships for capacity building.

CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS IN ARID AND SEMI-ARID ECOSYSTEMS IN EGYPT

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Saint Katherine Protectorate is one of region's most amazing areas, not only for its natural landscape, but also for its medicinal plants diversity that is presenting national and global interest. While previous plant inventories recorded 529 plant species within the protectorate boundary, only 316 plant species were rapidly recorded, of which 33 species are endemic and other 4 endemic to Egypt (these 37 endemic species represent over 60% of Egypt's flora endemic). This shows that over years, 213 species were not observed in the area. The disappearance of, or at least the difficulty to locate, 213 species confirm the dramatic loss of global plant biodiversity. A number of threats to medicinal plants and habitat in St. Katherine Protectorate were identified as: (1) trampling, soil compaction and accelerated soil erosion around settlements, along unpaved quarry roads and round quarries, and along tourist trekking/safari routes; (2) vegetation clearance resulting from urbanization and quarrying; (3) Over-collection of flora for medicinal uses (household use, traditional healers, medicinal plant trade and research); (4) Fuel wood collection for household use; (5) Overgrazing around settlements in addition to the destructive effect of feral animals. The immediate objective of the project is to remove root causes of biodiversity loss and the specific threats to the conservation and sustainable use of globally significant medicinal plants and their habitats in arid and semi-arid areas of Egypt. The following are the overall development goals of the project:

- On-site protection of globally significant medicinal plant biodiversity in the project site. Action will be taken to broaden this initiative beyond the selected priority sites to others in the country.
- Improve knowledge of medicinal plant biodiversity, habitats and ecosystems, interlinking, distribution, threats and uses.
- Improve capacity, at the local and national level to address biodiversity issues in lateral and integrated planning levels.
- Develop a detailed assessment of threatened species and appropriate management plan for their conservation.
- Increase public awareness with respect to the importance of natural resources conservation.
- Ensure stakeholders involvement in medicinal plant biodiversity conservation.
- Set-up a monitoring system for globally threatened medicinal plant.
- Implement a series of training programs for biodiversity experts and other relevant participatory bodies.
- Establish local level management structures to ensure sustainable use of medicinal plants.

Abstracts

A MASTER PLAN FOR THE REGIONAL NETWORK OF MARINE PROTECTED AREAS IN THE RED SEA & GULF OF ADEN

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One of the major Goals of the Strategic Action Program (SAP) for the Red Sea and the Gulf of Aden is the establishment of a regional, representative network of marine protected areas (MPA). The Process will lead, not only to the establishment of MPAs, but also to the assurance of sound mechanisms for their management and sustainability. The First priority is the development of a Regional Master Plan that agrees with international guidelines and incorporates regional environmental and socio-economic conditions. Experience and lessons drawn from existing MPAs in the region will, also, supplement its development. The Regional Master Plan will act as a template to be adapted into site-specific management plans for MPAs earmarked for development in the region. This paper presents the underlying principles and goals of the master plan. It also recognizes criteria for identification and selection of marine protected areas in the RSGA and identifies the guidelines for planning and managing the regional MPAs. A general framework of how the regional MPAs are to be networked and coordinated is described. The Role of the regional network of marine protected areas in the sustainable use and the conservation of biodiversity is discussed.

THE PERSGA EXPERIENCE IN CONSERVING MARINE BIOLOGICAL DIVERSITY IN THE RED SEA AND GULF OF ADEN REGION

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The Red Sea and Gulf of Aden contain some of the world's most important coastal and marine habitats and species communities. There are a wide variety of coral reef types in the Red Sea with a Structural complexity unmatched on earth and their diversity is greater than anywhere else in the Indian Ocean. The number of species confined to the region and found nowhere else is extremely high. The region in general and the gulf of Aden in particular are among the biologically least known parts of the Indo-Pacific, a major obstacle to meaningful management. Important issues of habitat and biodiversity conservation are described and the Persga experiences in conservation of marine biodiversity are presented. Mechanisms of enhancement of regional cooperation are suggested.

INNOVATIVE REUSE ORIENTED WASTEWATER CONCEPTS FOR RURAL AND PERI-URBAN AREAS WITH INNOVATIVE SANITATION CONCEPTS

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Industrial wastewater management has shown the way to resources recovery by decentralised treatment facilities. Different qualities are treated with adequate devices in order to regain water and substances in an efficient and economic way. The same can be applied to municipal wastewater with different concepts.

Several new sanitation concepts have been developed and installed around the world. In Sweden, many systems of urine collection with modern no-mix-toilets and reuse as fertiliser have been implemented and evaluated over about 10 years. The systems collect the yellow-water (urine) through a separate pipe into a storage tank until it is used for agricultural purposes. The storage period should be at least half a year, since this is an appropriate time for tank emptying and a good part of the eventual medical residues can be destroyed during this time period. These substances are always of concern, but emissions to surface waters where drinking water is produced may be worse. Production of new pharmaceutical products does increasingly consider the fate of residues in the water cycle.

The Lambertsmühle project developed by Otterwasser GmbH and operated by the river-basin-management organisation 'Wupperverband' in Germany is taking up this concept with a newly developed urine-sorting toilet where no water is added to the urine with help of a mechanical valve that closes the pipe when users stand up. In addition, usage of an outside de-watering and pre-composting tank for the faeces is applied. A pre-composting tank has strong advantages against the methane - emitting septic tanks with their expensive emptying. Compared to septic tanks no treatment plant is needed for further treatment, local further composting of the tanks contents that have already been de-watered and pre-treated at least for a year can produce material for soil conditioning. Drawbacks are the handling of the collected material and a loss of water level in the system requiring a pump. This paper will present the first results of an ongoing research project.

Another development is based on vacuum toilets that collect blackwater separately to a semi central digester. The blackwater is mixed with bio waste, hygienized and used for the production of energy and fertiliser. Greywater can be reused after treatment e.g. in a membrane-bioreactor if there is a demand. Such a system has been implemented in Lübeck, Germany in a settlement planned for 350 inhabitants.

A very promising new technology is the blackwater cycle, where the blackwater from conventional flush toilets is reprocessed for toilet flushing while a highly concentrated hygienic liquid fertiliser is produced. The inventor Ulrich Braun, Germany has internationally patented it. The solids are separated and treated in a digester. Greywater can be treated separately for high quality reuse because it has not been used for toilet flushing. This system is under construction in a semi-technical scale in TUHH.

Such a system has a potential to allow the realisation of extremely resource efficient systems with very low nutrient loads for receiving waters. The above-mentioned systems will be analysed and the suitability, feasibility and environmental impacts of its application for the Hotels and the touristic resorts in the Red Sea will be discussed.

SYSTEM OF PROTECTED AREAS OF SAUDI ARABIA

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Since 1986, Saudi Arabia succeeded in establishing NCWCD, which in turn prepared a system of Protected Areas amounting to slightly over 100 sites, equivalent to 10% of the overall area of the kingdom. Declaration and announcement was possible for only 15 sites or (4%), priorities of applied measures included the factor of biodiversity richness, and the possibility of using the site for rehabilitation and re-introduction of some endangered taxa. Each site is governed by rules, laws and regulations and is under constant monitoring and administrative plans, local communities are involved and several problems were tackled, some solved, some awaiting solution. The present paper throws some light of the interesting and difficult issues entailed.

NATURE CONSERVATION IN EGYPT: AN OVERVIEW OF HISTORY, ACHIEVEMENTS AND THE FUTURE AGENDA

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Nature Conservation in Egypt has roots deep in history. Ancient Egyptians were perhaps the first humans to regulate hunting, set aside valuable sites and protect certain species. In the recent past Egypt continued to pay much attention to its biodiversity, through documentation and legislation.

In more recent years, Egypt has made great strides towards conserving and protecting its invaluable natural heritage. The passage of Law 102 for 1983 was a milestone in Egypt's modern conservation history. This law provided the legal instrument to establish protected areas in the country. Since then an impressive 23 protected areas, covering about 9% of Egypt's area, have been established. These protected areas include some of Egypt's most valuable natural assets, representing a well-diversified and representative network of sites. The Protected Area Network is the backbone of Egypt's conservation effort.

The National Biodiversity Conservation Strategy and Action Plan (NCS 1998), which was adopted by the Government of Egypt, established the priorities for conservation in Egypt, and has a stated objective of managing 15% of the country's territory within the framework of protected areas.

In addition to protected areas, Egypt's nature conservation efforts encompass a broad and ambitious spectrum of activities. These target priority issues that cannot be addressed within the framework of protected areas, such as resource utilization, harvesting of wildlife resources and public awareness.

The future agenda for nature conservation in Egypt is challenging in light of continued population growth and increased demands on the natural environment. The Protected Area Network in Egypt represents a wealth of opportunities for sustainable resource utilization. However, some unique components of the Protected Area Network are still lacking resources facilitate their proper management. Ecotourism is one of the most important and promising sustainable activities, which need strategic development. Local community participation is essential if conservation efforts are to be meaningful and long lasting. Finding new an innovative means and channels for benefiting local communities is a priority on our agenda. The establishment of robust management tools for sustainable resource utilization, such as hunting management is also high on our priority list.

The success of Egypt's conservation effort to date is the outcome of indigenous initiative and consorted effort, stimulated by international support and cooperation.

EGYPT'S NATIONAL OIL SPILL CONTINGENCY PLAN

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Egypt's coastal zone is an area of intense activity where interchange between physical, biological, social, cultural and economic processes is quite obvious. The petroleum industry, which is one of the major components of Egypt's National income, creates perceived or real threats to the environment, local fisheries, tourist development and the conservation of coastal resources, including coastal wetlands. More than 85% of Egypt's total oil and natural gas is produced from coastal waters and areas. Moreover, much of the world's trade in oil is centred in the Middle East, large quantities of this oil is transported in the shipping lanes bordering Egypt's coastline.

A National Oil Spill Contingency Plan (NOSCP) where prepared to establish the national framework for preparing for and responding to oil spills in Egyptian marine waters. The objective is to provide the basis for more efficient oil spill response operations under the overall authority of the Egyptian Environmental Affairs Agency (EEAA). It provides the legal basis for implementing the Government of Egypt's obligations under the Oil Pollution Preparedness, Response and Co-operation Convention, 1990 (OPRC). It also implements the Government's obligations under the regional Barcelona and Jeddah Conventions for the protection of the Mediterranean Sea & Red Sea respectively. NOSCP also implements, in part, EEAA's obligation to prepare an Environmental Disasters Contingency Plan, as required by article 25 of Law No. 4 of 1994.

BIOREGIONS AND THE NATURAL PROTECTED AREAS IN PUBLIC POLICIES FOR THE METROPOLITAN AREA IN OF BUENOS AIRES

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Latin America is the most urbanized region in the world. Mexico city and San Pablo are the most important urban conglomerations in the planet. The process of globalisation that began in the early 1990s takes primarily the main metropolitan areas where the foreign invertruents are direct, there are economic activities and new forms of residential settlement are produced. Within this tendency, a process of rapid urban expansion in the metropolitan area of Buenos Aires is observed, where motorway systems are developed and large enterprises, trade seats (mainly large markets) and residential locations of different kind are established. The bioregions, the natural protected areas and the open places are fragments of nature inside the megalocity, with a high potential for the public use, that is to say, for the recreation, sporting, interpretative, environmental education activities and for the protection of nature. A public metropolitan policy must be settled to balance the uncontrolled process of urbanization, with the purpose of saving our natural and cultural patrimony and guaranteeing the adequate growing and localization of the inhabitants in the metropolis.

ROLE OF NGOS IN THE ISLAMIC REPUBLIC OF IRAN

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The role of NGOs as voluntary humanitarian work is the key ingredient of civil society movements for promoting the objective of protecting our environment.ÊThe certain criteria are voluntary, non-profit, non-governmental and responsive to needs of communities or special disadvantaged groups.

Fortunately Iran participated actively and a large number of NGO representatives also attended and participated in national and international projects and meetings. Iran is also gradually opening the door of collaboration with international NGOs particularly in the field of environment. Therefore, the NGOs as the private sector must expand the scope of international collaboration with the international development communities. Actually the NGOs should be:

- Flexible
- Non bureaucratic
- Cooperative
- More economical
- Innovative

The most important issue of NGOs now adays is NGOs Data Bank that should be considered in order to promote and support the development of information systems.

INTRODUCTION TO IRAN'S PROTECTED AREAS AND EXISTING THREATS

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The paper has two main objectives first to introduce the protected areas of Iran and second to present the results of a survey that was carried out on the threats to these protected areas. The Iranian network of protected areas covers about 6.8% of the country's total land areas. These protected areas are distributed widely in various bioregions and thus support valuable biodiversity at Genetic, Species and Ecosystem levels. Some of the most threatened species of the world are found in the protected areas such as Asiatic Cheetah and Siberian Crane. Iranian Protected Areas are classified in four general categories namely, National Parks, Protected Areas, Wildlife Refuges, and Natural Heritage Sites each demanding different management strategies. A survey was conducted using prepared questionnaires that were filled at provincial levels for each protected areas. In these questionnaires the existing threats for each protected areas has been identified and finally Iranian protected areas ranked based on level of existing threats (i.e., overgrazing, wood-fuel consumption, illegal hunting, over-fishing, invasive species).

A NEW PLANNING APPROACH IN SITE SELECTION FOR LANDFILL: BODRUM AS A CASE STUDY

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The main causes of environmental problems within the context of globalisation are unplanned or mis planned activities and their adverse environmental impacts. These problems go beyond to the limits of sustainability.

On the other hand, existing land use-planning approaches are changed due to ongoing environmental problems and the globalisation process. In this paper a national approach is developed within the framework of changed planning approaches. At the first step, in national context, a zoning based on watershed boundaries should be made where site selection studies for landfill will be conducted later on. The next step, called "Strategy Development (SD) for Landfill Activities" intends to develop a vision (policies, targets, and scenario) related to landfill activities. The following subjects should be taken into consideration during SD:

- Related policies about protection and development demands which can limit the waste disposal activities
- Settlements to be served
- Existing and projected economic activities and their lifespan
- Transportation, accessibility and possible transfer station
- Produced waste composition and amount
- Waste projections to be produced
- Opportunities to evaluate (reuse, recycle and recover) the waste and the areas (quarries, existing clay material, etc.) to be used to dispose the waste.

Afterward, a Strategic Environmental Impact Assessment (SEA) should be employed for the produced policies. In accordance with the results of previously conducted SEA, a rational site selection study for landfill with alternative options should be intended through the analysis of natural and socio-cultural properties using a geographical information system (GIS) engine. As a result suitable areas for landfill should be determined alternatively. The further step of whole waste management scheme/plan that is recommended to cover whole action areas above is the feasibility study.

MONITORING OF RED SEA BIOLOGICAL RESOURCES, AND INDICATORS OF DEVELOPMENT PRESSURE

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The Egyptian Environmental Policy Program (EEPP) improves environmental management, specifically including protection of biological resources in the Red Sea region from Hurghada south to the border with Sudan. The EEPP Monitoring System is being designed to provide the participating Egyptian governmental agencies, the Egyptian Environmental Affairs Agency (EEAA), and the Tourist Development Authority (TDA), as well as the US Agency for International Development (USAID), with information needed to measure their progress on this and to help design better environmental protection and conservation programs for the future. Initial work in building the EEPP Monitoring System brought out the need for a program to systematically monitor conditions of biological resources in the Red Sea region. Such a program in turn is predicated upon a common, standardized, and exchangeable information base on Red Sea biological resources.

The principal purpose of this paper is to discuss a concept of monitoring that is adapted to the actual situation of the Red Sea and of conservation efforts. Such a situation is characterized by protection capacity still being developed and by the wide variation of conditions and human pressures from one location to another. A full-fledged comprehensive system for monitoring of biological resources will take a long time to be developed and implemented. Thus use of a monitoring approach that links the ecosystem quality to the scale of human intervention impact would better serve the immediate and pressing needs of both development decision-making and the limited capacity for environmental management.

This paper highlights the issue of availability, quality, and systematic compilation of Red Sea biological resource data and information whether for monitoring or other needs. Occasional and single-purpose surveys of Red Sea biological resources conducted by various concerned parties could still support the purpose of monitoring in a preliminary phase of system development and building if undertaken according to standardized methods and modes of data collection, processing, and presentation. Such standards imply the need for a coordinating entity.

Specific indicators of Pressure, State, and Response as well as indexes built of several discrete indicators are briefly discussed here. Indexes such as an "Index of Biological Integrity" could be constructed not only for coral reefs but also for wadis, salt marshes, mangroves, and other parts of the Red Sea ecosystem.

STRATEGIC ENVIRONMENTAL COMMUNICATIONS: ADVANCING SUSTAINABLE DEVELOPMENT THROUGH PUBLIC PARTICIPATION

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Strategic environmental communications advances environmental protection and sustainable development.through effective engagement of key public and stakeholder audiences to support positive environmental practices. This presentation will focus on how strategic environmental communications can, through advocacy, public participation and social marketing approaches, support environmental initiatives by creating greater public support and awareness of the issue(s); building support for the adoption of new environmental policies; strengthening the capacity of non-governmental and community-based organizations to manage natural resources; developing strategic partnerships for marketing and financial support; and supporting the adoption of environmental-friendly practices among targeted groups.

THE PROSPECTS AND CONSTRAINTS OF THE DEVELOPMENT OF A GREEN ZONE AROUND PROTECTED AREAS: TWO UNIQUE CASE STUDIES

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Historically, in South Africa, terrestrial protected areas were designated in an ad hoc process rather than as part of a deliberate conservation strategy. Protected areas have thus been and still are managed as islands rather than as part of any holistic land use plans. Past approaches on protected areas designation and management rarely considered those areas outside protected areas. Many of the protected areas in South Africa are small, often isolated from one another and separated by large areas of mostly transformed land. Gauteng province, being highly urbanized, is particularly characteristic of this trend. Since 95% of landscapes worldwide are estimated to have been changed, and no protected area or reserve is isolated from its surrounding environment. Habitat changes outside the reserve inevitably leads to changes in ecological processes within reserves. Many studies on fragment and patch dynamics have failed to result in concrete implement-able action plans. The reason for these are multifold and have direct consequences for Biodiversity conservation efforts. Therefore, since many reserves are not viable in the long term in terms of critical habitat size for fauna and flora, studies on buffers and corridors have received the necessary focus to provide information on the possible extension and networking of existing habitats on both private and public land.

This papers aims to open a dialogue on the constraints of policy development and strategic action plans regarding the establishment of green zones surrounding protected areas. Alice Glockner nature reserve, home to the endangered Heidelberg Copper Butterfly, is a unique case study for the prospects and constraints for establishing a buffer zone. Abe Bailey, an urban-cantered nature reserve serves as a pilot study for the establishment of an innovative green zone within the reserve. Provincial red data and ridges policies have buffer considerations as part of the environmental impact assessment regulations. The challenge in the development of policy for the establishment of buffers and corridors lies in the hands of Nature conservation bodies to receive the buy-in power from private land owners through the exploration of the concept of conservancies and other innovative methods as a possible way forward.

APPLICATION OF GIS TECHNIQUE IN LANDUSE PLANNING OF THE GULF OF AQABA AREA, USING TOPOGRAPHIC AND BATHYMETRY DATA

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The aim of the present study is the construction, classification, and interpretation of digital elevation images as well as digital bathymetry images of the Gulf of Aqaba region. The study area lies between longitudes 34° 10' E & 34° 50' E and latitudes 28° 10' N and 29° 10' N in the south-eastern part of Sinai, Egypt. GIS technique have been applied to define, delineate and plan for land use benefits, e.g. for selection the favourable locations of the dam sites, road map network, touristic areas, marinas – harbour locations and safe navigation courses, ...etc. Finally a basic priority map for land use is constructed as extraction and integration of GIS application techniques.

The original topographic and bathymetry data were obtained from the Geological survey of Egypt, and Geophysical Data Centre of US. Digital maps have been introduced as vector files, which were transformed to images. A new grid maps were constructed and sets of polynomials have been developed to describe the spatial mapping of data (vector file grid). The output vector files are converted to raster file images.

A slope map has been calculated from the digital elevation model to prepare the priority map for rods network. While the digital elevation model was classified in different classes to determine the suitable location for dams to mitigate its hazards and for accumulation of the rainfall for agriculture and domestic purposes, furthermore to delineate the suitable locations for harbours and marina for tourism and save navigation courses.

SHORELINE COMPONENTS ANALYSIS OF THE GULF OF AQABA, EGYPT, USING SATELLITE DATA

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The aim of this study is the analysis of the shoreline curvature to emphasize the causative events and sources. The study area is belonging to the Gulf of Aqaba Western shoreline. It lies between latitudes 27° 45' and 29° 30' N. Shore line impacts and reflects many morphological and structural events; due to oceanographic and meteorological elements e.g. sea waves, tides, winds, (of surface origin) and tectonic crustal elements, (of deep seated origin). These elements left their imprints on the shoreline curvatures. Most of these impacts come up from both kinds of sources. Sudden effects, of high and low peaks separated by large spatial domain spacing in between, characterize the events of deep sources. Whereas the events of surface and / or shallow sources are characterized by a cyclic shape, which is repeated with a small spatial domain spacing between events. Moreover the cyclic shapes of shallow events are due to sea wave action, while the curved shapes are the resultants of interaction between both of shallow and deep events.

Correlation between geomorphological elements and geophysical potential field data (gravity and magnetic) has been carried out to emphasize the following:

- If the source of the potential field anomalies is attributed to deep causative bodies that affected the shoreline delineation through tensional / compress ional tectonic forces.
- If the effect of the deep causative bodies is complicated by shallow element sources.
- If reasonably accepting the analogy between shoreline data and| potential data.

All the above-mentioned probable interpretations are explained.

ASSESSING THE STATE OF THE WORLD'S PROTECTED AREAS

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Since ancient times people have set aside areas of land for the protection of natural resources – sacred groves in the grounds of Indian temples, fishing reserves in the Pacific and forests preserved for royal hunting across Europe and Asia. In modern times, protected areas form part of each nation's strategy for dealing with the conservation and sustainable use of biodiversity and landscape. Protected areas vary considerably in their objectives, the extent to which they are integrated into the wider landscape, and the effectiveness with which they are managed, but they nonetheless provide powerful evidence of a nation's commitment to conservation and sustainable development. Many of these areas also contribute substantially to a nation's commitments under a variety of international agreements, including the Convention on Biologica Diversity, the Convention on Wetlands and the World Heritage Convention.

Over the next year the UNEP World Conservation Monitoring Centre is coordinating efforts to carry out a systematic assessment of the world's protected areas, working closely with the IUCN World Commission on Protected Areas and a consortium of other interested international organizations. This work is being carried out with the direct involvement of protected areas management agencies in each country. The work will result in a range of products, the two most important being:

The United Nations List of Protected Areas, a definitive list of protected areas meeting international criteria that has been periodically compiled under a UN mandate going back 40 years.

A State of the World's Parks report, which will provide an assessment of the status of the world's protected areas, and the ways in which national and international protected areas programmes act to conserve biological diversity and contribute to society

The timing of this work is significant because of the World Parks Congress, which takes place in South Africa in September 2003, and discussion on protected areas in the context of implementation of the Convention on Biological Diversity, which will take place in Malaysia in April 2004. The first is a meeting of protected areas professionals, who will be sharing experience and identifying priorities for the coming decade. The second is a meeting of governments, who will be seeking ways to efficiently use protected areas in ensuring conservation and sustainable use of biological diversity. In both cases discussion and decision taking will be more effective if participants are properly briefed on the current status of the worlds protected areas. The reports will also be a significant step in trying to harmonise reporting on protected areas in the context of international agreements.

As will be made clear in the presentation, this work is also an important step in the follow up to:

- The UN Millennium Development Goals, and in particular Goal 7 and the associated targets and indicators
- The Hague Ministerial Declaration of the Conference of the Parties to the Convention on Biological Diversity adopted at the sixth Conference of the Parties in April 2002
- The Plan of Implementation developed at the World Summit on Sustainable Development in September 2002

Abstracts

ECO-TOURISM: AN EVALUATION FOR NEW AND IN USE TOURISM RESOURCES ALONG THE RED SEA COAST FROM ECOLOGICAL PERSPECTIVE (HURGHADA-SAFAGA SECTOR)

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The Conflict between tourism and Nature conservation has long been the issue in newly developed countries like EGYPT, where the investment in touristic facilities sometimes is accompanied by damage to the natural resources. The coast of the Red Sea had suffered a lot of damage from this conflict till the law of environment (4/1994) came to light. By the enforcement of this law, and its consequences (EIA's, Monitoring, ...etc), development of the coastal areas have started to take a different approach or in another words a more environmental friendly approach. The current work is an attempt for studying the Red Sea coastal resources potential for Eco-tourism industry. The main goal is to summarize the idea of promoting the nature-based tourism, using some of the Red Sea special areas by allowing the establishment of special types of lodges, within the boarder of environmentally sensitive areas. The customers in this case will be a special type of tourist with special need for a special type of environmental setting. The work presented in this case is a first of a series of studies to be conducted in different sectors of the coast. The results of the study of Hurghada-Safaga sector indicated the presence of more than one area suitable for Eco-tourism practices. In addition, a complete analysis of the current situation was presented with some Environmental Management suggestions.

PLANT COMMUNITIES OF JAL AZ-ZOR NATIONAL PARK, KUWAIT

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In the Kuwait Jal Az-Zor National Park, northwest of Kuwait Bay, 139 of vascular pieces were identified (45 perennials and 94 annuals belong to 32 families with higher proportion of Saharo-Arabian elements and conglomerates of the Irano-Turanian, Mediterranean and Sudanian element). Five plant communities and 14 sub communities were described and recognized after application of TWINSPAN and DCA programs: *Stipa capensis-Haloxylon salicornicum, Plantago boissieri-Cyperus conglomeratus, Zygophyllum qatarense, Nitraria retusa-Zygophyllum qatarense* and *Bienertia cycloptera-Halocnemum strobilaceum* communities. Their ordination indicates soil moisture, salinity and physiographic gradients starting with the xerophytic communities (dry with low salinity and fertility) that inhabit the inland desert plain, non-saline depressions, and ridges, and ending with the hygrophilous halophytic species (with high salinity and fertility stands) that inhabit the salt marshes near the Arabian Gulf. Floristic composition, diversity indices and soil variables were used to determine the distribution of these plant communities in the habitats within the Park. The habitats of inland desert plain, non-saline depression and rocky ridges; and their plant communities had higher species richness, higher diversity and low dominance, other than the salt marshes and their plant communities.

COMMUNITY-BASED MANAGEMENT OF PROTECTED AREAS: THE ROLE OF EDUCATION AND COMMUNICATION

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The Concept of community-based management of protected areas emerged out of the conviction that sustainable management of protected areas can only be achieved when local communities are seen as partners in the development and conservation process. It recognizes the fact that, traditional knowledge and practices of local people were effective in conservation and sustainable use of biological diversity in many regions of the world.

Many questions were posed during the past decade: How can protected areas be managed to support both biological and cultural diversity? How can local people be provided with more o the benefits of conservation, therefore becoming supporters of the protected areas? How can protected areas contribute to local communities food security and sustainable livelihoods, this ensuring their support and commitment to conservation of bio-diversity?

It became evident that, effective community development programmers and building partnerships with local communities need to be part of the adopted strategy for management of protected areas.

Education and communication are crucial elements for motivating local communities to become active partners in the development and conservation process. Awareness raising, knowledge acquisition, attitude change, confidence building, participation in decision-making, and action, all require processes of education and communication.

The Role of Education:

Education, besides being a fundamental right, is recognized, as a basic element is every development process. Education, at all levels, from formal to non-formal, from basic education to higher education, is essential for the success of efforts to sustainable development.

The Role of Communication:

Communication can plan a crucial role in promoting human development, through stimulating people's awareness, participation and capabilities. With communication local communities become principal actors in conservation of bio-diversity and management of protected areas.

SOCIO ECONOMIC AND GENDER ANALYSIS AS AN APPROACH FOR DEVELOPMENT AND SUSTAINABILITY OF PROTECTED AREAS

Fatiha Bousalah

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One of the main conditions for Sustainable Protected AREas is the consideration of the human aspect. During the initiation of any program, project or policy, the first step is to investigate the role and relations between man and woman in the management of protected Areas.

In fact, the role of the population, both men and women is very important regarding the management ad the protection of the areas. It is known that Bedouin women are involved in resource management and actively contribute. They perform almost 80% of tasks relevant to the households living or surrounding the protected areas. These include: water carrying, fuel wood collecting, milk, and wool processing, care of small ruminants. They also play an important role in the conservation of nature resources and biodiversity, as they possess traditional knowledge and practices, which constitute a potential to be identified and valorized for the success of protected areas programs.

Therefore, their motivation and their commitment are essential for the success and the sustainability of programmes and projects. In this regard, the planners, programmers and projects formulators should be aware on the roles and relations between men ad women, in order to design programmes and projects relevant to their needs, potentialities and priorities.

FAO has prepared methodological tools included in the Socio-Economic and Gender Analysis (Seaga) Programme. The SEAGA Programme is based on the 3 following principles:

- Participation of all stakeholders is essential for sustainable development.
- Gender roles and relations are key of importance.
- And disadvantaged people are a priority in development initiatives.

MANAGEMENT OF PROTECTED AREAS TALILA RESERVE: A CASE STUDY IN THE SYRIAN STEPPE

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Talila is the First Reserve created specially for the purpose of biodiversity conservation. As such its development is a pioneering effort. It was therefore, important to give priority to learning as much as possible form experience gained else where in protected area developmentnt.

An important general consideration at the planning stage was that as a result of experience in many parts of the world it is now widely accepted the biodiversity cannot function as isolated inlands . This means that there is a need to develop and maintain relationships between the reserve and the people and institutions at all levels.

The project jaded by the Italian Government and jointly executed by FAO and the Syrian Directorate of Albadia therefore, aimed at rehabilitation of the rangelands around the reserve and development of the reserve itself through a community approach to integrate sustainable multiple use.

This paper discusses concept and experience of developing relationship at the local, national, regional and international levels in matching conversation consideration with community needs for successful and sustainable protected area Management.

PROTECTED AREA MANAGEMENT AND SUSTAINABLE RURAL DEVELOPMENT: CONFLICT OR HARMONY?

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Conflict and harmony are both potential outcomes of the interaction between protected area management (PAM) and Sustainable rural development (SRD)

Factors, which can be conducive to conflict, include:

- Rural Poverty: Can create a situation in which immediate needs for access to and consumption of natural resources understandably come to have a much higher priority than sustainable use or conservation.

- Population growth: The relationship between population and resource use is complex because it contains both a predicable linear element-every human being has known minimal resource requirements for survival and unpredictable non-linear elements.- increased material aspirations are limited only by imagination , and changes in livelihood strategy can significantly change patterns of resource use.

- Inadequate or inappropriate policies, laws and institutions: Can both promote perverse practices and inhibit actions to increase sustainability and equity

- Law capacity: At all levels from central government to rural people and local communities can result in an inability to anticipate and manage potential conflicts.

Ways of promoting harmony, in addition to addressing the above problems, include:

- Collaborative management: The purpose of this to promote the sustainability of protected areas by making them more socio-politically acceptable
- Valorizing ecosystem services: we managed protected areas can provide rural people with direct benefits such as clean and reliable water supply and control of both water and wind erosion, the value of which needs to be understood and appreciated by the beneficiaries.

〈 Provision of livelihood support: Allowing people to sustainable harvest resources such as timber for construction, fuel wood, thatching grass and medicinal plants is a way of providing direct support to their livelihoods.
〈 Ecotourism development: If this is economically feasible and appropriately organized it can provide economic benefits though employment, service provision, opportunities to market local produce and sharing of revenues from the tourism activities.

There is thus appreciable potential for harmonizing PAM and SRD. Realization of this potential required a sustained commitment to raising the awareness and building the capacity of all those who are involved in the interaction between PAM and SRD.

MORPHOMETRIC ANALYSIS OF GOEMORPHOLOGICAL CHARACTERISTIC AND INFLUENCE ON BIOLOGICAL DIVERSITY OF LAKE QARUN PROTECTORATE

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Lake Qarun occupies the deepest part of the Faiyum Depression, with its surface some 43 m below sea level and mean depth about 4.2 m. Lake Qarun is well known as a wetland of international importance for water birds. Qarun Protected Area is characterized by geological and geomorphological features. Many theories explain the origin of the lake, most of them advocate that it dates back to the middle Pleistocene and quaternary age. The North of Lake Qarun consists of different formations dating back to the Middle Eocene Age to the recent. Most deposits consist of Marl Limestone, Clay, Sandstone, and these formations contain fossils such as invertebrate fossils.

THE ROLE OF PROTECTED AREAS IN CONSERVATION FOR THE GEOLOGICAL PHNOMENA IN EGYPT

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The present study attempts to evaluate the role of the Nature Conservation Sector on conservation of the geological features and landscapes in difference geological eras.

As a result of the progressive expansion of urban activity, land reclamation, and quarrying processes that occurred during the last few decades, besides a general lack of environmental awareness, the ecosystems of the different areas have been disturbed. In 1983, Egypt issued Law No. 102, defining a natural protectorate as an area of land, or coastal or inland water, characterized by its flora, fauna and natural features as having cultural, scientific, touristic or aesthetic value. Five area of geological significance were declared as Protected Areas: Petrified forest, Hasana Dome, Wadi Sannur Cave, Wadi Degla, and the Bahariya White Desert.

CONSERVATION OF MARINE TURTLES IN EGYPT

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Sea Turtles are a group of shelled reptiles and belong to the order Testudines or Chelonia. Also included within this order are the terrapins and tortoises. Within the Chelonia there are 13 families, the eight species of modern Sea Turtles are found within 2 of these, the Ernmochelyidae and the Cheloniidae. The first Family has only one Sea Turtle, the Leatherback. The other seven species of sea Turtles are found in the other family- The Cheoniidae. Four of these species have been recorded from the Mediterranean & Red Sea Coast of Egypt (Loggerhead, Green, Leatherback and Hawksbill Turtle).

The Population of Sea Turtles is declining from year to year the main reasons are as follows:

Natural Threats:

- Biotic: Disease, Perdition at Sea, Perdition at Nesting Sites.
- A Biotic: Flooding, Driftwood, Seaweed, etc..

Man induced factors (Tourism & Exploitation)

- At Sea: Subsistence and commercial exploitation, Fishing, Pollution, Boat Collisions.
- Nesting Beaches: Sea Defenses, Quarrying/Mining, Pollution, Noise, Light, Roads and Illegal Building, Beach Obstacles, Food (eggs for eating), Sand Compaction, Dredging.

Any action plan for conservation of marine turtles should include:

- Protection of the population of marine turtles as a global endangered species.
- Protection of marine Turtles habitats including feeding, wintering and nesting areas
- Protection and management of the species and their habitats
- Scientific Research
- Public awareness and education
- Data Collections
- Information and training
- Development and implementation of legislation

RED SEA REEFS – FROM INVENTORIES TO SUSTAINABLE MANAGEMENT

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The first reefs ever studied in a scientific way are those of the Red Sea. Since the 18th century, primarily European researchers and – in successively increasing numbers – local scientists are disclosing the richness of the reef fauna and flora. With the advent of scuba diving and the possibility of in situ observations some 40 years ago, ecological interdependencies among species got into focus. Dynamics of reef communities, especially the population ecology of key species (corals and others), however, are still insufficiently known. Whereas it takes many decades and even centuries to form a „healthy" coral reef, the reverse development of such a highly specialised community may proceed abruptly; especially anthropogenic degradation is expanding and accelerating. Since some 20 years the remote and secluded Red Sea shores are attracting tourist divers and sun seekers in tremendously growing numbers. Direct and indirect effects of human interferences are mechanical destruction, siltation, and eutrophication – all deteriorating the state of the reefs.

Management of the reefs as natural resources with the aim to use them sustainably and preserve them for a long time may make use of 1) passive and 2) active measures.

Passive:

- Protection, i. e. control of access up to complete seclusion.

Active:

- Elimination of sources of pollution/disturbance,
- Formation of reef nuclei as stepping stones to repopulate devastated areas,
- Husbandry of corals for transplantation,
- Attracting tourist divers from sensitive natural reefs to artificial, alternative uw-biota.

The feasibility of framework formation as well as of coral husbandry and propagation has been proved at an experimental scale. However, before embarking on a specific underwater construction project, it is necessary to identify and take into account the parameters, which are typical of the site and characteristic of the region. This is the matter of seascape ecology – a discipline still to be established.

BEDOUIN HEALTH SUPPORT PROGRAM IN SOUTH SINAI PROTECTED AREAS

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The protected areas of the Sinai Peninsula are traditionally occupied by a Bedouin nomad population using the scarce natural resources. A Health Support Program was developed first in Saint Katherine and has now expanded to other protected areas (Taba, Abu Galum and Nabq) with two main objectives: first aid training and health education. The initial results of these activities show the potential of the cooperation between the National Parks of Egypt and the Bedouin for both the improvement of the health and the participatory approach for the sustainable use of natural resources.

PROPOSAL FOR THE DECLARATION OF THE STRAIT OF TIRAN AS A PARTICULARLY SENSITIVE SEA AREA (PSSA) UNDER THE LAW OF THE SEA CONVENTION.

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The Gulf of Aqaba and the Strait of Tiran are heavily used for international navigation and trade with the northern and the eastern countries of the Gulf (Jordan that has the only harbour, Israel, and the Kingdom of Saudi Arabia). The whole Egyptian Coast of the Gulf of Aqaba is declared as a marine protected area for its ecological, social and economic importance. The Egyptian coasts in front of the Strait of Tiran had suffered from oil and chemical pollution and ship grounding in the last three decades as a result of ship accidents. The rapid increase of tourism developments along the coast has been taken into account in the national environmental concern to protect the Gulf. Internationally the Egyptian Coast of the Gulf of Aqaba is a part of a special area that has been declared by the International Maritime Organization (IMO). The purpose of this paper is to justify the declaration of the Strait of Tiran as a Particularly Sensitive Sea Area (PSSA) under IMO for the safety, environmental and economic protection.

THE UNESCO MAN & BIOSPHERE (MAB) ARAB COMMITTEES NETWORK

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A majority of Countries have now signed the "Convention on Biodiversity". This convention explicitly recognizes that the conservation of biological diversity requires the development of strategies and action plans.

The notion of establishing an ArabMAB network was explored at the second regional meeting of Arab national committees that was held in Cairo in 1994. The Network was launched in Amman in 1997 through the Amman Declaration. It thus becomes the most recent Regional Network of the UNESCO-MAB Program.

In order for this network to function efficiently, a web site has been developed for the ArabMAB network in 1998 and since then it has been under continuous upgrade processes, to enhance the use of this network and incorporate regional biodiversity information to it.

The purpose of this paper is to demonstrate the Arab MAB functioning & Operation. The Arab MAP Website has been developed in a way that allows the online administration through a "back-end" program using log in name and a password fro each biosphere reserve in every Arab Country.

A Guideline booklet and a tutorial CD was produced which aimed at providing Arab countries, members in ArabMAB, and regular users of the ArabMAB Biodiversity database, with material needed to understand the structure of the electronic database on the ArabMAB website, to enhance their capacities to administer this data base on line.

ArabMAB represents a successful network that disseminate/Share information and experience via the highest communication technology. This effective tool is indispensable for establishing new biosphere reserves in Arab Countries and strengthening the existing ones are indispensable for conserving our biodiversity, and reaching a full up and running electronic Arab Biodiversity database of Biosphere Reserves.

BIOREMEDIATION OF PETROCHEMICAL CONTAMINATED SOILS USING THE NOVEL OIL AND CHEMICAL SORBENT SUPAZORB

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A substantial volume of hydrocarbon - based pollutants are currently being dealt with either by dumping on designated landfill sites, treating with "remediation" chemicals which are essentially surfactants mobilizing the pollutant to move down into the soil column, or simply left untreated. SupaZorb is a novel sorbent produced from a defined selection of plant detritus in an environmentally friendly manner. Its sorbent properties are comparable to those of peat, the current market leader, and it is successfully employed to clean up a range of chemical spills. Its sorbent properties are believed to be due to a combination of its highly porous ultrastructure together with surface properties, which enhance its affinity for hydrophobic substances. SupaZorb was shown to contain a diverse microbial flora, both bacterial and fungal. A number of the Ascomycetes, Basidiomycetes and Pseudomonads have demonstrated bioremediation potential. The porous nature of SupaZorb offers a large surface area for attached microbial growth and therefore enhanced metabolic activity combined with increased tolerance to adverse environmental factors. This broadens the possible application base for SupaZorb. The bacterial and fungal communities were characterized to study the bioremediation potential of both selected isolates and the entire community, both alone and in the presence of SupaZorb, and strategies for remediation of hydrocarbon-based pollutants in soil were refined as measured by quantitative analysis (hydrocarbon extraction) and by comparing GC profiles of the metabolic by products. Remediation rates of up to 4.5% per day were achieveable over a three-week period using a Basidiomycete and Ascomycete fungal combination.

RAS MOHAMMED NATIONAL PARK: AS AN EXAMPLE FOR ENVIRONMENTAL MANAGEMENT SYSTEM FOR PROTECTION AND CONSERVATION OF NATURAL RESOURCES

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Ras Mohammed National Park (RMNP) was declared in 1983 as the first National Park in Egypt, the total area of RM is 480 km^2, located at the most southern tip of South Sinai Peninsula. Because of its national and international importance from an environmental and socio-economic point of view, the Ministry of State for Environmental Affairs and Egyptian Environmental Affairs Agency through Nature Conservation Sector has established policies that effectively reduce damage to the Natural Resources. These resources include Marine Environmental elements; (coral reefs, fish populations, turtles and sea grasses...etc) and terrestrial Environmental elements; (plants, mangroves, birds, animals and landscape...etc). To maintain the Natural Resources on a sustainable basis various management measures have been identified to manage the area these include; habitat management, species management, usage regulation, access regulation, education and public awareness and research. RMNP has a yearly work plan that draws-up the fieldwork activities through the year. The role of RMNP staff (Rangers) is to safeguard habitats

and to minimize damage to the natural resources through day to day management tools such as: i) Monitoring program, ii) Public awareness programs, iii) Land and Sea patrolling, iv) Infrastructure services v) Fighting oil spills vi) Law enforcement.

ECO-TOURISM - GREEN CITY SHARM EL-SHEIKH

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The city of Sharm El Sheikh is rapidly growing in tourism, since it is a popular and famous tourist destination, and it is expected to have more increasing number of tourists over the coming years. At the same time there is a remarkable challenge to protect the beautiful but also fragile environment. The area, with its limited fresh water supply, pristine desert, and sensitive coral reefs, is exceptionally vulnerable. The question is how best we can keep the city of Sharm El Sheikh as a tourist attraction also in the future.

The focus of the paper is principally on aspects of designing standards, systems and solutions needed to address the environmental concerns in Sharm El Sheikh, and take this as a model for other cities in Egypt.

The objectives of the paper are highlighted as follow; first to present environmental knowledge and technology drawing upon the Norwegian experience in the field of e.g. marine pollution and oil spill in the sea, waste management and recycling and sustainable building and construction. Secondly to illuminate the concept of "Green City". Thirdly, to introduce an Action-Plan for addressing environmental challenges in the area of eco-tourism in the coming years. The ultimate objective of the paper is how best to have a practical working partnership between companies and authorities taking the research as a basis for implementing the action plan.

The paper will be presented in a workshop that is bringing together companies working in the field of eco-tourism, as well as researchers and experts in this field. The format of a workshop has been chosen to have a reflective conversation with the view to develop it into a platform for launching future actions.

WADI ALLAQI BIOSPHERE RESERVE IN SOUTH EAST DESERT, EGYPT

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Wadi Allaqi Biosphere Reserve comprises two ecosystems: desert wadi and arid ecotone on the shores of a man-made reservoir (Lake Nasser).

To carry out the complementary activities of conservation and use of natural resources, the Biosphere Reserve is organized into three interrelated zones: core area, the buffer zone and the transition area.

The two core areas and buffer zones of the reserve are located in the downstream and upstream parts of the Wadi, separated by approximately 150 km.

For the Wadi Allaqi Protected Area there are three fundamental objectives in the conservation management program. These are:

- To protect genetic resources;
- To sustain actual and potential national resources in the sense of conservation of traditional land use systems; and
- to analyse the effects upon these two of continuing environmental and human impacts associated with the formation of Lake Nasser.

The successful management of a protected area ultimately depends on the co-operation and support of local people. The most ecologically and, indeed economically sound method of encouraging development in the area is to build from 'below' within the framework of the existing Bedouin's economy. This implies incorporating the views, aspirations, potentials and accumulated knowledge of the Bedouin into any development strategy for the area. The combination of the 'formal' science and 'people's' science in formulating a sustainable strategy for economic development is central to success in ensuring that such physical environments do not become unnecessarily degraded.

WADDEN SEA PROJECT IN GUINEA- BISSAU: WATERBIRDS

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With a surface area of 36,125 km•, the Republic of Guinea-Bissau is a small West African country. It is bordered in the North by Senegal, in the East and South by Guinea-Conakry and in the West by the Atlantic Ocean. It comprises two parts. The continental part is cut by several rivers, and permanent lagoons (e.g.: Cufada Lagoon which is a Ramsar site) and temporary lagoons. The island part, including the Bijagos Archipelago, which is composed of 88 islands and islets of which 22 are inhabited, the others being uninhabited but farmed according to the seasons.

There are two types of wetlands in Guinea-Bissau: coastal wetlands (mainly occupied by mangroves) and continental wetlands (lakes and flats).

Bilateral cooperation between representatives of the Wadden Sea Project (Holland, Denmark and Germany) and those of the Republic of Guinea-Bissau, has made possible to integrate Wetlands International-Dakar in the co-management of the project. To that effect, a memorandum of understanding was signed between the two parties in 1994 and enforced in 1995.

The main objective is to conserve the Wadden Sea in Europe and tidal zones along the Guinea-Bissau coast, through initiatives aimed at preserving these areas, which are lmainly linked through migratory birds.

The project has defined the following as priority activities for Guinea-Bissau:

- Participating in the International Water bird Census (IWC) / African Water bird Census (AfWC);
- Identification of Important Bird Areas (IBA);
- Education and sensitisation of society in general;
- Creation of a ornithologists NGO;
- Setting up a reference library on national and international wetlands and ornithology;
- Training

The national team participated four times in the African- and International Water bird Census (with sites in Bijagos Archipelago – biosphere reserve and Cufada) and several times in the routine count. The species recorded are mostly migratory, except for a few sedentary ones, e.g.: Palm-nut Vulture (*Gypohierax angolensis*). Over 1,000,000 individuals of more than 100 species were recorded.

It is mentioned in the agreement that it will be necessary, parallel to the recommended activities, to train a team of national ornithologists. This team should be able to take over the research and monitoring activities for waders wintering in Guinea-Bissau and migrating from the Wadden Sea. This Non-Governmental Organisation, Organisation for Protection and Development of Wetlands in Guinea Bissau (ODZH), was created on July 23, 2002.

As concerns management training, a Guinean technician from Bissau was awarded a fellowship for a traineeship in Portugal. Eight other national executives were trained in Guinea-Bissau. Seven training courses were organized on water birds, wetlands in general, water bird migration, etc. In total 20 technicians followed one or more of these wetlands related training courses.

The national team and a consultant designated by Wetlands International carried out two missions at the country level, which resulted in the identification of 17 Important Bird Areas.

Notable progresses have been achieved in collecting and filing of literature on wetland aspects, in particular the avifauna. These activities are continuous and their relevance is recognised by the different partners who are the beneficiaries of the services provided. The library already exists.

An awareness-raising campaign was launched on February 2, 2001 in the Cufada Lagoons Nature Reserve, parallel to the celebration of World Wetlands Day. This campaign was chaired by the General Director for the Environment, in the presence of the Governor of the Region of Quinara (in the south of Guinea-Bissau). Twenty pupils from different secondary schools in the capital city, Bissau, were invited to participate in this campaign. Posters on wetlands and their ecosystems were presented. During the last wetland training course in Bubaque these actions were carried on with the participation of almost all Community Radio Directors in the country. It must be stressed that these directors are all members of ODZH. At present further financing of sensitisation activities relatively to the community radios is being sought.

The project will be completed in December of the current year, but the project activities will continue with the national team of ODZH.

A PROPOSAL OF A MACRO PLAN FOR SUSTAINABLE TOURISM: A CASE OF TURKEY

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Sustainable development has a crucial role especially for the less developed and developing countries for their progress. It is due to fact that when both the internal and external factors are not utilised optimally, in the long run, the development may have negative consequences conjunctural floats and changes than developed countries. Hence, the governments and other economic decisson- making institutions of the less developed countries should develop rational strategy should be allocating the national resoources, especially human resources, in such a way that the outcomes and added-value are maximised. This is an important strategy for a nation to ensure and develop their materialistic and non-materialistic resources.

In this study within the sustainability concept there are some macro proposals to be made for the developing countries' tourism strategy. The reason for choosing the tourism sector is it's minimal side effects for capital accumulation and hence resource supply. Choosing Turkey as a case study, will allow us to guide other Mediterranean countries. So it is hoped that this study will be a gateway for further empirical studies.

SUSTAINABLE AND UNSUSTAINABLE MANAGEMENT OF PROTECTED AREAS: STORIES FROM SUDAN

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As a positive response to the global tendency towards achieving environmental protection and mitigating the harmful effects of the ill-advised human activities on natural resources, many countries including Sudan, have created protected areas. These areas were basically meant for the protection of biodiversity and of natural and associated cultural resources using legal and other means to enforce the protection process. Traditionally such areas were "set aside" for the purposes of fauna and flora conservation, research and education, as well as touristic activities. It was later realized that the sustainability of such areas require more than the rule of law. It actually demands
the involvement of all stakeholders, especially those of the local communities in and around the protected areas.

In the Sudan, the Forest Service started to establish forest reserves in the mid-1920s, and was completely dependent on the enforcement of the law to keep "intruders" out of its reserves for more than fifty years. During that time the people viewed the forests as isolated government islands situated on lands they could have used for food production and/or other income generating activities. They therefore tended to break into the forests, remove and sell the stolen forest products whenever they could escape the eye of the armed forest guard.

As a consequence the tree cover dwindled from over 30% in the mid-fifties to less than 20% of the country area in the early nineties. When the notion of "forestry for the people" was introduced by FAO in the late seventies and the people's involvement in forest protection and management started to rise, the forestry stock improved and protection became easier and more cost effective. The case of reserved range areas is not much different.
Though important for the study of means of range improvement and enhancing range management techniques, the reserves were often encroached upon by both nomads and settled animals herders.
The situation completely changed when community based range reserves were introduced.

Protection was then more effective and the sustainability of those reserves was made possible. In the wildlife sector, 23 national parks, game reserves and game sanctuaries were established with a total area of approx. 12 million ha. Fencing and law enforcement for protection purposes for such a vast area proved too costly and most of these areas experienced marked losses in fauna and flora through tree felling, overgrazing and displacement by agriculture.

In general the failures of sustainability of protected areas are attributed to the lack of involvement of the different stakeholders, insufficient funds available for management, and the inadequate training of the staff in charge of these areas.

Abstracts

ECOTOURISM IN LIBYA: REALITY AND FEARS

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Libya is rich in environmental heritage, from the mountains that rise gradually from the coastal environment, to archaeological cities, and the oases, internal lakes and distinguished desert environment and protectorates.

However, tourist activity in Libya is relatively new. Increasing tourism creates extra pressure on those sensitive environments.

ECO-TOURISM WITHIN THE DESERT CULTURE LANDSCAPE

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The eastern desert of Egypt, with its unique and vulnerable arid ecosystems in one of the most arid deserts of the world constitutes ancient Cultural Landscapes formed and maintained by man through millennia. They extend from the desert and dry land mountain ecosystems in the land of the Sudanese Beja tribes northwards into the lands of the Bisharin, Ababda and the Maaz, and fades out approaching the Gulf of Suez.

The mountain chain is bordered on one side by the coastal desert strip along the Red Sea and by wide wadis that cross the desert towards the Nile on the other. Rainfall is extremely low but the mountain chain still captures airborne moisture and infrequent showers that are the basic requisite for a unique wadi vegetation, flora and fauna.

The desert is not barren but contains a high biological diversity. Primary production is based on life forms that are well adapted to prevailing climatic conditions. To them the desert is not dry but optimal. Ephemeral plants survive long dry periods as seeds. Their biodiversity is high and to large degree unknown. Trees and bushes that survive deeply rooted in permanent moist subsoil dominate the perennial vegetation. The regeneration and population dynamics of desert perennials are infrequent and their resilience is low. There are reasons to believe that the desert tree populations in parts of the Eastern Desert are extremely old and in practice impossible to replace if lost.

Abstracts

Although the desert seems desolate and uninhabitable, it is in fact the homeland of indigenous populations with ethnic and cultural roots in this desert since the dawn of history. Their nomadic lifestyle, based on animal husbandry, developed in this Cultural Landscape and maintained by cultural transmission until present, has proven its sustainability and must be protected in order to preserve the desert ecosystems with their unique biodiversity. The nomadic lifestyle is dependent on the perennial vegetation and their land use systems are adapted to protect this resource. After the infrequent showers however the desert becomes a paradise for desert dwellers and their animals.

Numerous ancient monuments bear witness to the pressure from the outside world that these cultures have sustained. Already during the ancient Pharonic Kingdoms the desert was the gateway to the east. During the Graeco-Roman period trade routes through the desert where established and furnished with watering stations (*hydreumata*) and fortified waystations (*praesidia*). This desert also contained resources that were precious to the outside word. Goldmines and quarries for monumental stone material from the Pharonic and Graeco-Roman Periods are part of this cultural landscape—features that are part of the cultural history of both tribal insiders and outsiders and that constitute elements in the mythical landscape of the desert. In the desert you footprints remain. The wheel tracks of Roman wagons still mark the gravel hillsides.
The desert cultural landscape with its unique ecosystems sustained the pressures of the past and the tribal cultures have survived until the present. But the desert is no longer safe from intruders. It has become an urgent task to preserve the cultural landscape and to plan for a sustainable development of its resources for its indigenous population. To prevent deterioration in the desert cultural landscape and its ecosystems requires however a better knowledge of desert ecology to and long-term dynamics of desert ecosystem than we possess today. The recognized lack of knowledge about desert ecology in general and about this particular cultural landscape in particular makes the ecosystems are more vulnerable to pressure. Without such knowledge it is also impossible to predict the effects of changes in land use.

The large-scale and accelerating growth of tourism along the Red Sea coast is impacting on its desert hinterland. The expansion of tourism along the coast, motorised transport, and modern industrial development pose serious treats to the desert ecosystems and the desert cultures. The desert dwellers are looking for their share in this development; and one of the few options open to them is to be guides for and safari tourists. Further development of mass tourism along the coast must be restricted, and the interior must be protected from further destruction. Maintaining traditional land use and animal husbandry is a prerequisite for conservation. Development of small-scale ecotourism in limited areas under the sole control of the local tribes might be a way to go.

If one could forge a link between the protection of desert culture, biodiversity and the preservation of the unique cultural landscape of the desert, including its vegetation and wildlife, the possibility to create a recognized role for desert dwellers as "landscape rangers" and to integrate this status and function into the formal structure of Egyptian administration, should be investigated.

THE COMPLEXITY AND IMPORTANCE OF CORAL REEFS: THEIR VALUE AND NEED FOR PROTECTION

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Coral reefs are among the most biodiverse ecosystems in the world, ranking equal to or above tropical rainforests. The immense number of plant and animal species there represent an invaluable natural resource for the country that possesses them. The reefs support fisheries of both demersal (bottom-dwelling) pelagic (open-water) fish. The complex three-dimensional structure of the reef provides protection for the many species that live there and refuge for larvae recruited from the water column. The corals living there build the reefs through their natural growth and the concomitant deposition of their calcium carbonate skeletons. Because of the geological history of the Indo-Pacific, coral reefs there have perhaps the highest frequency of organisms with novel compounds, many of which have tremendous pharmaceutical value. The beauty of coral reefs attracts divers and snorkelers from all over the world, supporting a valuable tourism and ecotourism business. Coral reefs attract both commercial fishing vessels and recreational fishermen, both groups of which support the government revenue system through their fees and taxes, and which supply protein-rich food to the people of their own country and other countries. The reef structures themselves provide a physical barrier from storm waves and seismic waves, protecting the towns, agricultural areas, and the people associated with them. Thus, there are many users of coral reefs.

These stakeholders include commercial fishermen, recreational fishermen, charter fishing companies, divers, diving companies, hotels, restaurants, scientists, pharmaceutical companies, etc. Most users would prefer to be the sole users of such a resource. It is critical, however, to protect them, so that they continue to be not only a natural heritage of their country, but also a continuing source of revenue. Such protection has been achieved by designating different reefs for different uses, ranging from "no-touch" reefs through "open" ones. Models for multiple use have been successfully implemented on the Great Barrier Reef, Australia and the Florida Reef Tract, US. Egypt is perfectly positioned to learn from these models and, with broad consultation between its government agencies and its people, design its own unique, effective, and productive Coral Reef Marine Protectorate in the Red Sea.

INVASIVE MACROALGAE IN CORAL REEF ECOSYSTEMS: A SYMPTOM OF ANTHROPOGENIC GLOBAL ENVIRONMENTAL CHANGE

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Human induced ecosystem alteration is a recognized precursor to introductions of non-indigenous species, which results in the contamination of gene pools of native species, reduction of biodiversity, and overall degradation of ecosystem function. Destabilized coastal ecosystems receiving excessive pollution and introductions from ballast water and introductions from the aquarium trade have been particularly affected by non-indigenous species. Proliferation of non-indigenous macro algae (or "seaweeds") is a widely reported and global problem leading to the demise of coastal habitats, including coral reefs. Reefs receiving slight increases of primary limiting nutrients (e.g. nitrogen and phosphorus) may provide conditions for "blooms" of macro algae that may be unpalatable to herbivorous fish and invertebrates. Examples include the proliferation of several species of nitrogen-demanding Rhodophytes in Hawaii whose productivity may exceed removal rates by herbivores. Chemically-defended *Caulerpa* spp., including a Pacific species *Caulerpa brachypus*, now dominate coral reefs on the south-eastern coast of Florida. The biogeochemically-altered Mediterranean Sea and its suite of macro algal invaders may be a potential threat to Red Sea Protectorate reefs affected by excessive development. In particular, shipping interests in the Suez may be a potential source non-indigenous macro algae from the tropical Indian and Pacific oceans, as well as from the Mediterranean Sea.

THE ECOSYSTEM APPROACH FOR SUSTAINABLE DEVELOPMENT: GULF OF AQABA AND THE RED SEA EGYPT

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Natural resource management is often described based upon flora, fauna, physical surroundings and impacts inherent in their interactions. Ecosystem planning and management however, includes people, economics, and land-use policies. This paper discusses ecosystem management on the land and water subsystems of the Egyptian coast. Boundaries of the coastal zone and cultural heritage are considered in maintaining sustainable communities in human, physical, and biological dimensions. Observations of ecosystems from a survey of lands and cities from Marsa Alam, Hurghada and Sharm el Sheikh in 2001 are reported and recommendations made. These recommendations include 1) to use the drainage basin of each wadi as a planning unit; 2) to encourage phased and flexible land uses rather than coastal strip development; 3) to maintain access to the shoreline for traditional uses; and 4) to maintain a natural and cultural identity for the protected areas and tourism development.

BIODIVERSITY AND ECOLOGY OF CRUSTACEAN FAUNA IN THE MANGAL ECOSYSTEMS ALONG THE NORTH- WESTERN RED SEA COAST OF EGYPT

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Fourteen mangal ecosystems were surveyed along 600 km of the north- western coast of the Red Sea, from Al-Humierah swamp in the south to Myos Hormos Bay or Al-Gona in the north. All mangrove sites were mono-specific, composed of *Avicennia marina* (Forsskål) Vierh trees and shrubs. They varied greatly in topography, structures, and general shapes, with a remarkable increase in swampy areas and a slight increase in tree height southwards. These swamps are unique to Egypt, and often threatened by human activities, camel and sheep grazing as well as uncontrolled tourist activities.

These mangrove sites a harboured 80 crustacean species dominated by brachyuran crabs (43 species, belonging 10 families. The most frequent families were Portunidae, Xanthidae, Ocypodidae and Grapsidae. The anomurans (hermit crabs) comprised 15 species in 4 families, dominated by members the Diogenidae (7 species). Cirripedia (barnacles and lepas) and Caridea (snapping shrimps) comprised 7 and 4 species respectively. The other crustacean groups included, Penaeidea (prawns and shrimps), Amphipoda, Astacura (mud lobsters), Stomatopoda (mantis shrimps), Isopoda and Palinura (lobsters) and were represented by only a few species and individuals. Out of the recorded species 11 were frequent, 14 common and the remaining (55) were rare. *Metopograpsus thukuhar, Utica barbimana, Helice leachii, Callianassa bouvieri* and *Ubogebia rhadames* were specific and recorded only from mangroves.

The diversity indices of crustacean species was high and varied greatly among sites, highest value at Abu Minqar and lowest at Qura'at El- Hertway. The number of recorded species varied between 53 species (South Safaga) to 8 (Marsa Shagra'a).

During this study, *Dotilla sulcata, Macrophthalmus depressus* and *Uca inversa* were the most frequent species, with densities of 432 ± 101, 176± 28, and 64 ± 8 individuals /m^2 respectively. *Balanus amphitrite* was also frequent, with 4.9 ± 1.0 individuals /respiratory root of the mangrove trees. Seasonal variations and site differences were observed in population densities, and there was a general trend of an increase in the number of species northwards.

BIRD RINGING IN EGYPT

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Bird migration attracted people from early. Bird migration is a conspicuous event, and the inhabitant of certain areas started to ask where do the birds go? Where do the birds come from? At different times of the year.

Bird migration can be defined simply as bird movement from one place to another during certain times of the year, repeated annually. Birds show impressive variety of migration patterns and strategies, passerines for examples can be generally classified according to their migration patterns, to long distance migrants, short distance migrants, and dispersal migrants.

There are several methods used for bird migration studies, which are direct observation, acoustic registration and radar.

SUSTAINABLE TOURISM DEVELOPMENT IN THE NATIONAL MARINE PARK OF ZAKYNTHOS (GREECE): DEVELOPING NEW ACTIVITIES COMPATIBLE WITH THE AIMS OF NATURE CONSERVATION.

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The National Marine Park of Zakynthos (NMPZ) is a recently established marine park (1999) situated at the southern most part of the island of Zakynthos (Greece). The Marine Park's objectives are to preserve the natural environment and conserve the ecological balance of the marine and coastal area of Laganas' bay and Strophadia islands. Within the Marine Park is the most important loggerhead sea turtle *Caretta caretta* nesting rookery in the Mediterranean, a habitat essential for protection. Simultaneously, the Park aims at developing economic activities compatible with the principles of integrated management and sustainable development. The mass tourism developed in the two last decade in Zakynthos is obviously in conflict with the primary aims of the NMPZ. In order to lessen the impacts of tourism development on the natural environment, the management agency of the NMPZ undertook actions based on a close partnership with tourism entrepreneurs and all stakeholders involved in this activity. The final objective is to reverse and redirect the development process on the island, thus creating new comparative advantage for Zakynthos as a tourism destination.

MARINE ENVIRONMENT PROTECTION IN SHARM EL-SHEIKH

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This paper concentrates on using GIS & Remote Sensing of two different marine ecosystems (coral reef and mangrove forests), detecting change in a decade as well as the human impacts on those ecosystems. Eventually a number of suggestions and contributions are made to save those considered treasures.

Marine ecosystems are a number of marine species living interactively within the same environmental constraints. Marine ecosystems found in Sharm El-Sheikh area are:
Coral Reef, Mangrove Forests, Sea Grasses, Salt Marches.

Because of the increasing of the environmental awareness and the importance of environment protection from human influence, consider two important marine ecosystems, the coral reef and mangrove forests.
Any damage of these ecosystems affect the marine creatures and the ecology system and as well as the humans.

After detecting change in coral reef and mangrove forests, it's noted that a deterioration of coral and mangrove happens in some parts. This degradation is mainly caused by human impact. Nevertheless there are also natural influences as well.

The Question is how we can generate a system to manage the tourist & human activities to support decision-maker to protect the marine environment in the one of most important national parks in Egypt.

HOW PROTECTED AREAS CONTRIBUTE TO SUSTAINABLE DEVELOPMENT

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Protected areas are an essential element of the strategies that modern societies use to ensure that natural resources are used sustainably, and that biodiversity is conserved for present and future generations. Protected areas provide a wide range of economic, social, cultural, recreational, scientific, and spiritual values, generating very considerable economic benefits, ranging from tourism development to carbon sequestration to watershed protection. For example, many protected areas generate direct revenues from tourism that far exceed the management budget. The economic benefits from watershed protection often are even greater, though the means of capturing such benefits by protected areas remain elusive. Many means are available for managing protected areas in order to provide substantial benefits to the people living in and around protected areas. Providing sustainable development to these communities may require more effective controls to ensure that population of plants and animals are maintained at provide levels.

This paper advocates using a wide ranger of protected areas categories managed as system that involves national, provisional, and local governments; NGOs; local communities and indigenous people; the private sector; research; and other stockholder. The protected areas also need to be seen as part of a larger regional landscape, which includes a surrounding buffer zone designed to provide benefits to local people, often through voluntary cooperative agreement established with local stockholders. This paper suggests seven major options for action designed to facilitate border cooperation in support of the sustainable development benefits of protected areas. These include: building a strong economic foundation for the protected areas system; designed robust protected area institution; provide incentives to encourage the private commercial sector to contribute to protected areas; promote stronger linkages between biotechnology and protected areas; strengthen research and about protected areas; seek new approach to involve local communities in protected area management; and ensure that the national legislation supports the evolvement civil society in protected area management.

THE CHUMBE ISLAND CORAL PARK CASE STUDY

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Chumbe Island Coral Park (CHICOP) in Zanzibar, was established in 1991 as the first fully functioning Marine Protected Area (MPA) in Tanzania, and the only privately created and managed MPA in the world. The project was developed along the lines of a commercial enterprise, using ecotourism as the revenue generating component of the project with all profits from the tourism operations going into conservation management & education programmes for local schoolchildren.

Eco-tourism, as the commercial arm of the project, is closely managed, with a maximum of 14 guests allowed on the island at any one time, and accommodation is provided in specialised eco-banda's unrivalled in the world of eco-construction (with solar electricity, rainwater catchment systems, grey-water recycling through filtration irrigation and composting toilets). All employment on the island is targeted at the neighbouring fishing communities, which promotes awareness raising at all levels and empowers the local Zanzibari community to feel committed towards the preservation of their natural heritage. The island is managed by rangers who were former fishermen from neighbouring communities. These rangers play a key role in teaching fellow fishermen of the importance of Chumbe as a protected area. With the pristine Chumbe reef based upstream from the major fisheries areas of the West Zanzibar coast, Chumbe is a vital fish nursery that continues to replenish the exploited resources of the fisheries eco-system around Zanzibar. In this way anti-poaching tactics rely on education and awareness rising in the local communities and has proved immensely successful as a unique approach to MPA management in the region.

Two thirds of the investment of the project came from a single independent founder (investor) with donor support helping to set up the remaining project components. However, Chumbe receives no financial support for operations from either government or donor agencies. Independent financial sustainability is a key component of the project. In the East African Region, conservation and rural education programmes, where present, are dominated by donor and aid related associations. Often these politically entangled arrangements lend support to inappropriate spending and ineffectual cost management. Though the project is not-for-profit, through the use of commercial oriented principles more closely associated with the Private Sector the costs of managing the non-commercial components of the Chumbe MPA are only a fraction of what is normally needed for comparable donor-funded projects through government agencies in this region. As a unique and experimental project many challenges have been countered in the establishment of this MPA and ecotourism enterprise, and the lessons learned provide an invaluable insight into the best approach to duplicating this style of project in other regions.

In an area where the economy is now heavily dependent on the income from tourism, Chumbe is a blue print for both conservation area management and environmentally friendly tourism management. It is a leading case study exemplifying that it is possible to have Conservation, Education and ecotourism working in harmony.

HERPETOFAUNA OF EL OMAYED AND EL BURULLUS PROTECTED AREA, EGYPT

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The herpetofanal survey of El Omayed and El Burullus Protected Areas contains 39 species. Four amphibian species and 35 species of reptiles were recorded, belonging to 30 genera and 12 families in the two areas. In El Omayed 30 species (one amphibian species and 29 reptilian species) were recorded belonging to 25 genera and 11 families. From reptiles, 18 species of lizards, 9 species of snakes and 2 species Testudinidae. In El Burullus, 18 species were recorded, belonging to 15 genera and 9 families. Three amphibian species and 14 species of reptiles. From reptiles 9 species of lizards, 4 species of snakes and one species of Testudinidae. No endemic species were found in both areas. *Acanthodactylus schreiberi* Boulenger, 1878, which was collected from El Burullus was added to the herpetofauna of Egypt for first time. Threats to the populations of herpetofauna of the study area and conservatory recommendation are discussed.

MAXIMIZING BENEFITS FROM PROTECTED AREA MANAGEMENT

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Few protected areas are managed in a way that maximizes their potential long-term benefits. Many are thus operating inefficiently and on an unsustainable basis. This paper outlines some key concepts and approaches essential to help maximize potential protected area benefits and revenue raising opportunities. It stresses the need for an environmental, economic, social and business management theory. In particular, the paper links various concepts relating to biology (e.g. carrying capacity and impact assessment); environmental economics (e.g. environmental valuation and market-Based instrument); sociology and socio-economics (e.g. stakeholder analysis and community participation); operations management (e.g. marketing mix and corporate social responsibility); modelling (e.g. demand analysis); and organizational behaviour (e.g. individual, group and organizational psychology and structures). Only by drawing upon all these disciplines will protected area management become truly sustainable.
James Spurgeon has over ten years experience as a consultant specializing in environmental valuation, environmental impact assessment and financing mechanisms for coastal and freshwater resources. He has an MSC in Tropical Coastal Management, where he specialized in environmental valuation, and is time currently studying part-time for a Master in Business Administration, focusing on environmental applications.

MARICULTURE AND WILDLIFE INTERACTIONS

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Mariculture interacts with wildlife, it utilizes resources and causes environmental changes. Some of the mariculture interactions are negative; these may include conversion of wetland habitat, nutrient and waste discharge, introduction of exotic species, chemical usage and deterioration of water quality, spread of disease and genetic problems. There is also evidence indicating that a great many bird's and mammals are killed on farms, either intentionally or by accident. Mariculture facilities (cages, rafts, stores) and high densities of fish and feed at fish farms may act as attractants to scavenging and predatory species while it can disturb sensitive species. On the other hand, many of the mariculture interactions on wildlife are beneficial. Mariculture is being promoted for its potential to compensate for the decline in natural fisheries. Stocking and release of hatchery-reared organisms into inland and coastal waters support pet trade, fisheries and wildlife conservation. Examples include shrimp larvae release, sea cucumber, giant clams, lobsters, corals and mangrove transplantation. Experimental trials and pilot projects that can be applied at the Egyptian Red Sea coast are discussed.

ENVIRONMENTAL AND BACTERIOLOGICAL STUDIES ON THE GULF OF AQABA COASTAL WATERS, EGYPT, DURING 2001

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Aqaba Gulf is considered as a unique ecosystem with highly diversified marine life including corals. It has a great value for recreational, environmental and scientific interests. Because the recreational areas are increasing rapidly in several sites in the region, therefore a proper environmental management was highly desired. Accordingly, the Environmental Information and Monitoring Program (EIMP) for Egypt was initiated to define the state of Aqaba Gulf coastal Regions, due to their importance for the tourism and consequently national income. Within the framework of EIMP, five field trips were performed during January, March, May, July and September 2001, respectively. A total of 11 stations along the Aqaba Gulf from Taba in the north to Sharm El Sheik in the south were selected to represent different locations including national parks. Visual observations (Tar balls, oil, Faeces, sewage, general and harmful litters and seaweeds), hydrographical conditions (water temperature, salinity, dissolved oxygen and pH), Eutrophication parameters (chlorophyll-a, total suspended matter, transparency, nitrogen, phosphorus and reactive silicate) and bacteriological parameters (total coliform, faecal coliform and faecal streptococci) were investigated. They indicated that: 1- The presence of variable quantities of thin oil films, general and/or harmful litters and seaweeds at few beach zones of the Gulf. 2- The effect of human impact on different hydrographical conditions were still insignificant. 3- The levels of TSM, Chl-a, different nitrogen and phosphorus forms and reactive silicate were quite low. The phytoplankton primary production was potentially phosphorus limited. Aqaba Gulf coastal waters can be classified into oligotrophic state. 4- From the bacteriological point of view, few locations showed high counts of bacteria exceeding the acceptable levels of the current standards in at least one or more sampling campaigns for the presence of one or more indicator bacteria.

RAS MOHAMMED NATIONAL PARK AS AN IMPORTANT BIRD AREA

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South Sinai, Egypt.

Ras Mohammed National Park is a headland at the southern most tip of the Sinai Peninsula, overlooking the juncture of the Gulf of Suez and Gulf of Aqaba. Sinai serves as a land bridge for those migrating birds, which do not cross Mediterranean and Red Sea in a wide front. During autumn migrations these birds have to choose between passage over land - curving the route towards northern end of Gulf of Suez, or continuing towards South Sinai and facing the Red Sea waters. The general strategy for every species involved has been settled long time ago, but tactics can vary. As it can be expected large soaring birds prefer to choose "northern route" along the town of Suez, thus escaping crossing the gulf. But not all of them. Some are adapted to sea crossing.

The White Storks do not pass at town of Suez, as do not many Black Kites, Honey Buzzards and Levant Sparrowhawks. At least these species (from category of soaring birds, which are mentioned as examples), can be expected to enter South Sinai on autumn passage. The other soaring birds, even more passive fliers from "northern route", enter the area only accidentally, forced by unusual weather conditions or being unable to follow event. Of course, there is many other bird species, which do migrate through South Sinai. These are all broad front migrants - firstly, waders and passerines. Also their occurrence at coastal flats and in wadis is closely related to bottleneck effect of South Sinai.

As the result of the studying the migration pattern of the white storks, the following Behaviour was obtained Morning take off from roosting sites occurred between 9:00 - 9:50). After take off start thermaling and usually drifting N-NE-E from Suez side flats. This can be a drift caused by SW-W winds and/or search for thermals inland. In conditions of eastern winds thermaling usually occurred right over Ras Mohammed peninsula, and gulf crossing can be started from there. Crossing storks gained height right over there, creating large streams along curve - Hidden Bay - Ras Attar - Marsa Bareika. During comparatively strong SW-W winds storks hesitate in prolonged thermaling, obviously looking for circumstances to start crossing. Usually, however, in such conditions flocks finally move NW or N, or landing Suez side beach. The peak of the migration inside Ras Mohammed is between 15- Augusts to 30 - August according to the observations and data collected through the past four years (1998 - 2001).

TEMA FOUNDATION (TURKISH FOUNDATION FOR COMBATING SOIL EROSION, FOR REFORESTATION AND THE PROTECTION OF NATURAL HABITATS)

Gkigit

TEMA Foundation, Turkey

One of TEMA 's most important projects, also chosen as one of the best practices of Turkey's National report for Johannesburg World Summit on Sustainable Development in "TEMA-MACAHEL RURAL DEVELOPMENT PROJECT FOR THE CONSERVATION OF NATURAL HERITAGE" . The project, also chosen as one of the 32 finalists at the World Summit Business Awards for Sustainable Development Partnerships organized by International Chamber of Commerce (ICC) and United Nations Environment Programme (UNEP), aims to enable the low-income population of the region to secure an income from bee-keeping and nature tourism, while protecting, rather than damaging the nature.

التنمية المحلية فى محمية العميد الطبيعية

ماجدة غنيم
مستشار

قطاع حماية الطبيعة
جهاز شئون البيئة

تقع محمية العميد فى محافظة مطروح على امتداد الساحل الشمالى من الكيلو ٧٠ حتى الكيلو ١٠٠ على الطريق الساحلى إسكندرية/مطروح . و تبلغ مساحتها حوالى ٧٠٠كم. وتتعرض المحمية لمجموعة م المخاطر والمشاكل البيئية الناشئة عن الأنشطة التى تمرس بالمنطقة أهمها تحويل مساحات المراعى الطبيعية إلى الإنتاج الزراعى ،و الرعى الجائر، ومخلفات الصرف الصحى و التحطيب الجائر الناشئ عن استخدام النباتات الصحراوية كوقود منزلى و صيد الحيوانات والطيور البرية.

المجتمع المحلى بالعميد

تشمل المحمية ٤ قرى رئيسية (وحدات محلية) هى :العميد، و ساحل العميد، والشمامة، وأولاد جبريل ويبلغ تعداد السكان حوالى عشرة آلاف نسمة. و يتمثل النشاط الاقتصادى بالدرجة الأولى فى رعى الأغنام وزراعة أشجار التين و الزيتون إلى جانب زراعة بعض المحاصيل التقليدية فى نطاق ضيق.
ويعانى السكان من مشاكل عديدة أهمها : عدم توفر البنية الأساسية بشكل كاف ، و نقص الخدمات الصحية والتعليمية والترفيهية والثقافية وانخفاض مستوى المتوفر منها ، وانخفاض مستوى الدخل و محدودية مصادره ، وانتشار البطالة، وانخفاض المستوى التعليمى و الثقافى ،وعدم تقنين أوضاع حيازة الأراضى والمنازل، واستخدام أراضى المحمية فى التخلص من المخلفات الصلبة والصرف الصحى الخاصين بالقرى السياحية.
توجهات مشروع صون الأراضى الرطبة فى مجال التنمية المحلية فى قرى المحمية:يستهدف الشق التنموى للمشروع التوفيق بين الإنسان والبيئة فى منطقة المحمية ، أى التوفيق بين أهداف وأنشطة السكان المحليين وأهداف وأنشطة المشروع، بحيث تصبح التأثيرات المتبادلة بين الجانبين فى مجملها إيجابية، وتنحصر التأثيرات السلبية فى حدودها الدنيا.

مبادئ العمل التنموى فى المحمية: يقوم العمل التنموى فى المجتمع المحلى على مبادئ : الاستدامة ، المشاركة ، المساعدة الذاتية، التكامل ، دمج المرأة ، تقديم النموذج.
محاور الأنشطة: التعليم ورفع الوعى البيئى: من خلال تطوير العمليات التعليمية الرسمية، وفتح قنوات تعليمية غير رسمية ، ودمج المعلومات البيئية فى المجالين، إلى جانب برامج التوعية البيئية الموجهة لفئات محددة.
توليد الدخل: من خلال المساعدة فى حل مشاكل الرى، والبطالة ، وتدعيم الصناعات اليدوية التقليدية، وتوزيع شتلات الأشجار، وتنظيم الرعى، والدعم الفنى للعمليات الإنتاجية والتسويقية.
تحسين الظروف البيئية: من خلال التعاون مع الأهالى والهيئات المعنية على حل المشاكل البيئية المتراكمة، وأهمها تراكم القمامة ومشاكل الصرف الصحى.
تدعيم العمل المؤسسى والجهود الذاتية: من خلال تشجيع الأهالى على تنظيم أنفسهم فى جمعيات غير حكومية ، وتقديم الدعم الفنى والمؤسسى لهم بهذا الشأن، وتنشيط دور المنظمات القائمة حكومية وغير حكومية، وتحقيق التفاعل بينها وبين الأهالى، وتنظيم الأنشطة القائمة على الجهود الذاتية.آلية العمل التنموى:
تقوم أنشطة التنمية المحلية فى العميد على أساس العمل من القاعدة للقمة ، بمعنى تحديد الاحتياجات والمشاكل ومقترحات الأنشطة وأولوياتها مع الأهالى أولا ثم التحرك لأعلى على عدة محاور:
محور إدارة المشروع
محور الإدارة المحلية
محور الهيئات الحكومية المركزية
محور المنظمات التنموية المحلية والدولية

لمشروعات السياحة البيئية (نموذج التنمية المتكاملة و المستدامه) في تخطيط و تصميم مشاريع التنمية المستدامه

عبد الرحمن المنياوي
شركة مصر تيران للسياحة البيئية

المقدمة و التعاريف :-

لقد فرضت الطبيعة على كل موقع منظومة بيئية متزنة و لابد ان يكون احدى محددات مشاريع التنمية المستدامه هو الحفاظ على التنوع البيولوجي و الحضاري الذي يختص به الموقع بل و تدعيمه والاهتمام بالبيئة المحيطة بالموقع و مراعاة و احترام الطراز المعماري المحلي في التصميم و التخطيط العمراني .

١- استيفاء احتياجات الطاقة عبر تصميم شبكات تعمل بصورة ايجابية و باستخدام الطاقة من المصادر المتجددة
٢- استخدام المواد الحساسة التي تراعي الشروط البيئية كلما امكن ذلك .
٣- اتباع اساليب انشائية تتوفر لها عناصر الاستدامة و الاستمرارية .
٤- تتوفر لها شبكات خدمة دائمة لتوفير المياه و خدمات الصرف الصحي و المجاري .
٥- تعليم و تدريب العاملين و السائحين و اعلامهم بالقضايا البيئية و الحضارية المحلية .
٦- تعيين العاملين و الموظفين من اعضاء المجتمع المحلي المحيط للعمل بها و اشراكهم في مراحل التخطيط و التشغيل .
٧- الاسهام في الحفاظ على الموارد الطبيعية و البيئية الحضارية بتوفير برامج التدريب و اجراء الدراسات اللازمة .

و يجب ان نضع في الاعتبار بان القيام بعملية البناء في حد ذاتها ايا كان طراز البناء فسوف يكون لذلك تأثير على الارض لذا فان الهدف هو السعي للحد من اية اثار سلبية محتملة .

١- التخطيط و التصميم :-

أ) الاطار الطبيعي :-

يعتبر المشروع القائم من اكبر المشاريع في مصر مساحة و هو الضمان حتى يتسنى للمفكرين و المصممين المتضامين مع النظم البيئية ان يعملوا ويبدؤا على مساحة تفوق واحد مليون متر مربع و ذلك في اطار نظم التنمية المتكاملة و المستدامه و هو ملاصق للمنطقة العازلة لمحمية نبق الطبيعية و بطول ٢ كم و يطل على ساحل خليج العقبة .

ويتميز الموقع بسلسلة من الجبال الطبيعية و السهول الصحراوية الملاصقة لساحل عظيم و هو خليج العقبة ، و نظراً لتوافر الاحجار الطبيعية و المصرح باستخدامها في اطار الاتزان البيئي فقد غلبت على منشأت المشروع كاملة الاحجار المحلية مع استخدام مونه طبيعية من الرمال و المثبتات الطبيعية و المياه علاوه على الاخشاب و النخيل و الاقمشة و الحبال .

كذلك تم ادخال المنشأت الخشبية المجففة نظراً لعدم تأثيرها على البيئة المحيطة و كذلك امكانية تدويرها و اعادة البناء بها و هو الاسلوب السائد في معظم المناطق الساحلية في جمهورية مصر العربية تاريخياً مع اسلوب جديد في تجميع المفردات المعمارية ليتلائم مع الروح المتدرجة للجبال كذلك احترام المناسيب الطبيعية و البنا عليها كما هي ، و كذلك تم تقليص استخدام الزجاج الى ادنى درجة لاتتجاوز ١٠٪ من المشاريع القائمة .

ب) الاطار الحضاري :-

في اطار البحث عن الهوية الحضارية للمكان و احترامها ومع الدراسة المتممة لاحدث ما وصلت اليه النظم المعمارية و التخطيطية المتوافقة مع البيئة و الطبيعة .

نبضت فكرة ترسيخ شخصية حضارية مصرية للمكان و كان استخدام المفردات المحلية التراثية و المطورة كذلك المواد النبيلة كالاخشاب و جذوع الاشجار و النخيل و الاحجار المحلية و الاقمشة المصنعة من القطن الخالص و المشغول يدوياً . هذه المواد المحلية (اساساً بدوية و ريفية) ساعدت على اعطاء روح حضارية للمشروع داخلياً و خارجياً .

ج) تكامل مفهوم التصميم :-
الشمولية هي اهم مبادئ تصميم المشروعات التنمية المستدامه فالتخطيط المتكامل يخدم كل عناصر المشروع بدأ من اسس و مقومات الانشاء حتى عملية التشغيل كذلك العناصر الجزئية التي تنمو من الاكتفاء الذاتي الطويل الامد .
وان ادماج المزرعة البيئية و محطات الطاقة الجديدة و المتجددة في المشروع علاوة على محطة معالجة مياه الصرف لهو اكبر دليل على تكامل الانشطة في اطار احترام الاشتراطات البيئية الصارمة وفقاً لتوجيهات الجهاز المركزي لحماية الحياه الطبيعية .

د) المراجعة البيئية على عمليات التخطيط :-
هذا المبدأ و الاتجاه في ان واحد هو اكبر ضمان لنجاح استمرارية التنمية المستدامه حيث ان استراتيجية تنمية الوعي البيئي و الاجتماعي تجاه هذا المنتج المتناغم مع الطبيعة يستلزمه الاتي :-
التفاعل مع الطبيعة و زيارات المناطق مع الخبراء و المنشطين لتنمية هذ المناطق .
تعميق مبدأ المشاركة الجماعية في دراسة كل ما يمكن ان يساهم في التقليل من الاثار الضارة على البيئة المحيطة .
الاهتمام بالمقابلات الشخصية مع كل المصممين بكل المستويات و مقابلاتهم و التفاعل مع جميع الاراء.

هـ) مراحل العمل :-
لقد صمم المشروع تخطيطاً و معمارياً على ان ينفذ على سبعة عشرة مرحلة على مدى سبع سنوات ، هذا المبدأ يسمح دائماً باستخدام مبدأ المراجعة على عمليات التخطيط كذلك على تطوير كل مرحلة بناء على تقدم المرحلة السابقة عليها نتاج التفاعل مع السائح او المسئول عن الانشطة البيئية او الابحاث الجديدة الخاصة بالتصميم لمشاريع السياحة البيئية كذلك معايشة المكان اكثر فترة ممكنة (جغرافياً و طبيعياً و حضارياً) مما ينعكس على وحدات المشروع و ما يتميز به من عدم التكرار كذلك تطور كل مرحلة عن سابقها .

و) التخطيط المشترك :-
ان التنازل عن نرجسية المصمم و تنمية التوافق الفكري يسمح بان يتم اشراك افراد المجتمعات المحلية في عملية التخطيط الشامل للمشروع. و يعنى بالافراد المحليين (السكان الاصلين / السكان المقيمين بجهة المكان منذ فترة طويلة / المسئولين القائمين على حماية البيئة و اي فرد ينتمي للمنطقة حتى لو كان مسئول سياسي يعمل لصالح المنطقة .

ز) امكانات التحميل :-
احدى اهم عناصر التصميم البيئي هي عدم الضغط على المنظومة البيئية بشكل له تأثير عكسي عما يتخيله المصمم و هذا يتمثل في ان الكثافة السكانية للمشروع و في هذا المشروع لا يتجاوز نسبة الاشغال ٩١.٣٪ اى لايتجاوز ربع الكثافة المعمول بها في المشاريع الاخرى و يحاول في المراحل القادمة الاقلال منها .
كذلك عدم المبالغة في تحميل الموقع اي تحميل زائد فيما يخص ايضاً عدد الوحدات و احتياجاتها من المياه و الكهرباء و الصرف الصحي و ذلك لعدم استنزاف الموارد الطبيعية على المدى الاستراتيجي مما يمثل خطورة كبيرة على الموقع و البيئة المحيطة .

ح) المتابعة و التقييم :-
تقوم الشركة الان بالتعاون مع جهاز حماية الحياة الطبيعية لعمل سجل بيئي للمشروع و الشاطئ حتى نتمكن من مراجعة و تقييم و مراجعة معدلات الاستهلاك الخاصة بالطاقة (مياه / كهرباء / غاز / صرف صحي). كذلك ستقوم بتسجيل كافة الملاحظات الشخصية للزوار المسئولين عن البيئة لزيادة وعي القائمين على ادارة المشروع حتى لا تنحرف عن المسار و في حالة الانحراف سيتم اتخاذ اجراءات فورية تصحيحيه حتى لوكان على حساب العائد الاستثماري للمشروع.

ط) الحلقات الدراسية :-
كان للحلقات الدراسية و المؤتمرات و المنشورات التي نفذت على يد جهاز شئون البيئة و خاصة الجهاز المركزي لحماية الحياة الطبيعية الاثر الكبير في توعية المصمم و المنفذ و ملاك المشروع كذلك لاحظنا هذا بين الزبائن و المستخدمين للمشروع و قد خلق هذا الجهاز تيار جديد للوعي البيئي خاصة في وسط الشباب المصري و الاجنبي المستخدم بهذا المشروع في مصر و هذه الحلقات الدراسية و المؤتمرات والتي حضرها جميع المتخصصين من العالم و كافة الاطراف المعينة بصناعة السياحة البيئية و الفنادق المتوافقة مع البيئة كان لها كذلك الاثر في طرح القضايا بشكل محترف .

٢- التكنولوجيا المستخدمة :-

أ) التصميم من اجل اعادة البناء :-

مقترح جديد سوف يتم تنفيذه على شكل مخيم و معسكر حيث يقوم السائحين و الزوار ببناء خيمتهم بنفسهم و عمل و جباتهم بشكل جماعي ويتطلب نصب الخيمة او الشالية الصغير اقل من ساعة و فكها يستلزم و قت اقل ثم يحمل على جمال او خيول حتى يتمتع الزائر بالحياة البدائية .

ب) استخدام انظمة المعلومات الجغرافية في التخطيط :-

ان استخدام الاقمار الصناعية و نظم المعلومات الجغرافية خاصة في المناطق ذات الحساسية البيئية كانت عون كبير في تحليل موقع المشروع و قمنا بعمل ايزومترك كبير للموقع و تضاريسه و تمت التحاليل على اساس الحفاظ التام على هذا المرتفعات و التضاريس كذلك الاحترام الشديد لمنطقة الشاطئ بما يحافظ على توسيع نطاق الرؤية و الحفاظ ايضاً على الموارد الطبيعية للموقع.

ج) تقديم التكنولوجيا كتجربة عملية :-

ان استخدام التكنولوجيا صديقة البيئة في مشاريع التمية المستدامه و السياحة البيئية لابد من تقديمه بصورة مبسطة للمستخدم، حيث ان كافة المواد المستخدمة من اقمشة و اخشاب و احبال و مفروشات كذلك المياه المستخدمة مياه ابيار محلاه بنظام التناضح العكسي اما فيما يخص نظم التكييف فهى مرفوضه تماماً و استعيصن عنها بنظام مبردات خالية من الكلور وتعمل بنظام الهيدروكلور كربونات و استخدامها للطاقة يعادل سدس استخدام المكيفات العادية اما الطاقة الكهربائية فهي نتاج العمل بنظام طواحين الهواء المولدة للطاقة .

كما ان المطابخ و المغاسل في هذا المشروع تعمل بنظام الغاز و قد انشأنا محطة لطاقة ١٨ طن خاصة للمشروع و يمكن امتداد هذه المحطة لتموين السيارات اذا رأت السلطات الفائدة من ذلك و جاري الان الاتفاق على طواحين الهواء المولده للطاقة الكهربائية.

وهناك دائرة الغذاء البيئي حيث تقوم الشركة بتربية الحيوانات المماثلة لحيوانات السكان المحلين (اغنام / ماعز / جمال / طيور) علاوة على المزرعة البيئية الخاصة بالمشروع و المنطقة بنظام (البيوفود) و يقوم الزوار بزيارة هذه الخدمات و الاطلاع على التكنولوجيا هم و ابناؤهم .

بالاضافة الى محطة معالجة مياه الصرف باحدث النظم المتوافقة على البيئة و التي يعاد استخدامها في مقننات مضبوطة .

وجاري الان دراسة نظام معالجة المخلفات الصلبة فيما تفتقده المنطقة و نظام حديث يدعى (معالجة المخلفات باستخدام المخلفات)

الادارة الرشيدة للمحميات الطبيعية بهدف تحقيق التنمية المستدامة "منظور الاقتصادي"

نهي الخطيب
الادارة البيئية بأكاديمية السادات للعلوم الإدارية

تتمثل المشكلة الاقتصادية لأي مجتمع فى الندرة النسبية للموارد بكافة أنوعها (الطبيعية -البشرية - الرأسمالية) ومن خلال التفاعل بين المواد الطبيعية و تلك البشرية يمكن أن تتراكم الموارد الرأسماليةو هذا يعني أن أي تدهور فى الموارد الطبيعية مع عدم إبلاء الاهتمام الكافي للموارد البشرية يؤدي حتما إلي إستنزاف الموارد الرأسمالية أيضا مم يعيق التنمية الاقتصادية ذاتها.

و قد تعدي الهدف من إنشاء المحميات الطبيعية مجرد صيانة الموراد الطبيعية للأجيال القادمة بما يضمن إستدامة التنمية إلي أن تكون هي نفسها مشروعات اقتصادية ذات عائد إقتصادي مجزي إلي جانب دورها فى إعداد المورد البشري تعليميا و تربويا و الذي لا تستطيع غيره من المشروعات تحقيقها.

و فى هذا الصد يهدف هذا البحث إلي التعرف على ما يلي:
- المشكلة الاقتصادية و أهمية الموارد لأي مجتمع
- الاهمية الاقتصادية للمحميات الطبيعية و دورها فى تحقيق التنمية المستدامة ، و ذلك من خلال التعرف على ما يلي:
- الاضرار الاقتصادية الناجمة عن تدهور الموارد الطبيعية و أسباب هذا التدهور
- المنافع الاقتصادية المترتبة على صيانة هذه الموراد
- مقومات الادارة الرشيدة للمحميات الطبيعية بهدف تحقيق التنمية المستدامة ، و ذلك فيما يتعلق بالاتي:
- إدارة الموراد الطبيعية
- إدارة الموارد البشرية المناط بها هذ المحميات الطبيعية

دور الجمعيات الأهلية فى تنمية الصناعات البيئية بالمناطق المحمية

مجدى الشرقاوى
رئيس مجلس إدارة جمعية البيئة العربية

حيث أن الصناعة هى الملوث ةالأول للبيئة وإحداث التوازن بين التنمية الصناعية والتنمية البيئية هى أعظم التحديات التى واجهت قمة الأرض بجوهانسبرج ٢٠٠٢

ومن اجل تعظيم الاستفادة من الموارد الطبيعية المتاحة بدون التعدى على حقوق الأجيال المستقبلة وللحفاظ على النظام الأهلى لتوازن الكون تعاظم دور الجمعيات الأهلية من أجل إيقاظ الحس القومى والعالمى بضرورة قيام صناعات صديقة للبيئة والاستفادة من تدوير المخلفات وخاصة المخلفات الحقلية تحقيقاً للأهداف المنشودة من التنمية المستدامة.

ونظراً لأن جمعية البيئة العربية تأسست من أجل تفعيل طاقات وقدرات وتكامل جهود العلماء والباحثين العرب من أجل تكنولوجيا بيئية عربية بالتعاون مع الجهات العلمية فقد تم إعداد بروتوكول تعاون مع كلية الهندسة جامعة عين شمس يهدف الى تعظيم الفائدة من المخلفات الحقلية باستخدامها فى ابتكارات جديدة للنشاط الصناعى بما يحقق فرص عمل رخيصة للشباب فى الحقل والمنزل والورشة والمصنع الصغير وتنمية المجتمعات المحلية اعتماداً على إمكانتها الذاتية وتنشيط الطلب على البحث العلمى الجاد الهادف لخدمة المجتمع وتوفير العملة الصعبة التى تدفعها الدولة لاستيراد الخامات الصناعية من الخارج وباكورة التعاون مع المركز هو إقامة المعارض والدعاية والإعلان والتسويق وتدريب الشباب على استخدام جريد النخيل كخامة فى الأغراض الأتية :

١. تصنيع ألواح الكونتر باتوه بمواصفات عالمية من جريد النخيل مع تطوير التقنيات المستخدمة فى تصنيعه
٢. تصنيع الأثاث وخاصة أثاث المدارس
٣. استخدام ألواح الكونتر باتوه بمواصفات عالمية بديلاً لخشب البياض المستورد وفى تصنيع الخرط العربى (الارابيسك) بديلاً لخشب الزان المستورد وفى تصنيع الخشب الحبيبى من مخلفات تصنيع الكونتر والارابيسك
٤. استخدامه فى البناء بديلاً للخامات الملوثة للبيئة وتعظيم الاستفادة من جذوع الأشجار وكقواطيع للمبانى وفى أعمال الديكور

التنمية المحلية فى محمية العميد الطبيعية

ماجدة غنيم
مستشار

قطاع حماية الطبيعة
جهاز شئون البيئة

تقع محمية العميد فى محافظة مطروح على امتداد الساحل الشمالى من الكيلو ٧٠ حتى الكيلو ١٠٠ على الطريق الساحلى إسكندرية/مطروح . و تبلغ مساحتها حوالى ٧٠٠كم. وتتعرض المحمية لمجموعة م المخاطر والمشاكل البيئية الناشئة عن الأنشطة التى تمرس بالمنطقة أهمها تحويل مساحات المراعى الطبيعية إلى الإنتاج الزراعى ،و الرعى الجائر، ومخلفات الصرف الصحى و التحطيب الجائر الناشئ عن استخدام النباتات الصحراوية كوقود منزلى و صيد الحيوانات والطيور البرية.

المجتمع المحلى بالعميد

تشمل المحمية ٤ قرى رئيسية (وحدات محلية) هى :العميد، و ساحل العميد، والشمامة، وأولاد جبريل ويبلغ تعداد السكان حوالى عشرة آلاف نسمة. و يتمثل النشاط الاقتصادى بالدرجة الأولى فى رعى الأغنام وزراعة أشجار التين و الزيتون إلى جانب زراعة بعض المحاصيل التقليدية فى نطاق ضيق.
و يعانى السكان من مشاكل عديدة أهمها : عدم توفر البنية الأساسية بشكل كاف ، و نقص الخدمات الصحية والتعليمية والترفيهية والثقافية وانخفاض مستوى المتوفر منها ، وانخفاض مستوى الدخل و محدودية مصادره ، وانتشار البطالة، وانخفاض المستوى التعليمى و الثقافى ،وعدم تقنين أوضاع حيازة الأراضى والمنازل، واستخدام أراضى المحمية فى التخلص من المخلفات الصلبة والصرف الصحى الخاصين بالقرى السياحية.
توجهات مشروع صون الأراضى الرطبة فى مجال التنمية المحلية فى قرى المحمية:يستهدف الشق التنموى للمشروع التوفيق بين الإنسان والبيئة فى منطقة المحمية . أى التوفيق بين أهداف وأنشطة السكان المحليين وأهداف وأنشطة المشروع، بحيث تصبح التأثيرات المتبادلة بين الجانبين فى مجملها إيجابية، وتنحصر التأثيرات السلبية فى حدودها الدنيا.

مبادئ العمل التنموى فى المحمية: يقوم العمل التنموى فى المجتمع المحلى على مبادئ : الاستدامة ، المشاركة ، المساعدة الذاتية، التكامل ، دمج المرأة ، تقديم النموذج.
محاور الأنشطة: التعليم ورفع الوعى البيئى: من خلال تطوير العمليات التعليمية الرسمية، وفتح قنوات تعليمية غير رسمية ، ودمج المعلومات البيئية فى المجالين، إلى جانب برامج التوعية البيئية الموجهة لفئات محددة.
كذلك استخدامات حطب القطن وقش الأرز فى أعمال البناء وصناعة الأخشاب وأسقف المبانى وقوالب الطوب فجريد النخيل نموذج مثالى للصناعات الصديقة للبيئة والمجتمع لأنه يعنى أن تحصل على أخشابك من خلال تقليم خدمة النخيل وليس قطع الأشجار وصديق للمجتمع لأن المنتجين من خلال تدريبهم يقومون ببيع الإنتاج بأنفسهم دون وساطة أو استغلال فهذا المشروع يحقق استخداماً رشيداً للمخلفات الحقلية خام جريد النخيل كنموذج حالة تطبيقه فمصر تنتج ٢٠٠ ألف طن سنوياً من جريد النخيل وحوالى ٥،٢ مليون طن بالوطن العربى كما يؤدى إلى مشر صناعات صغيرة فى المصانع والورش وبساتين النخيل باقل تكلفة رأسمالية ممكنة حيث أمكن بمعرفة مركز تنمية الصناعات الصغيرة وتطوير التكنولوجيا المحلية بجامعة عين شمس من انتاج كافة المعدات الازمة لهذه الصناعة.
وهو أيضا بديلا لاستيراد الأخشاب مما يحقق وفر مستور فى العملة الصعبة يقدر بحوالى ٣٥٠ مليون جنيه كما يساعد على تقليم أشجار النخيل والتوسع فى زراعتها ويقدم آلية فعالة لتوفير فرص عمل رخيصة للشباب مما يساهم فى التنمية الذاتية للمجتمعات المحلية ودعما للصناعات التقليدية القائمة وإحياء للتراث المرتبط بها . ففى ظل المتغيرات الإقليمية والدولية القائمة وتجسيدا لأهداف الجمعية فى تفعيل القدرات وكافة الجهود اتفقت الأهداف لتؤكد حتمية المبادرات المحلية غير التقليدية النابعة من الواقع الحى بالتعاون مع الجمعيات الأهلية والمراكز البحثية من أجل تحقيق التنمية المستدامة والعودة إلى تنفيذ أوامر الله وصدق قوله تعالى "ظهر الفساد فى البر والبحر بما كسبت أيدى الناس ليذيقهم بعض الذى عملوا لعلهم يرجعون" سورة الروم.

محميات المحيط الحيوى - محميات خاصة

سمير غبور
أستاذ متفرغ بمعهد الدراسات والبحوث الافريقية
جامعة القاهرة

نشأت الحركة البيئية في الستينات من القرن العشرين وتكونت مؤسسات دولية عديدة للتعامل مع الموارد الطبيعية انطلاقاً من مفهوم الاستخدام بدلاً من مفهوم الاستغلال لتحقيق أهداف التنمية المستدامة التى تحافظ على البيئة وتحمى حقوق الأجيال المقبلة وتضمن تحقيق العدالة الاجتماعية ، ولقد قام الاتحاد الدولي لصون الطبيعة بتشجيع إنشاء المحميات الطبيعية التى كانت في مصر منذ عهد الفراعنة ثم أنشئت أول محمية طبيعية عام ١٩٨١ في إطار نظام محميات المحيط الحيوي الذي أنشئ عام ١٩٧١ التابع لليونسكو، إن من أهم عيوب المحميات المنشأة بنظام هضاة أنها لا تضع في الحسبان السكان المحليين وتهميش ممارستهم للأنشطة الحياتية التقليدية وكانت فكرة المحميات مرفوضة في إفريقيا والدول النامية بسبب إهمال مصالح السكان . ولكن جاءت فكرة محميات المحيط الحيوي لإصلاح هذا الوضع . وذلك بتقسيم حيز الحماية إلى ثلاث قطاعات القلب -المنطقة العازلة - المنطقة الانتقالية وهو يسمح بتدرج الأنشطة المسموح بها من الأنشطة العلمية في منطقة القلب إلى الأنشطة التقليدية للسكان المحليين في المنطقة العازلة إلى أنشطة السياحة والتدريب والتعليم في المنطقة الانتقالية ويوجد حوالي ٤٠٠ محمية محيط حيوي في العالم. وفى عام ١٩٧٢ طرحت اتفاقية حماية التراث العالمي التى تتضمن مواقع التراث الطبيعي والثقافي العالمي ويوجد حالياً ٧٠٠ موقع على هذه القائمة العالمية ، ويوجد في الوطن العربي ٣ مواقع طبيعية وموقع واحد ثقافي وطبيعي ، ويوجد في مصر ٥ مواقع تراث ثقافي ولا يوجد حتى الآن مواقع للتراث الطبيعي. ومما هو جدير بالذكر أنه لابد من توافر بعض المعايير في الموقع لكي يدرج على القائمة العالمية يعبر فيه عن عمليات جيولوجية أو إيكولوجية أو بيولوجية أو مناطق ذات جمال طبيعي غير عادى أو مواقع مهددة ذات قيمة عالمية غير عادية . ولقد تقدمت الحكومة المصرية بطلب إدراج منطقة سانت كاترين كموقع عالمي للتراث الثقافي والطبيعي العالمي ومحمية رأس محمد للتراث الطبيعي العالمي .