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Sectoral and Cross-Sectoral Integration of Biodiversity in Oman

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1. Introduction

Oman reported[1] on the integration of biodiversity conservation and sustainable use into directly relevant sector and cross-sector plans, programs and policies of the country. Communications with leading stakeholders of the country for biodiversity was conducted in order to solicit as much information as possible on how they accept and adopt biodiversity in their systems. Sultan Qaboos University (SQU) represented the academic institution principally from their contribution in the advancement of biodiversity research. Experts were requested for updates of developments in their fields where they unselfishly shared their data for this national report. Ministries of Heritage and Culture, Agriculture, Fisheries Wealth, Diwan of Royal Court and other ministries were contacted. ESO representing the non-government organization was also tapped.

Extent and Process of Integration

2. Sector and Cross Sector Integration

Sultan Qaboos University and Ministry of Heritage and Culture

SQU and the Ministry of Heritage and Culture both keep scientific specimens and a limited number of live plant collections. MECA has close working relationship with these agencies in terms of research and formulation of national policies on the conservation of the country's biodiversity. Housed in the Ministry of Heritage and Culture is the National Herbarium where 14,000 plus collections of plant specimens from over 1000 species of plants are kept in their herbarium together with some live plant specimens at the backyard. Within the Ministry is the Oman Museum of Natural History where a large collection of shells, vertebrate and invertebrate skeleton collections and fossils are kept. These are on display for public viewing enhancing people's knowledge of the country's biodiversity. A recently concluded project on classification of marine algae in the southern coasts of Oman had been completed by the museum further adding knowledge on this group. Research projects with the museum and SQU include the country's biodiversity and nature reserves. Conduct of research had been coordinated closely with the Ministry where some key technical persons were directly involved as in survey work for the turtles and birds of prey. The museum and university were recently tapped for updating information on MECA's biodiversity list for which they unselfishly shared what they have.

Ministry of Agriculture and Ministry of Fisheries Wealth

These Ministries are in close communication with MECA in terms of consultation on matters pertaining to permitting on use of certain species particularly the endangered ones. Studies and field surveys on plant genetic resources for food and agriculture had been carried out in the Sultanate. Twenty locations of natural pastures covering 171 ha are in the monitoring supervision of the Ministry of Agriculture. The

[1] Oman (2010). Fourth National Report to the Convention on Biological Diversity, Ministry of Environment and Climate Affairs, Directorate-General of Nature Conservation, June 2010, 155 pp.

goal of the Ministry is to protect and preserve the diversity of pasture and grasses including the wild plant species and agricultural crops. Local breeds of vegetables are being raised in the farms through the cooperation of farmers. A National Gene Bank was established and developed through a Seed Technology Unit established by the Ministry. One hundred eighty six varieties of date palm trees together with mango, Omani banana varieties, citrus, medicinal plants, shrubs and trees were housed in the field gene banks of Wilayat Bahla and Wilayat Barka. The Ministry is also working on the propagation of wheat and barley varieties in the hope of obtaining superior varieties of these cereals.

Fishing gear and methods development project had been carried out by the Ministry of Fisheries Wealth taking into consideration the species selective ability of the methods. The Ministry is also involved in lobster fisheries project, shrimps, crustacean and abalone farming and modernizing the fisheries statistical system which are directed towards the conservation of the fishery resources.

Diwan of Royal Court

Occasionally, the Diwan of Royal Court which handles similar environment projects is consulting MECA on biodiversity matters. His Excellency, Sultan Qaboos bin Said is himself an environmentalist and a nature lover. It has become imperative that all his ministers and supporters imbibe the principles of nature conservation in all their programs. All conservation programs pertaining to biodiversity had been supported by the Sultan, with the bulk of budget for the various projects being funded by him. In fact most of the big projects originated in the Diwan, to name a few.

About 250 heads of Arabian Oryx are being kept in captivity in Jaaluni within the Arabian Oryx Sanctuary (AOS) where 20% of fence completed. A further 250 heads thrive in the Omani Mammals Breeding Center in Barka, Muscat. The project actively participated in a regional initiative to develop strategy for the conservation of Arabian Oryx. Benefited within the AOS are the Arabian Gazelles where they freely graze in the field. The Royal Oman Police were deployed in the area for patrolling purposes.

Currently, the Arabian Tahr is being bred in captivity at the Omani mammal Breeding Center. Rangers of the Office for Conservation and Environment of Diwan set up a “Nature Reserve” in Wadi Serin to conserve the Arabian Tahr. A management plan is being developed for the Wadi Serin Reserve. The rangers are also working closely with rangers of MECA in monitoring the Arabian Tahr in Jabal Qahwan where both are concerned with the protection of the species.

Also bred in captivity at the Omani Mammal Breeding Center, the first group of Arabian Leopard was successfully established in 1985. Both rangers of MECA and Diwan worked with Biosphere Expeditions in the mountains of Mussandam in 2006 and 2007 and in Dhofar in 2008-2009 where populations had been monitored by camera trapping and satellite tracking. The expeditions brought local awareness of leopard conservation.

Quite recently, the Diwan of Royal Court also signed a Memorandum of Understanding with the Earthwatch Institute regarding four programs, two of which are concerning the Arabian Leopard and Arabian Tahr. Though the programs have not started yet, the Memorandum of Understanding will be

transferred to the recently created National Centre for Field Studies in Conservation of the Environment. Under the supervision of Diwan is the Oman Botanic Garden (OBG) which targets to complete the checklist of Plants of Oman. It develops protocols for propagation, cultivation and plant conservation of all native plants. Around 30% of the 261 species of rare and threatened plants of the country are in the ex situ collection of the garden. The garden is also working towards the cultivation and preservation of the genetic crop diversity and documentation of the associated local knowledge. The garden includes conservation and the importance of plant biodiversity into all of its education programs and communications. The garden is part of a regional network of botanic gardens and member of the Arabian Plant Specialist Group. OBG has produced a comprehensive Red List of plants in the Sultanate of Oman.

It conducts regular field research. It has propagated 330 species of plants and has grown more than 60,000 plants. A seed bank has been established in coordination with Millennium Seed Bank Project founded by Royal Botanic Gardens in Kew, England.

The Diwan has also been involved with the Sooty Falcon Survey where 10% of the species global population is breeding on the islands in the Sea of Omn. In 2009, surveys were made in Dimaniyat and Fahal Islands revealing 36 and 40 nesting pairs, respectively.

Ministry of Defense

The Royal Oman Police and the military cooperate accordingly on protection measures. Likewise, in the media, a strong promotion program for biodiversity appreciation is constantly being aired or published to reach for a larger public.

Ministry of Information and Ministry of Tourism

Oman's unique wildlife and nature reserves are key attractions of the country and as such are being featured and promoted by both the Ministries of Information and Tourism. They publish the nation's facts and figures in their website and other forms to entice local and foreign tourists and largely to provide general knowledge. Ecotourism in Oman is promoted vigorously by the Ministry of Tourism online, on print media and other venues. The more popular wildlife like the Oryx, Gazelle, Turtle and Leopard and famous places and reserves of the country are focused in the ministry's attractions for ecotourism.

Ministry of Education/Ministry of Higher Education

In cooperation with MECA, the Ministry of Education took the lead in incorporating messages of biodiversity conservation in the curriculum of schools (Grades 1-12) with many schools participating in various environmental awareness programs of the government. At different grade levels, school children are taught of the basics of environment and an appreciation of biodiversity. Beyond grade school, formal courses are offered in the Bachelor of Science program in Environmental Biology at Sultan

Qaboos University. In the same university, a Master of Science program in Environmental Science is still in the pipeline.

Diploma/BS in Environmental Science program is now instituted at the Higher College of Technology through the Ministry of Higher Education. Though the program's emphasis will be in the applied science aspect of environment, biodiversity courses will still be highlighted.

Environment Society of Oman (ESO)

Founded in 2004, it is the sole Omani NGO that supports the government campaign for environment conservation and protection on national scale. ESO has engaged in various projects that enhance environment and biodiversity awareness that compliment national and regional knowledge and information data base. This NGO has launched research projects on whales, dolphins and turtles in Omani waters and a project on frankincense with government and international supports.

ESO engaged itself in educating the public about the importance of Arabian Tahr, native plants particularly trees, economic/aesthetic importance of Oman's cultural and natural landscapes. ESO is instrumental in organizing clean up campaigns and awareness building meetings.

3. Program Integration

Conservation of biodiversity has become one of the environmental activities of development programs of Oman. It aimed for the best planning and implementation for the benefit of the Omani environment and protection of all its components. In 1974, the Office of the Advisor for Conservation of Environment in the Diwan of Royal Court was established. The Diwan is directly under His Majesty's directive, such office played a role in spreading interest in the environment and natural resources. It initiated the development of Arabian Oryx reintroduction program in Jiddat Al Harasis.

The Ministry of Environment was first established in 1984 which became the Ministry of Regional Municipalities, Environment and Water Resources in 2001 but became a separate Ministry of Environment and Climate Affairs in 2007. The emergence of the 1992 Earth Summit paved the way for the Ministry to be engaged in biodiversity protection. The Sultanate became a signatory to the Convention of Biological Diversity which prompted the Ministry to produce its National Biodiversity Strategy and Action Plan in 2001, a national effort to conserve its biodiversity and the sustainable use of the biological resources. Thereafter, National Reports for the CBD were submitted to meet the requirements as a member signatory country. After IUCN's study on major environmental problems in Oman, the National Conservation Strategy was formulated giving rise to proposals for protecting coastal zones natural resources. Management plans were developed to cover the 3,165 km coasts of Musandam, Al Batinah, Muscat, Sharqiya and Dhofar. In particular, the lagoons or khwars being fragile ecosystems and biodiversity rich areas had received national attention. In fact some of them were proclaimed as protected areas.

Marine habitats of the Arabian Sea caost of Oman include key environments of international significance including,

1. the turtle nesting beaches of Ras Al Hadd and Masirah Island,

2. migratory bird feeding and nesting grounds of Barr Al Hikman,

3. suspected resident, breeding populations of the humpback whale,

4. a unique, monospecific coral reef off Barr Al Hikman,

5. wetlands including mangroves.

A major boost to efforts by the Sultanate of Oman to reduce oil (tar ball) contamination of its coastline was met by the successful submission to the International Maritime Organization (IMO) at the first pass in 2002 for designation of Special Area status for the Arabian Sea coast of Oman. Once the obligations to IMO to provide Reception Facilities and other requirements are met, the Special Area of the Arabian Sea coasts will come into force. This will allow Oman to issue specific mandatory methods for protection of its marine environment against oil pollution and other discharges from ships and tankers. So far, Oman had been vigilant in monitoring its territorial waters from polluting local, regional and international ships and tankers to protect its sensitive coasts and beaches. In 1992, UNEP classified Oman as among arid countries in the world having 95.8% of its space being affected by desertification. The Sultanate has identified four regions of desertification: Governorate of Dhofar, Sharqiya Region, Jebel Al Akhdar and Al Wusta Plains. A National Plan for Combating Desertification was developed in 1993 for which RD 8/2003 was passed issuing the law for grasslands and management of animal resources. It required the replanting of deteriorated lands and their protection against overgrazing.

3. Policy Integration

Being an environmentalist himself, His Majesty's ensured that the laws of the land will address effectively the protection needs of the country's biodiversity. Perhaps, the very first law affecting biodiversity was Royal Decree 38/75 proclaiming Qurum Area as an open protected area followed by RD 26/79 which was about the law of national gardens and protected natural areas. Royal Decree No. 10/82 issued in 1982 proclaims the law on conservation of the environment and prevention of pollution. This law committed the importance and need to provide the greatest possible protection of nation's natural wealth and avoid immediate or long term damage or side effects which may appear as a result of the various development projects to be executed throughout the Sultanate.

In addition, a number of other regulatory legislations were passed that integrate biodiversity, to wit: RD 36/94 establishing the Arabian Oryx Sanctuary; RD 23/96 establishing Dimaniyat Islands Natural Reserve; RD 25/96 establishment of the Turtle Reserve; RD 48/97 established Jabal Samahan Reserve in Dhofar; RD 49/97 established the Khwar Reserves in the Salalah Coast; RD 50/97 established Saleel Natural Park; RD 114/2001 was issued as the law on conservation of the environment and prevention of pollution which superseded RD 10/82; and RD 6/2003 decreed the law on nature reserves and wildlife. In support of Royal Decrees, various Ministerial Decisions were likewise issued particularly on management guidelines for specific proclaimed nature reserves.

Protection measures for wildlife through banning of killing, hunting and catching of wild animals and birds was also contained in MD 2/2002.

5. Mainstreaming of Biodiversity

For many years, population surveys of Arabian Tahr, Arabian Leopard, Sooty Falcons and Marine Turtles have been conducted providing a wealth of scientific data. Being all flagship species, efforts to monitor had provided protection of other species and the different habitats and ecosystem associated with the species, deemed beneficial for the conservation of biodiversity. In the same light, propagation of 350 Omani plant species which are mostly endemic species and 30 % of which are in rare and threatened status have found a secured habitat in the Oman Botanic Gardens. The Diwan of Royal Court had been instrumental in the implementation of this kind of project.

The opening of Oman Natural History Museum in 1985 had paved the way for public education on biodiversity. Its holdings of herbarium, insects, shell, skeleton and fossil specimens had enriched the museum collections providing materials for display.

Visitors, particularly the school children, became more exposed to learning about the country's biodiversity. It also became a venue for conducting valuable research by local and international investigators.

Various fishery projects had also emphasized appreciation of Oman fish resources. There were specific projects on abalone, shrimps, crustaceans, kingfish, sharks, marine algae, fish marketing and others that underscore economic benefits for the fishing communities.

Information on biodiversity conservation has effectively been spread to a larger segment of the society by way of multi-media. It was the fastest way to reach the general public and for them to understand government efforts in conserving biodiversity. Several programs on radio, television and print media had been disseminated. Many documentaries on biodiversity have been featured and had reached both local and international viewers.

6. Inclusion of Biodiversity in EIA and Other Assessments

Royal Decree No. 10/82 entitled "Law on Conservation of the Environment and Prevention of Pollution" paves the way for prescribing all development projects of Oman to prepare an environmental impact study. This was further strengthened by R.D. 114/2001 which is the law on conservation of the environment and prevention of pollution requiring a full EIA before an environmental permit is issued. Eight groups of projects had been identified: industrial, mining, agricultural, food, service, marine and coastal, tourism and light industries. The EIA process is based on this particular principle: EIA is a process to help decision makers to protect, conserve and manage Oman's environment according to the principles of sustainable development, thereby achieving or maintaining human wellbeing, a healthy environment and a sound economy.

Baseline study requires listing of all species and habitat types within the project area and vicinities and for which rare and protected species are to be highlighted. Species and habitat types encountered in

field surveys as well as from secondary records are presented in the EIA report. Mitigation measures and environmental protection opportunities are presented in the Environmental Management Plan (EMP) reducing potential impacts by the project on biodiversity. The EIAs are thoroughly scrutinized by the Ministry as to its soundness and acceptability before any environmental permit is granted.

Before Environmental Permits are issued, adoption of the EIA requirements had been mandatory for all development projects. Unfortunately, lack of manpower in the Ministry resulted in many projects not being monitored closely. In spite of this, few projects strictly adhered in the implementation of their Environmental Management Plan as evidenced traceable in their progress reports. One outstanding applicant is Sohar Power Desalination Plant who was granted the Final Environmental Permit in 2008. An initial site visit conducted by the staff from MECA's Directorate of Environmental Affairs evaluated favorably the project's compliance to the conditions set in the permit.

They religiously submitted the required quarterly report thereafter. In fact, they were already granted a second Final Environmental Permit which proved their dedication to strictly adhere to the conditions set in the permit. Likewise, Petroleum Development of Oman (PDO) has proved its project's worth to be awarded the environmental permit for oil exploration. They submitted a full-scale EIA to the satisfaction of MECA reviewers and for which a Final Environmental Permit was granted. Such permit is only granted when major issues regarding project implementation are thoroughly addressed.

7. Analysis of Outcomes

During the time when the Sultanate of Oman became a signatory of the Convention of Biological Diversity and when it formulated its NBSAP, the country had since then imbibed the concepts and practices in biodiversity conservation. It has become the inspiration of MECA and adopted it in many of its decision-making endeavors to always provide priority and consider the interest of biodiversity in the country. New laws had been created that will perpetually protect and will directly address the needs of the country's flora and fauna. It strengthened further the Ministry's justification in preserving its declared nature reserves by proposing more funding to be allotted for each reserve. It further keeps the eyes of the Ministry in considering other sites for declaring as protected areas realizing that indeed unique biodiversity should be conserved for posterity.

Because of the deepening international interest in biodiversity, MECA's Directorate of Nature Conservation has been leading in addressing the country's quest for conserving its biodiversity. Two years ago, the directorate had redesigned its Biodiversity Department which now comprise four sections:

1) Biodiversity Development,

2) Combating Desertification,

3) Biological Database, and

4) Wildlife Rehabilitation and Reproduction Centers.

The Department was instrumental in forging mutual agreements between countries to protect wildlife that are common in their territories to include the Arabian Oryx, gazelles, migratory birds, turtles, whales and dolphins and others. It periodically updates its list of traded species in close consultation with the university, museum and concerned ministries. As a new signatory country to CITES, the Directorate is still in the process of preparation for formulating its policies and guidelines to regulate the trade and transit of protected species. At present, the Directorate lacks support staff and space to accommodate the CITES program hampering its progression. Likewise, the Marine Environment Conservation Department of the Directorate has been regulating the issuance of marine permits that will ensure no heavy tourist use like diving in marine reserves to ensure no disturbance on the coral reefs and breeding fishes. Its deployment to date of over 300 artificial reef masses in Dimaniyat, Fahal Islands and other coastal areas had produced good results in coral reef growth and increase in fish stock. The department conducts periodic beach clean up in Dimaniyat and Masirah Islands where they actively involve the local citizens through partnership with the Environment Society of Oman (ESO). Such beach clean up events promote good public image for the Ministry and consciousness towards maintaining the integrity of the marine ecosystem.

Oman had been actively participating in the many workshops conducted by the Regional Organization for the Protection of the Marine Environment (ROPME) which include all the GCC countries, Iran and Iraq. Since its inception in1979, the Ministry has been actively participating in various workshops on topics about the red tide, coral reef, mangrove and mussels. It has tailored most of its marine and coastal programs on ROPME's thrusts.

Three departments in the Directorate (Biodiversity, Nature Reserves, Marine Environment Conservation) all worked together to regularly conduct turtle census in all the marine reserves. However, several years of census data had never been analyzed to become useful for the management of the turtle species in the country nor the voluminous census data on Oryx, Gazelles, Tahr, Ibex, Leopard, Foxes, and others also waiting for attention. The Directorate lacks suitable technical staff to handle the processing of wildlife census data. On similar light, baseline data on biodiversity generated by almost all the EIA reports submitted to MECA had not been organized nor analyzed. These data could have already served as kick off information on biodiversity of important sites in the country.

Recently, the directorate published new editions of the Nature Reserves in the Sultanate of Oman and A Field Guide to the Larger Wild Terrestrial Mammals of Oman to update data and information in the publications. These publications target the general public to promote the appreciation of the country's nature reserves and wildlife. ESO likewise published books for appreciating biodiversity which include The Native Plants of Oman by Clive Windbow, Landscaping with Omani Wild Trees by David Insall, Birdlife in Oman by Hanne and Jens Eriksen and The Natural History of Oman by Martin Fisher.

Perhaps biodiversity conservation had already been built-in in the culture of MECA for quite sometime. Such culture is also assumed already existing in SQU which lives by its laurel and prestige as the country's top academic institution. Apparently, other ministries may just be starting to feel or internalize the key importance of biodiversity in their system instead of just for the sake of abiding biodiversity laws

of the country. Credit should be due to non-government entities like the ESO that boldly advocated for the conservation of biodiversity but fully supporting the government's program. Thus, it is implied that there will always be consciousness to inject biodiversity importance on matters that will be beneficial for the Oman environment. Though moving at a slow phase, it is envisioned that goals to conserve Oman's biodiversity would still be attained in the very near future.