

**National Assessment Report on
Traditional Knowledge and Biodiversity
Sultanate of Oman**

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**Muscat – Oman
November 2006**

Abbreviations and Acronyms

CBD	Convention on Biological Diversity
ESO	Environment Society of Oman
GEF	Global Environment Facility
GOs	Government Organizations
IPR	Intellectual property rights
IUCN	the World Conservation Union
KHF	King Hussein Foundation
MRMEWR	Ministry of Regional Municipalities, Environment, and Water Resources
NBSAP	National Strategy and Action Plan
NGOs	Non Government Organization
PACI	Public Authority for Craft Industries
RSCN	the Royal Society for the Conservation of Nature
SQU	Sultan Qaboos University
SWOT	Strengths, Weaknesses, Opportunities and Threats
TK	Traditional Knowledge
UNDP	United Nation Development Program
UNESCO	United Nation for Education, Science and Culture
US	United States
WESCANA	IUCN Office for West Asia, Central Asia and North Africa
WHO	World Health Organization

Executive Summary

As a result of signing the International Convention on Biological Diversity (CBD) in 1992, the Sultanate of Oman has prepared and ratified the NBSAP on the 26th of September 2000. This strategy is aiming at reflecting the country's vision towards conservation of the biological diversity in the Sultanate of Oman. Accordingly, the Ministry of Regional Municipalities, Environment and Water Recourses (MRMEWR) requested additional support from UNDP/GEF for a project, entitled, "Assessing Capacity Building Needs and Country Specific Priorities in Biodiversity" with technical assistance from IUCN. This support was vital for continuing and supporting the implementation of the NBSAP. Through this project, there will be an evaluation of the country's capacity-building needs, definition of country-specific priorities, analysis of functional capabilities and determination of the mechanisms necessary to conserve and sustainably use its national biodiversity

The project implementation commenced in January 2006 and it is foreseen for its activities to be concluded by the end of November 2006. Many outputs are expected to be achieved under the additional support for the NBSAP one of which is the subject of this report: "the evaluation and assessment of capacity building in the field of traditional knowledge related to biodiversity". The objectives of this assessment report are as follows:

- Describe the state of documentation of TK on biodiversity in Oman;
- Provide an assessment of capacity-building requirements in relation to the documentation and analysis of traditional knowledge; sources of excellence; and
- Provide a set of recommendations with a strategy for the protection and maintenance of TK on biodiversity conservation

The Assessment mission was conducted from October 5th- October 14th, 2006 at the Capital city of Muscat. The research team adopted a situation analysis methodology due to time limitations. The methodology depended on three sources of information; which are summarized below:

1- A review of secondary data including all publications, journals, data or information pertaining to biodiversity and Traditional knowledge in Oman. Subjects covered included: Irrigation, Tree cultivation, Crop improvement, Livestock management, Seed selection and preservation, Range land management, Post harvest techniques, Soil and Water Conservation, Pest Control, Fisheries and medicinal plants

2- In-depth interviews with 21 respondents representing Universities, Research institutions, Ministries, NGOs and environmental activists.

3- Participatory workshop held towards the end on the mission (October 12th, 2006) aiming at validating the input obtained through interviews and literature, understanding in- depth the various contextual changes affecting TK and biodiversity from 1970s up to date, obtaining consensus among stakeholders on future steps

regarding preserving and utilizing TK to conserve biodiversity and SWOT analyzing the capacities of the various institutions

Oman is rich in biodiversity including the presence of a variety of endemism among plants and animals in its different habitats and ecosystems. Seventy-eight endemic species of plants, five regionally endemic and one nationally endemic mammal species, six nationally endemic species of reptiles and amphibians and 26 species and subspecies of scorpions were recorded in Oman.

As a result of the exploitation of these resources in Oman, many threats have led to the loss of many species and destruction of ecologically important habitats. Consequently, Oman has entered and signed many international conventions and protocols and most of them were sanctioned by Royal Decrees. The establishment of both the legislative and institutional prerequisites has laid the ground for environmental protection activities to take place. Many environmental achievements and initiatives were attained and participated in conserving the Sultanate of Oman's important ecosystems and habitats including preparation many national strategies and polices dedicated for conservation biological diversity.

In relation to the traditional knowledge and through the literature and despite the immense effort of producing voluminous material on biological diversity of Oman; they all tend to lack the conceptual linkage between biodiversity conservation and the Traditional knowledge of Oman. It is worth revealing that TK was mentioned once in the NBSAP. This indicates an obvious gap in understanding the TK concept and its concrete relationship with biodiversity.

The documentation of traditional knowledge on biodiversity conservation was only concentrated on six areas; agriculture (crop production, date culture, livestock practices), fisheries (*Sonan Al Behar*), water supply systems (Aflaj system, most of the traditional agricultural practices have stimulated the creation of this spectacular Aflaj system), traditional conservation area (referred to as '*hamiyah*' system), medicinal plants and their traditional uses and traditional craft (using the natural resources as a raw material). It is worth mentioning that studies on the medicinal plants and their traditional uses were limited to certain areas in Oman particularly in Dhofar region. The level information and research available on these subjects and fields varies in its exploration and coverage of the 6 topic. Three areas were identified as the most researched topics, which are¹ Al Aflaj, fisheries and medicinal plants

The situation analysis indicated a general tendency to perceive TK in a folkloric manner, rather than a functional mean which can enable the local community as well as environmentalist to avoid adopting a top down approach which might impact the environment negatively. This tendency was heavily criticized in the scholarship addressing the management of fisheries. Another tendency is to perceive conservation as a process removed from its social context and communities. Nevertheless, scholarship in Oman requires conducting studies of National level on

¹ The remarks above are based on the general review of the available Omani literature at Sultan Qaboos University during the 11 days mission.

TK and bio diversity, and qualitative studies exploring community knowledge, understanding and meaning assigned to biodiversity within a certain locality.

In relation to the management of the traditional knowledge in Oman, it was not clear who has the mandate institutionally to manage it. The responsibility of surveying, researching and documenting the knowledge should be multi sectoral; macro- micro linkages need to be enhanced. That is the ability of research on local level can influence both policy and implementation.

The report additionally highlights the strengths, weaknesses of relevant institutions that have direct or indirect relationship to documentation of TK related to biodiversity. It addresses the threats and opportunities facing these organizations. The institutions were categorized into three types; governmental, non governmental and academic. During addressing the summary assessment to each organization, aspects such as organization, infrastructure, technical, human resources, financial resources and other were tackled.

The report includes a set of recommendations aiming at effectively documenting and conserving the traditional knowledge related to biodiversity in order to ensure its viability and sustainability among local communities in the Sultanate of Oman. In addition, it includes a proposed three-year preliminary action plan for documenting and protecting TK related to biodiversity. The main objective of this strategy is to effectively document and conserve the traditional knowledge related to biodiversity to ensure its viability and sustainability among local communities in the Sultanate of Oman. In order to achieve this objective, the following outputs were suggested

- Clear institutional arrangement for management of the traditional knowledge identified and developed and necessary resources are provided
- Traditional Knowledge is mainstreamed in the relevant laws, bylaws and national strategies and polices.
- Comprehensive awareness and educational programs are developed and implemented effectively to ensure better understanding of TK concept and the importance of conserving it.
- A well trained and equipped team of national specialists which is capable of managing and protecting TK is in place and operational. For example: a Center of Excellence.
- A detailed research program aiming at documenting TK related to biodiversity prepared and implemented and best practices for utilization of TK are documented.
- A comprehensive database for documenting TK and its practices is designed and established.
- Pilot biodiversity project/s to demonstrate the documentation and protection of TK are developed to promote of the best practices and lessons learnt.
- Successful regional and international cooperation mechanisms are in place and operational and existing multilateral, regional and international agreements and initiatives are employed for effective documentation and protection of TK related to biodiversity.

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1. Introduction

1.1 Background

As a result of signing the International Convention on Biological Diversity (CBD) in 1992, Oman became a party in the convention and committed itself towards the development of a National Biodiversity Strategy and Action Plan (NBSAP). This strategy aims at reflecting the country's vision towards conservation of the biological diversity in the Sultanate of Oman. The NBSAP was prepared and ratified by the Cabinet on the 26th of September 2000. Accordingly, the Ministry of Regional Municipalities, Environment and Water Recourses (MRMEWR) requested additional support from UNDP/GEF with technical assistance from IUCN. This support was vital for continuing and supporting the implementation of the NBSAP.

Based on these initiatives, funding support was received from GEF/UNDP for continuation of BSAP. This additional support project, entitled, "Assessing Capacity Building Needs and Country Specific Priorities in Biodiversity" aimed at evaluating the country's capacity-building needs, defining country-specific priorities, analyzing functional capabilities and determining appropriate mechanisms necessary to conserve and sustainably use its national biodiversity (MRMEWR website).

The project implementation commenced in January 2006 and it is foreseen for its activities to be concluded by the end of November 2006. Many outputs are expected to be achieved under the additional support for the NBSAP. These outputs are as follows:

- Preparation of the third national biodiversity report related to the Convention on Biological Diversity,
- Preparation of the first report related to the National Biodiversity Strategy and Action Plan,
- Establishment of the website of the biodiversity in the Sultanate,
- Evaluation of the requirements of capacity building in the field of conservation within and outside nature reserves,
- Evaluation of capacity building in the field of Biosafety,
- Evaluation of capacity building in the field of monitoring biodiversity including classification (biodiversity national information system),
- Evaluation of capacity building in the field of traditional knowledge, and
- Review and evaluation of the implementation of the National Biodiversity Strategy and Action Plan.

The biodiversity department at the MRMEWR is responsible for implementing the Add-On various activities. Significant progress has been achieved in many activities of the Add-On project. However, a comprehensive assessment report on Traditional Knowledge (TK) has not been prepared yet. In order to address this issue, IUCN, through its regional and global specialists'

networks, has identified appropriate consultants who will assist with the TK assessment report. For more information on the IUCN see IUCN background in annex 2.

1.2 TK Assessment Report Objectives

The objectives of the assessment report are:

- Describe the state of documentation of TK on biodiversity in Oman;
- Provide an assessment of capacity-building requirements in relation to the documentation and analysis of traditional knowledge; sources of excellence; and
- Provide a set of recommendations with a strategy for the protection and maintenance of TK on biodiversity conservation

1.3 Contractor Terms of Reference

1. The main task of the consultant will be to work closely with the national project team and the national traditional knowledge working group in addition to IUCN's WESCANA Regional Office to prepare the National Assessment Report for Traditional Knowledge and Biodiversity for the Sultanate of Oman.

The Report needs to include:

- A description of traditional knowledge on biodiversity in Oman.
- An assessment of capacity-building requirements in relation to the documentation and analysis of traditional knowledge.
- Identification of the sources of excellence; priorities for further documentation and research in regard to traditional knowledge and biodiversity.
- Identification of information and knowledge gaps in the context of traditional knowledge documentation and propose necessary actions and means to fulfill them.
- Development of an action plan for national capacity building on traditional knowledge and biodiversity for relevant ministry staff and related stakeholders including the technical working group.
- Draft guidelines and regulatory frameworks for submission to Government endorsement (*This task was not included in the current assessment*).

2. Undertake a comprehensive literature review to all existing initiatives, projects and activities related to traditional knowledge and biodiversity. This should include arranging for sound publications and reports on traditional knowledge to be shared with MRMEWR and other stakeholders in Oman.

3. Discuss the results of the review with the national technical working group on traditional knowledge and biodiversity.

4. Develop and conduct a training workshop on the development of national assessment reports and workplan on traditional knowledge and biodiversity in the context of the Sultanate of Oman as well as traditional knowledge documentation, analysis and publication (*This task was not included in the current assessment*)..
5. Contribute to the national technical capacity-building on the preparation of national assessment reports and action plans for traditional knowledge and biodiversity directly during the mission to Oman and indirectly through the technical review and support for the national technical working group.
6. Participate in the national workshop planned for November 2006 and present the outcomes of the process of preparation of the assessment report and workplan and recommendations for follow-up tasks and potential cooperation between IUCN and the Sultanate of Oman.
7. Coordinate all activities and interventions with the national project coordinator and IUCN WESCANA regional office.

1.4 Traditional knowledge Definition

The Traditional Knowledge (TK) can be identified as follows:

Traditional Knowledge (TK) which is also known as indigenous or local knowledge; is the body of knowledge or natural history built up by a group of people through generations of living in close contact with nature, which, through trial and error they have developed an understanding of the ecosystem in which they live.

TK includes a system of classification, a set of empirical observations about the local ecology, and a system of self management that governs resource uses such as hunting, trapping and fishing. Knowledge is accumulated over generations and passed on by word of mouth and direct experience.

The above definition has been mainstreamed into the programmatic and operational frame works of international organizations. For example, the World Health Organization (WHO) defines traditional medicine, which forms part of traditional knowledge, as "the sum total of knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement of treatment of physical and mental illness".

Moreover, two other organizations recognize traditional knowledge: the Convention on Biological Diversity (CBD) and the World Intellectual Property Organization (WIPO). The CBD recognizes the close traditional dependence and inter-relationships that exist between indigenous and local communities and biological resources, as well as the impact upon biological resources by local populations. It also recognizes the need to ensure these communities

share in the benefits of their traditional knowledge and practices in sustainable conservation and biodiversity (CBD website). WIPO's role is to identify issues and facilitate discussions on IPR and to eventually address these issues.

Traditional knowledge is vital for sustainability of natural resources including forests, water, and agro-ecosystems across various sites in the World. IUCN has highlighted the following roles of TK in biodiversity conservation.

- TK can enhance the scientific knowledge and can help in discovering new facts and mechanisms
- TK can provide new ways and approaches for sustainable management of natural resources. Many examples were recorded in the field of rangeland and livestock management.
- Protected areas have been managed for thousands of years by local communities in their territories and tribal lands. Many sustainable practices can be learned from their knowledge and used in protected areas in the current time.
- Involvement of local communities in the planning and development processes can improve the chances of successful development.

1.5 Importance of biodiversity and TK in Oman

The importance of biodiversity is stimulated from the fact that it is the basis for life continuity and includes the various elements and resources to support that. Communities always have a direct and indirect interaction with biodiversity since life started on Earth. Therefore, knowledge has been built up by communities through generations of living in close contact with nature. Through trial and error, communities have developed an understanding of the ecosystem in which they lived.

In the case of the Sultanate of Oman, the interaction of geophysical, climatic, biological and human being factors has created a substantial diversity in its ecosystems and richness in its flora and fauna species with a high level of endemism.

Oman's history extends over four thousand years of human settlement. Due to its geographical location and demographic complexity and multi cultural exposure, Oman has had the opportunity to become a major hub for the cultures of the oxidant i.e. Indian, Persian, east African and Arab Islamic. For this reason, the Omani society is characterized by cultural diversity and a rich tribal heritage.

Additionally, Oman has witnessed during the past century a substantial and transitional transformation from multi traditional economy based on livestock, agriculture, fishing and pearl trade to a modern society dependent on oil industry, trade and tourism. The integration into both modernity and global economy has had a profound impact on the Omani society and its development.

Consequently, this rapid transition and the increase in population meant further concentration of human settlements in certain areas in Oman. This situation resulted in a negative impact on and high competition for natural resources leading to loss of biodiversity. Meanwhile, the traditional knowledge associated with all practices related to biodiversity is under the severe threat of erosion; due to two main factors:

1. the rapid transformation in the socio- economic context: where certain practices are perceived as no longer relevant or beneficial, and
2. their oral nature.

On the international level, the World Intellectual Property Organization (WIPO) has recognized and summarized the concerns of traditional knowledge holders as follows:

- Concern about the loss of traditional lifestyles and of traditional knowledge, and the reluctance of the younger members of the communities to carry forward traditional practices,
- Concern about the lack of respect for traditional knowledge and holders of traditional knowledge,
- Concern about the misappropriation of traditional knowledge including use of traditional knowledge without any benefit sharing, or use in a derogatory manner,
- Lack of recognition of the need to preserve and promote the further use of traditional knowledge.

2. Methodology

The mission was conducted from October 5th - October 14th, 2006 in the Capital city of Muscat. The research team adopted a situation analysis methodology due to time limitations. The methodology depended on three sources of information; which are detailed below:

2.1 Review of Secondary Data

The research team had conducted review for the secondary data including all publications, journals, data or information pertaining to biodiversity and Traditional knowledge in Oman. Literature reviewed included approximately 62 references in both Arabic and English languages (see references section).

This task aimed at reviewing the methodologies and subjects of available literature addressing TK and biodiversity in Oman. The review has focused on the selected eleven areas:

1. Irrigation
2. Tree cultivation
3. Crop improvement
4. Livestock management
5. Seed selection and preservation
6. Rangeland management
7. Post-harvest techniques
8. Soil and Water Conservation
9. Pest Control
10. Fisheries
11. Medicinal plants

2.1 In-depth interviews

In-depth interviews were conducted with 21 respondents representing universities, research institutions, ministries, NGOs and environmental activists see annex 1. The interview targeted various institutions that may have direct or indirect relation to biodiversity conservation and traditional knowledge. This included relevant Sultan Qaboos University (SQU) departments or specializations i.e. Archeology, Anthropology, Agriculture, Environmental Studies and Science, the Ministry of Agriculture and Fisheries Resources, Ministry of National Heritage and Culture, Ministry of Regional Municipalities, Environment and Water Resource and the Environmental Society of Oman.

The following research questions were explored in the interviews:

1. Is there literature addressing biodiversity from a TK perspective in Oman?
2. What are the methodologies adopted in researching and documenting TK in relation to biodiversity in Oman?
3. Who collects oral heritage in the Sultanate? Is the community involved?
4. How is the collected information documented and for what purposes?

5. Are there any initiatives/projects aiming at linking TK to biodiversity? By whom?
6. Who are the national stakeholders in the field of TK and biodiversity? If they do not exist, whom do you suggest as a potential stakeholder?

2.3 Participatory Workshop

A workshop was held by the end of the mission (October 12th, 2006) aimed at achieving four main objectives:

1. Validating the input obtained through interviews and literature
2. In-depth understanding of the various contextual changes affecting TK and biodiversity from 1970s up to date.
3. Obtaining consensus among stakeholders on future steps regarding preserving and utilizing TK to conserve biodiversity
4. Analyzing (SWOT) the capacities of the various institutions.

2.4 Consulting Team

1. Mr. Mohammad Yousef: Director of Conservation at the Royal Society for the Conservation of Nature (RSCN), MS.c in Horticulture. For more information on the consultant, see annex 2.

2. Ms. Lamia Raei: Executive Director at the Information and Research Center in King Hussein Foundation, M. A. Social Anthropology. For more information on the consultant, see annex 2.

2.5 Limitations

The following research limitations occurred during the assessment:

- The research took place during the holy month of Ramadan; where working hours were reduced. Thus, limiting accessibility to many stakeholders.
- The research duration was limited (10 days), which can only provide an overview of existing knowledge situation. It could have been more useful to extend the duration.
- The research focused on literature review. This resulted in attempting to access literature at the Sultan Qaboos University. Therefore, the research team was confined to a particular geographical site i.e. Muscat
- Accessibility to actual publications was not possible in some cases i.e. books out of print, expatriate contributions which are not available on the Oman book market.
- No field work took place to areas which were researched.
- The difficulty in proposing research questions related to the linkage of biodiversity and TK to an audience that lacks the familiarity of their significance.
- The research team had faced some logistical arrangements during conducting the assignment

3. Situation Analysis

3.1 Overview on Natural Resources Conservation and Management in Oman

Biodiversity is defined as the variability among living organisms and ecological complexes in which they occur as well as the number of different items and their relative frequency. These items are organized at many levels, ranging from complete ecosystems to the chemical structures that are the molecular basis of heredity. This term biodiversity encompasses different ecosystems, species, genes, and their relative abundance (Jordan Country Study on Biological Diversity, 1998).

Biodiversity in layman terms includes the wide variety of plants, animals and even microorganisms. Estimates as to the number of species identified have reached 1.75 million species, majority of which are insects. Scientists, however, estimate about 13 million species to about 100 million species exist (CBD website).

In the Oman context, Omanis are reliant on the natural resources systems on daily basis in order to sustain their lives. Most of the Omani population and settlements are concentrated around coastal zones. This means that there is a dependency on the marine resources such as fisheries for their subsistence; but still there is also a continuous reliance on agriculture, livestock, forestry, oil industry and trade.

The Sultanate of Oman terrestrial and freshwater fauna include thousands of species of bacteria, fungi, invertebrates (this includes insects, mollusks and arachnids), and vertebrates. Among vertebrates, there are seven species of freshwater fish, two amphibians, 89 species of reptiles of which six are nationally endemic, 461 species of birds and 54 species of mammals. Intensive information about birds, reptiles and amphibians are available in a database at Sultan Qaboos University. Information on insects is available at the Natural History Museum, Ministry of Heritage and Culture.

The terrestrial and aquatic flora of Oman include 1204 species of vascular plants, 14 species of liverworts, 30 species of mosses, 35 species of lichens and 55 species of marine macroalgae. In general, natural vegetation of Oman includes various habitats such as evergreen and deciduous woodlands, drought–deciduous open thorn woodlands, sclerophyllous and succulent shrubland, dwarf shrubland and open xeromorphic grassland. Seventy-eight species of vascular plants were identified as endemic to the country or the region and several are at risk. Some plants were identified as medicinal plants. Good documentation for medicinal plants in certain areas of the country was accumulated and a set of specimens were placed at the national herbarium at the Oman Natural History Museum.

Due to its location, Oman has a high diversity in marine and fisheries genetic resources. The marine biota is not well studied and needs more investigation

and research programs. Until now, 1142 species of fishes were recorded in Omani water. In addition, 232 species of seaweeds, 75 species of corals and four species of marine turtles were also recorded. Coastline is characterized by beaches, coastal lagoon, mangroves, tidal inlets and sinkholes that are very vital for ecosystem productivity. Fisheries provide significant direct economic benefits to Omani societies.

More than 7,374,159 ha are classified as agricultural land under cultivation. The country also has a diverse range of domesticated animal species including goats, sheep, cattle and poultry. The ministry of agriculture and fisheries has put a great effort in the development of the livestock sector including implementation of national plans, research programs and extension activities. As a result of these efforts, the livestock population has been increased from 1,025,227 heads in 1982 to 1,408,178 heads in 1993.

Oman has several diverse mineral resources including copper, gold, chromites, silver, manganese, gypsum, salt, dolomite, ornamental stones and others. The government is planning to invest in the development of certain minerals such as copper, chromites and gold. For other minerals, private sector is encouraged to put more investment.

Regarding water resources, Oman has almost no permanent surface water resources. Most of the water available is from perennial springs and groundwater. Traditionally, people have used to tap water by aflaj to supply their daily use. The Sultanate has recognized the need to protect water resources by preparing a national plan to protect and conserve this valuable resource.

Institutionally, by the Royal Decree No. (117/91) amended the title of the Ministry of Regional Municipalities to become the Ministry of Regional Municipalities and Environment, the responsibilities of managing environment and its issues were transferred from the Ministry of Environment and the Council for Conservation of Environment and Prevention of Pollution to this new ministry, which has given it a new impetus. The same is applicable after the issue of the Royal Decree No. (47/2001) amending the title of the Ministry of Regional Municipalities and Environment to become the Ministry of Regional Municipalities, Environment and Water Resources and transferring the responsibilities of the Ministry of Water Resources to this ministry. By these Royal decrees, this ministry has become responsible for all issues related to environment (including nature conservation) and water resources. However, other resources such as fisheries, crop and landraces are under the responsibility of the Ministry of Agriculture and Fisheries Resources.

The establishment of both the legislative and institutional prerequisites has laid the ground for environmental protection activities to take place. Many environmental achievements and initiatives such as planting mangrove trees and rehabilitation of Khawrs, establishment of environmental database, combating desertification to stop the cause of erosion of the coastlines, inventory and tagging of the wild Gazelle breeding in captive environment, comprehensive study for the threatened *Vulpes cana*, study of Hawksbill

Turtles nesting areas, Oryx conservation program, establishment of a network of protected areas and other efforts and projects were attained and participated in conserving the Sultanate of Oman's important ecosystems and habitats. Local communities' involvement and participation in the planning and implementation of these initiatives were very limited. The only and newly established non government organization (NGO), the Environment Society of Oman, has also dedicated its efforts and resources to conserve the terrestrial and marine resources. This emerging NGO has a promising future and the chance to streamline the culture on voluntary work on environmental issues in Oman. However, this organization is still at its embryonic stage and needs more support and development.

To encourage the participation of the Omanis in the management or preservation of the environment, a prize called the "Sultan Qaboos Prize for Environmental Preservation" has been initiated for this purpose. Many other initiatives such as awareness campaigns and extensions programs were initiated to conserve agricultural resources in particular and natural resources in general.

3.2 Oman Biodiversity in the Global Context

It is clear that Oman is rich in biodiversity; the NBSAP (2001) shows the importance and the presence of a variety of endemism among plants and animals in its different habitats and ecosystems. Seventy-eight endemic species of plants, five regionally endemic and one nationally endemic mammal species, six nationally endemic species of reptiles and amphibians and 26 species and subspecies of scorpions were recorded in Oman.

As a result of the exploitation of these resources in Oman, many threats such as illegal hunting, overgrazing, inappropriate land use activities and its impact on habitats, pollution, dam construction, mining, oil production, urbanization, agricultural pesticides, introduction of alien species, over-fishing and coastal erosion have led to the loss of many species and destruction of ecologically important habitats. The loss of biodiversity is a major challenge not only to a country like Oman but to the majority of countries in the world. It is estimated that 40 to 150 species are disappearing every day in the world.

In the Sultanate of Oman, 136 threatened species of plants were recorded. Of these, 80% are found in southern Oman. In total, 100 endemic and regionally endemic species were recorded in the Sultanate. Out of these, 63 are in Dhofar region, 12 in central Oman and 25 in the northern mountains. It is obvious that most of the endemism is concentrated in the southern region of Oman, and 46% of these endemics are also at risk. All these regions with these numbers of endemic and threatened species are extremely important at the national, regional and international levels.

As highlighted before, Oman has many threatened habitats and species of regional and international importance. Consequently, Oman has prepared many national strategies and policies to conserve and protect these habitat and species. Moreover, it has entered and signed many international

conventions and protocols and most of them were sanctioned by Royal Decrees. Around 34 Royal Decrees concerning conventions and protocols such as Biological Diversity, Stockholm, Kyoto, Montreal and others were issued, see annex 3. This high amount of royal decrees indicates the interest and keenness of His Majesty Sultan Qaboos to keep Oman environment safe.

3.3 Review of Literature on Documentation of TK on Biodiversity Conservation in Oman

Recent archeological discoveries and research in Oman suggests that human settlements date back 5000 years. The excavations near Sohar indicate that copper mining and smelting industry was well developed by the year 2000BC. Frankincense from Dhofar region, which was crucial to the ancient social religious life, provides evidence of the existence of an early trading community. In addition, it is clear that there were farming and fishing settlements from the earliest times.

It was noticed that most of the areas such as Dhofar and Sohar regions that are characterized by high biodiversity are the ones who has existence of historical human activities. In view of that fact, the communities of those areas had the advantage of gaining an invaluable knowledge regarding the use of natural resources in a sustainable manner.

This knowledge is reiterated today in popular proverbs and folktales; which illustrate vividly the exchange between nature and biological diversity and the daily lives of local communities.

The literatures review process, indicates the immense effort in producing voluminous material on biological diversity of Oman. In addition, national strategies, polices and action plans were prepared to conserve and maintain this biodiversity. Nevertheless, they lack the conceptual linkage between biodiversity conservation and the Traditional Knowledge of Oman (TK was mentioned once in the NBSAP). This indicates an obvious gap in understanding the TK concept and it's concrete relationship with biodiversity.

Literatures lack the conceptual linkage between biodiversity conservation and the Traditional knowledge of Oman. It is wroth revealing that TK was mentioned once in the NBSAP. This indicates an obvious gap in understanding the TK concept and its concrete relationship with biodiversity.

Documentation of the traditional knowledge on biodiversity conservation was more focused on six subjects or areas; these areas are as follows:

1. Agriculture (crop production, date culture, livestock practices),
2. Fisheries (*Sonan Al Behar*): traditional management and protection of fisheries resources are still very effective and can be considered as vital tools to conserve the marine threatened habitats and species.
3. Water supply systems: most of the traditional agricultural practices have stimulated the creation of the spectacular Aflaj system.

4. Traditional conservation area (referred to as '*hamiyah*' system),
5. Medicinal plants and their traditional uses
6. Traditional craft (using the natural resources as a raw material).

It is worth mentioning that studies on the medicinal plants and their traditional uses were limited to certain areas in Oman particularly in Dhofar region.

The level of information and research available on these subjects and fields varies in its exploration and coverage of the 6 topics. Three areas were identified as the most researched topics, which are²:

1. **The Aflaj system** (most of the traditional agricultural practices have stimulated the creation of this spectacular Aflaj system) is ranked as the most scholarly researched topic and has been thoroughly studied. This extensive academic focus can be attributed to the fact that a number of Aflaj sites are currently acknowledged as UNESCO World Heritage sites. Most studies deal with the socio- economic aspects related to the management of Aflaj. Additionally, studies do warn against the impacts of urbanization on the quality of water produced, as well as the decline in interest among young generations in the management of Aflaj due to its decline in young labor power that would prefer to join a more lucrative labor market.
2. **Fisheries** have received a more critical attention by scholars; since it is perceived as a potential source of employment for 50,000 Omani citizens by the year 2020. The critical examination of the status of fisheries is focused on two main issues:
 - the state intervention which has destroyed the viable traditional system of **Sonan Al Behar**; hence deterring any collective action by the community of local fishermen to voice their views and
 - the economic impact of the state intervention which resulted, contrary to its intention, in a decline in one of the major sources of income in the country.

Reviewing the literature which dates back to 1997 and up to now; indicates that it has influenced the decision-making process and has succeeded in influencing policy and in acknowledging the need to return to Sonan Al Behar as a ' successful' traditional institution resulting in better outcomes for both nature and community.

3. **Medicinal plants** have been extensively studied in Oman. It is worth noting that major references are compiled by non-Omani scholars. Most of the work tends to focus on the scientific aspect of researching medicinal plants. Additionally, there is an evident scarcity in Arabic sources; where references are compilations of unverified uses. Those

² The remarks above are based on the general review of the available Omani literature at Sultan Qaboos University during the 11 days mission.

references are not based on any empirical data collected from the community itself.

3.4 General Remarks on the Status of TK Research Topics

As indicated in the previous paragraph, most of the available research reviewed, tends to focus on the above three areas. However, a general overview of the status and understanding of TK in Oman reveals a post card approach to it. The research team has observed a general tendency to perceive TK in a folkloric manner, rather than a functional mean which can enable the local communities as well as environmentalists to avoid adopting a top-down approach which might impact the environment negatively. Consequently, efforts are expected to focus on compilation of data without any strategic definition of how this data might conserve the natural biodiversity. This understanding limits the ability of environmentalist to learn and apply successful models that has worked for thousands of years.

There is a general tendency to perceive TK in a folkloric manner, rather than a functional mean which can enable the local communities as well as environmentalists to avoid adopting a top-down approach which might impact the environment negatively. Consequently, efforts are expected to focus on compilation of data without any strategic definition of how this data might conserve the natural biodiversity.

Another tendency is to perceive conservation as a process removed from its social context and communities. This tendency was heavily criticized in the scholarship addressing the management of fisheries. As a result, most scholarship and research does not address the fact that TK (which is intangible in most cases) is being quickly eroded due to rapid transition socio-economic developments in the Sultanate. Thus, failing to examine with rigor the very essence of Omani national memory in relation to biodiversity and how conservation took place over the years, prior to modernization.

Meanwhile, gaps exist in other domains of biodiversity and TK research which are in need of further investigation and documentation such as livestock management, rangeland management, soil conservation, crop improvement, seed selection and preservation, post-harvest techniques, pest control and natural resources management including protected areas management. Indeed, communities have accumulated knowledge on these areas that can be documented. This will help the country to conserve its natural resources by referring to this knowledge as a basis for that.

As for the research locations, studies of TK and biodiversity on the national scale do not exist to enable the investigators to compare and contrast the status of TK. The coverage of these studies was restricted to certain areas in the country. This restriction will limit the representation of these research programs on the national level and make comparative analysis between these

programs and areas difficult to be achieved. This is very clear with the medicinal plants studies in the country. It is very limited to certain areas and researcher can't do any comparative studies between these sites.

3.5 TK Research Methodology and Disciplines

The research team has noticed the lack of disciplines and approaches studying TK and biodiversity; namely: anthropology and multi-disciplinary studies. It is worth noting that only one Omani has a PhD degree in anthropology and that there is no anthropology department at Sultan Qaboos University. Additionally, there are very few existing anthropological studies. Again, this situation indicates that TK is not transformed in any form to the younger generation through the **educational system**.

Moreover, methodologies chosen for conducting research on TK and biodiversity reflect the complete absence of the community knowledge and participatory methods. This absence reflects again that the understanding of the close connection between traditional knowledge and biodiversity is not mainstreamed within the scientific community in Oman. The methodologies used include the following:

- Historical accounts based on observations and secondary data.
- Surveys.
- Semi-structured interviews targeting very little purposive samples of community elders, which are usually for purposes of Journal publishing.
- Observations.

In qualitative studies, researching community knowledge, understanding and meaning assigned to biodiversity within a certain locality do not exist.

Finally, in relation to the management of the traditional knowledge in Oman, it was not clear who has the mandate institutionally to manage it. The responsibility of surveying, researching and documenting the knowledge should be multi-sectoral; with no clear macro- micro linkages (how can research on local level and on TK feed to policy). Currently, information on some TK-related biodiversity practices are dispersed among various institutional bodies, without a clear strategy beyond documentation: such as the Diwan of Royal Court, the Ministry of National Heritage and Culture, Ministry of Agriculture and Fisheries Resources, the Public Authority for Craft Industries and the Ministry of Regional Municipalities and Environment and Water Resources.

3.6 The State of Legislation on Documentation and Protection of TK on Biodiversity

The Sultanate of Oman has issued many Royal decrees stating the required measures to conserve biodiversity. Legally, many efforts have been taken towards environmental conservation in general and biodiversity conservation in particular. This is evident in the chronology of the following laws:

No.	Royal Decree	Royal Decree No.
Municipal Laws		
1	Law Regulating the Regional Municipalities	96/2000
Environmental Laws		
2	Marine Pollution Control Law	34/97
3	Concerning the use and Handling of Explosives in the Sultanate	82/77
4	Law on National Parks and Nature Protected Areas	26/79
5	Issuing Marine Law-Amended by Royal Decree No. 12/93	35/81
6	Issuing Law on Sea Fishing and Protection of Aquatic Life Living Resources	53/81
7	Issuing the Law of Handling and Use of Chemicals	46/95
8	Issuing the Law on Protection of Water Wealth	29/2000
9	Issuing the Law on protection of Excogitated Plants	92/2000
10	Issuing the Law on Conservation of the Environment and Prevention of Pollution	114/2001
11	Law on Nature Reserves and Conservation of Wildlife	6/2003
Water Resources Laws		
12	Law on the Protection of Water Wealth	29/2000
13	Issuing the Law on Protection of Sources of Drinking Water from Pollution	115/2001
Agricultural and fisheries resources Laws		
14	Law on agriculture system	48/2006
15	Law on Rangeland and management of animal resources	8/2003

Furthermore, the Sultanate of Oman has also ratified many conventions and protocols that help in protecting the environment and conserving the nature of Oman, see annex (3). The convention on the biological diversity is one of the first conventions that recognize the close dependence and inter-relationships that exist between local communities and biological resources.

In general, most of these laws and decrees regulate, encourage and promote the utilization of natural resources in a sustainable way between Omanis. However, there is no clear emphasis on the protection of the traditional knowledge that accumulated with local communities through direct and indirect contact with these natural resources.

From a constitutional and legal framework aspect, there are clear legal statements on the management responsibilities of the environment, nature conservation, water resources, fisheries resources and agricultural resources. On the other hand, the legal management responsibilities for traditional knowledge are not clear; neither is the legal definition. There are only two organizations that have some direct relation to traditional knowledge. The first organization is the Public Authority for Craft Industries. This Authority was established to revive Omani traditional crafts in the modern context of Oman. The second organization is the Ministry of National Heritage and Culture. Currently, this ministry is establishing a new section that will be responsible for addressing issues of intangible heritage. However, it is not clear what would that mean on the operational level and how it might link to the knowledge on biodiversity. In addition, the ministry has indicated that there is an intention for reviewing its law to include intangible heritage.

In sum, there are no legal regulations dedicated to encourage the documentation or conservation of traditional knowledge in Oman. It is of utmost importance to legally preserve, protect and develop the past, present and future manifestations of local community's culture and accumulated knowledge on biodiversity conservation and to safeguard the property rights of the community. Another legal measure should be taken to organize the access to traditional knowledge related to biological and genetic resources conservation and utilization. This can be done through developing a law on Intellectual property rights (IPR). This law should treat knowledge as a private property of the community³.

3.7 The State of National Institutions' Capacity on TK Related to Biodiversity Conservation

The purpose of this part of the report is to give a summary assessment for the various organizations that were interviewed and attended the workshop on the documentation and conservation of TK related to biodiversity. This summary assessment will highlight the strengths, weaknesses of each institution and address the threats and opportunities facing them. The institutions were categorized into three types; governmental, non governmental and academic. During addressing the summary assessment to each organization, aspects such as organization, infrastructure, technical, human resources, financial resources and other will be tackled.

3.5.1 Governmental Organizations (GOs)

Institutional Strengths of GOs: The analysis will be targeting the relevant governmental organizations. These are mainly the MRMEWR, Ministry of National Heritage and Culture, Ministry of Agriculture and Fisheries Resources and the Public Authority for Craft Industries. These ministries with their specialized directorates in nature and water resources conservation, traditional craft development and intangible heritage protection have a good working relationship with national and international organizations including academic institutions and secretariats of international conventions. These institutions have a legal frame sanctioned by royal decrees, clear vision and aims with stable budgets.

Many of those ministries have planned research programs in various fields related to their mandates. Well-equipped staff with various technical backgrounds is employed systematically. As a result of these resources, many efforts, projects and support are directed to preserve and maintain biodiversity in various areas of the country. Coordination between these organizations and others such as Sultan Qaboos University and ESO is considered to be good. A national database for environmental protection is currently developed in collaboration with many directorates and organizations.

³ This issue was extensively discussed on Multilateral level in the " Roundtable on Intellectual Property and Traditional Knowledge" organized by the World Intellectual Property Organization (WIPO) held in Geneva on November 1-2, 1999. Reference: <http://www.wipo.org/>. It important to note, the Oman was not a participant country.

Legally, MRMEWR has generally strong laws on conservation and protection of environment and water resources (including the Aflaj system). The Ministry of National Heritage and Culture has ratified with UNESCO the agreement on protection of intangible heritage. This ministry is in the process of reviewing the ministry law. The process of legislation review can be an entry point to mainstream the concept of intangible heritage including TK related to biodiversity. Another young and ambitious institute is the Public Authority for Craft Industries with the mandate of recording and reviving the traditional crafts on the national level. Also, this authority is working on transforming traditional crafts to the younger generation at the local community level; as a mean for protecting the knowledge in the areas of crafts and traditional art. The Authority has already started that through organized training programs and sessions with knowledge holders and younger individuals.

The marine law is another law that protects and regulates the fisheries resources in the Omani water. As mentioned previously, Oman also has ratified many international and regional protocols and conventions that help in biodiversity and TK protection in the Sultanate. Besides these, GOs are responsible to formulate national strategies and policies to serve the protection of these resources. Until now, many strategies and polices were prepared to protect environmental, agricultural, water resources and national heritage at the national level. Including TK or intangible heritage, as a main component of any biodiversity initiative, can be a priority area for those strategies in the future.

Economically, governmental organizations believe in the concept of ecotourism as a good source of income for the country. The focus of TK and biodiversity can promote cultural tourism as well. In addition, this type of tourism will promote the cultural heritage and traditional knowledge nationally and internationally.

Areas for Improvement and opportunities: In spite of having various specialized directorates, GOs have some major weaknesses. Firstly, there is still some duplication in responsibilities in the field of environmental protection. Secondly, many studies and research programs, documents and information on environmental, water and agricultural resources were prepared and published; however there is no clear national mechanism to exchange this information between the relevant organizations and interested people. In addition, GOs employees have a strong feeling about the erosion of traditional knowledge on the national level specifically among the old people. Also, they highlighted that Omani TK has been accessed by various actors who are non-Omani, without acknowledging the ownership of the Omani people, a situation which need remedial measures. This is predominantly due to the absence of IPR law that can protect and regulate the access to local knowledge. Thirdly, there is an absence of an active body or a directorate with well-trained and equipped team specialized in studying, documenting and protecting the traditional knowledge related to biodiversity. This will be attained only if this management structure and its team are positioned in a proactive organization that has the flexibility to mobilize the needed resources to do so. In addition,

this organization should adopt a participatory approach (local community-based programs). Documentation of lessons learned from previous projects and initiatives should be documented and used as a source of knowledge to plan for better TK protection in collaboration with the local communities. Regional and international collaboration are vital and need more support to maximize the joint efforts at these levels for better documentation and protection of TK.

Financially, there are no specialized funds from the government for studying, documenting and protection of traditional knowledge related to biodiversity. Having a specialized fund for this issue will raise the awareness regarding this subject and increase the interest of young generations, who lost the interest in this type of knowledge, in protecting this valuable heritage.

3.7.2 Non-governmental Organizations (NGOs)

Institutional Strengths of NGOs: Oman has a single NGO working on environmental issues. This NGO is the Environment Society of Oman (ESO) established in 2000. This organization aims at helping to conserve Oman's natural heritage and raise awareness about environmental issues. Also, ESO has the following aims:

- Help educate and raise awareness of environmental issues.
- Enable the public to become actively involved in conservation efforts by organizing participatory events.
- Provide a forum for exchange of ideas and information related to Oman's natural environment.
- Foster cooperation between government, NGOs and the private sector to promote conservation of Oman's natural environment.
- Carry out field research of Oman's natural environment in order to help provide the necessary information to conservation initiatives.

It is clear that the main goal of this organization is nature conservation and there is a keenness to involve local communities in nature conservation and management. As a fact, NGOs have the strength in voluntary work, community participation and policy advocacy. ESO has a pool of volunteers with various fields of specialties in habitats and species research and management. It will work to demonstrate and promote the culture of voluntary work on the national level. The extravagance of having only one NGO will give ESO the priority and access to various resources with no competition from other NGOs.

ESO has various and good working relationships on national and international levels including IUCN, MRMEWR, US Fish and Wildlife Research Institute, Middle East Partnership Initiative and others. These relationships facilitate and enhance the ESO priorities in various fields. ESO is in the process of preparing its first strategy that will focus on local communities' participation in environmental protection. Institutionally, this will make the organization more focused and has a clear mission and strategy.

Financially, ESO is a member-based organization and has a corporate membership. This enables the organization to a good access to funding sources inside and outside Oman. ESO can use the already present national funds and other sources in the implementation of its activities.

Areas for Improvement and opportunities: More solid work is needed to institutionalize the work of ESO. This can be done by having more permanent and trained staff in various technical and administrative fields should be attained. The Society should develop a mission with a comprehensive strategic plan that defines its priorities for long term. Traditional Knowledge should be taken into consideration in the strategic planning process. Local communities participation will help stimulate the community-based nature conservation.

Financially, the NGO does not have the funds to cover all the management and technical commitments that it has. More work should be done on enhancing the ESO staff knowledge on the various mechanisms for funding, the priorities of donors and technical writing for good and sound proposals

3.7.3 Academic Institutions

Institutional Strengths of Academic Institutions: The only Academic institution that was interviewed during the assessment was the Sultan Qaboos University. Interviews included: the College of Science (Chemistry Science), Centre for Environmental Studies and Research, the main Library (Oman Room), College of Agricultural and Marine Science and Department of Archeology were visited and included in the assessment. It is clear that the University is considered as the scientific backbone for the country as a whole. So, the availability of good infrastructure for scientific research programs is available at the university and is directed to meet the national development needs through directing the research priorities to the required needs. The university has always received the financial and technical support and has the thrust from the Royal Court and the government.

The university with its well-equipped resources is considered as the centre of excellence for research programs and activities on the national level. The availability of funds encourages professors and graduate students to address new issues and fields that need more research and assessment. In addition, the university is willing to adopt new policies that enhance the dissemination of the findings of research programs and exchange information between different organizations on the country level.

Areas for Improvement and opportunities: Despite the fact that the university is well-equipped with the necessary resources for scientific research, there is no clear policy or priority to direct scientists to study or document traditional knowledge related to biodiversity. There is no department specialized in studying social or cultural anthropology in the country. The field of social anthropology is not well-equipped with the necessary resources, especially human resources, with only one scientist

specialized in that field. More efforts are needed to develop this academic sector with supportive policies, programs, methodologies, human and financial resources.

Given the fact that Sultan Qaboos University is the only governmental university present in the Sultanate, there is a huge pressure and keenness from Omanis to enroll their sons and daughters in the institute. Especially that education is considered as a mean for upward social mobility.

The annual increase in the number of students constitutes a major pressure on professors; where very little time is available to conduct scientific research. Although TK research programs would require time consuming in-depth examination and participant observation methods in order to understand and acquire the knowledge of the local communities.

4. Recommendations for the Documentation and Protection of TK Related to Biodiversity

4.1 General Approach

It is obvious that documentation and protection of traditional knowledge related to biodiversity in Oman is still not recognized very well on the national level. More efforts are needed on various aspects to enhance the importance and the protection of this subject. ***Omanis believe that this can be possible through an integrated and comprehensive approach taken into consideration the role of all relevant organizations in the Sultanate.*** A multidisciplinary approach will synergize and synchronize the efforts for better documentation and protection of TK. Local communities should be the focus of this approach. It will encourage, mobilize and empower these communities to conserve their valuable heritage and will produce better outcomes for the natural biodiversity of the country.

4.2 Institutional arrangement

1. In the light of the shortage of national initiatives in documentation and protection of TK related to biodiversity and the lack of an institutional framework to do so, there should be an urgent need to ***identify any suitable body or structure*** to take the responsibility of managing this type of knowledge. This management structure should have the interest in the subject and belief in the social-based approach. Another important role will be the ability to advocate for policy development and to be proactive in attaining the required funds to document and protect TK. The best and most suitable organization to host this management structure is the Environment Society of Oman. This organization is a non-governmental organization and all the mentioned characteristics are fit.

2. A National Ministerial Steering Committee should be established to provide an avenue for cross-sectoral decisions, supervise the selection of the appropriate management body and oversee the various programs and plans that will be implemented.

The Committee should consist of the Minister of MRMEWR, Minister of Agriculture and Fisheries Resources, Minister of National Heritage and Culture, President of Sultan Qaboos University, the President of Public Authority for Craft Industries, the President of ESO, representative from the Royal Court, representative from IUCN and local experts.

4.3 Legislations and advocacy for protection of TK Related to Biodiversity

1. ***Traditional Knowledge related to biodiversity concept should be mainstreamed in relevant laws, strategies and policies.*** As highlighted

before, TK has been accessed by various actors who are non-Omani, without acknowledging the ownership of the Omani people. Development of Intellectual Property Rights (IPR) law will protect TK and regulate this process.

2. Advocate including the TK concept in the mandate of the Ministry of National Heritage and Culture Law. There is a golden opportunity to include TK due to the review process that the ministry is intending to do.

3. Advocate mobilizing greater involvement of the civil society in protecting TK, hand in hand with a capacity-development program for that purpose. This can be done through the network of ESO members.

4.4 Public Awareness and Educational Program

1. A national awareness-raising campaign should be developed and implemented to promote better understanding of TK Concept and the urgent need to document and protect such knowledge; which is subject to erosion due to rapid globalization. The campaign should include the right messages and the right tools. It should be designed to target various segments in the Omani society. The culture of civil work should be also more promoted among the members of the country.

2. Education in its two forms -the formal and informal- is very important to keep and protect the traditional knowledge with the knowledge holders. Universities should address topics such as the Omani civilization and culture and the traditional uses of natural resources. The informal curriculum is one of the vital steps in maintaining the TK. School curriculum should also include concepts and applied examples related to biodiversity conservation and the TK.

4.5 Research and Documentation

1. More research is needed; focusing on documenting traditional knowledge related to biodiversity and interpreting this knowledge with local communities. This is a very important step to cover most of the information gaps in different fields in details. Individual communities, in consultation with researchers, should identify priorities for future research topics on Traditional Knowledge.

2. The methodologies and tools selected in studying and documenting traditional knowledge should ensure proper documentation and cultural sensitivity. Qualitative, participatory methods and visual anthropology tools of collecting and interpreting data are highly recommended. The audio-visual means such as filming, photography, recording and mapping would enable community knowledge owners of telling their stories through the most familiar medium to them i.e. narration.

3. A comprehensive database should be developed to disseminate the collected data and information. Tarek will add

4. Academic institutions should encourage scientists to actively communicate and collaborate with communities, and include traditional and local knowledge in their research priorities. The identified priorities should be scheduled systematically to cover the whole country.

5. The proper identification of knowledge owners requires a gender-sensitive approach. In many societies, women are the knowledge keepers of healing. Hence, researchers should avoid gender bias and should enable the woman voice either as a knowledge keeper or as a scholar to be heard.

6. The access for researching communities should be facilitated for scholars, students, independent researchers and NGOs. This would require less bureaucracy in granting research permissions at universities and relevant government organizations.

4.6 Financing TK and Biodiversity

1. Development of fundraising mechanisms to attain more donors and sponsors interested in funding projects related to TK documentation and protection.

2. Development of a national fund or a cultural development fund (having the blessings of His Majesty Sultan Qaboos) dedicated to sponsor activities and research related to this valuable heritage.

3. Providing capacity development to target organizations on fundraising mechanisms, proposal writing and administrative skills in order to manage such a fund either solely or in collaboration with the Government of Oman.

4.7 Capacity Building

1. A comprehensive training-needs assessment should be carried out to the relevant organizations focusing on TK documentation and protection. This will build the capacity of these organizations and form a well-trained team capable of protecting TK related to biodiversity. Promotion and adopting on-job training approach during implementation of these training programs are very important to materialize and facilitate the exchange of experience between trainees.

2. Developing a policy to streamline the participatory approach in documenting and protecting TK.

3. Enhancing the knowledge of Omanis on the importance of the TK related to biodiversity concept.

4. Establishing a social anthropology department at Sultan Qaboos University by providing qualified personnel and resources needed to encourage more research on the TK.

5. Development of national research plans for studying the TK using appropriate methods.

4.8 Regional and International Collaboration

Successful regional and international cooperation mechanisms should be developed and implemented and existing multilateral, regional and international agreements and initiatives should be employed for effective documentation and protection of TK related to biodiversity.

5. A Preliminary Action Plan for Documentation and Protection of TK Related to Biodiversity

Based on the above-mentioned recommendations, hereby a proposed three-year preliminary action plan for documenting and protecting TK related to biodiversity.

Main Objective

To effectively document and conserve the traditional knowledge related to biodiversity to ensure its viability and sustainability among local communities in the Sultanate of Oman.

Outputs

1. Clear institutional arrangement for management of the traditional knowledge identified and developed and necessary resources are provided.

This may include the following activities:

- 1.1 Identify the most relevant organizations that may have direct or indirect responsibility for documentation, protection and management of TK.
- 1.2 Establish a national ministerial committee that consists of representatives from these organizations.
- 1.3 Select the appropriate management body to nationally manage the TK and protect it.
- 1.4 Prepare a comprehensive strategic plan to guide the management and protection of TK by the selected management organization.
- 1.5 Provide the necessary resources for effective implementation of the strategic plan

2. Traditional Knowledge is mainstreamed in the relevant laws, bylaws and national strategies and policies.

This may include the following activities:

- 2.1 Review, prepare and issue specific legislative protection for TK related to biodiversity including law for IPR
- 2.2 Advocate including the TK concept in the mandate of the Ministry of National Heritage and Culture Law.

2.3 Advocate mobilizing greater involvement of the civil society in protecting TK, hand in hand with a capacity-development program for that purpose.

3. *Comprehensive awareness and educational programs are developed and implemented effectively to ensure better understanding of TK concept and the importance of conserving it.*

This may include the following activities:

3.1 Define target groups to promote TK related to biodiversity awareness.

3.2 Develop and implement a national awareness-raising campaign to promote better understanding of TK Concept and the urgent need to document and protect such knowledge; which is subject to erosion due to rapid globalization.

3.3 Carry out national campaigns with the right messages and the right tools.

3.4 Promote the culture of civil work among the members of the country.

3.5 Develop an informal educational material to raise the awareness and understanding of universities and schools students.

3.6 Develop informal curriculum to include TK concept in the schools curriculum with applied examples related to biodiversity conservation and the TK.

4. *A well-trained and equipped team of national specialists which is capable of managing and protecting TK is in place and operational. For example: a Center of Excellence.*

This may include the following activities:

4.1 Carry out a comprehensive training-needs assessment to the relevant organizations focusing on TK documentation and protection.

4.2 Promote and adopt on job training approach during implementation of these training programs to materialize and facilitate the exchange of experience between trainees.

4.3 Develop and implement a comprehensive training program to build a qualified team capable of managing and protecting TK

4.4 Provide the team the required equipment and materials.

5. A detailed research program aiming at documenting TK related to biodiversity prepared and implemented and best practices for utilization of TK are documented.

This may include the following activities:

- 5.1 Identify the information gaps and areas that need more investigation in TK related biodiversity field with a priority list of research topics.
- 5.2 Prepare and implement a research program to cover these priorities for effective documentation of traditional knowledge related to biodiversity.
- 5.3 Select appropriate methodologies and tools to ensure proper documentation and cultural sensitivity.
- 5.4 Encourage academic institutions and scientists to actively communicate and collaborate with communities, and include traditional and local knowledge in their research priorities.
- 5.5 Document and disseminate the best practices for utilization of TK.

6. A comprehensive database for documenting TK and its practices is designed and established.

This may include the following activities:

- 6.1 Collect, collate and categorize information regarding the TK related to biodiversity
- 6.2 Prepare a comprehensive web-based database program
- 6.3 Enter the categorized information into the database program

7. Pilot biodiversity project/s to demonstrate the documentation and protection of TK are developed to promote of the best practices and lessons learnt.

This may include the following activities:

- 7.1 Prepare and implement a pilot biodiversity project/s dedicated for biodiversity and TK protection
- 7.2 Evaluate and assess this/these project/s for to ensure better protection for TK and to promote of the best practices and lessons learnt.

8. Successful regional and international cooperation mechanisms are in place and operational and existing multilateral, regional and international agreements and initiatives are employed for effective documentation and protection of TK related to biodiversity.

The following is a tentative plan with estimated costs and responsibilities including IUCN

Outputs	Resp.	Cost \$	Y1				Y2				Y3			
1. Clear institutional arrangement for management of the traditional knowledge identified and developed and necessary resources are provided.		50,000												
1.1 Identify the most relevant organizations that may have direct or indirect responsibility for documentation, protection and management of TK.	MRMEWR & IUCN													
1.2 Establish a national ministerial committee that consists of representatives from these organizations	MRMEWR & IUCN													
1.3 Select the appropriate management body to nationally manage the TK and protect it.	Steering Committee													
1.4 Prepare a comprehensive strategic plan to guide the management and protection of TK by the selected management organization	IUCN and Steering Committee													
1.5 Provide the necessary resources for effective implementation of the strategic plan	Relevant GOs													
2. A comprehensive database for documenting TK and its practices is designed and established.		50,000												
2.1 Review, prepare and issue specific legislative protection for TK related to biodiversity including law for IPR	MRMEWR & IUCN													

Outputs	Resp.	Cost \$	Y1				Y2				Y3			
2.2 Advocate including the TK concept in the mandate of the Ministry of National Heritage and Culture Law.	ESO & IUCN													
2.3 Advocate mobilizing greater involvement of the civil society in protecting TK, hand in hand with a capacity-development program for that purpose.	ESO & IUCN													
3. A detailed research program aiming at documenting TK related to biodiversity prepared and implemented and best practices for utilization of TK are documented		350,000												
3.1 Identify the information gaps and areas that need more investigation in TK related biodiversity field with a priority list of research topics.	SQU & IUCN & ESO													
3.2 Prepare and implement a research program to cover these priorities for effective documentation of traditional knowledge related to biodiversity.	SQU & IUCN & ESO													
3.3 Select appropriate methodologies and tools to ensue proper documentation and cultural sensitivity	SQU & IUCN & ESO													
3.4 Encourage academic institutions and scientists to actively communicate and collaborate with communities, and include traditional and local knowledge in their research priorities.	SQU & IUCN & ESO													
3.5 Document and disseminate the best practices for utilization of TK.	SQU & IUCN & ESO													
4. A well-trained and equipped team capable of managing and protecting TK is in place and operational		100,000												

Outputs	Resp.	Cost \$	Y1				Y2				Y3			
4.1 Carry out a comprehensive training-needs assessment to the relevant organizations focusing on TK documentation and protection.	SQU & IUCN & ESO & PACI													
4.2 Promote and adopt on job training approach during implementation of these training programs to materialize and facilitate the exchange of experience between trainees.	SQU & IUCN & ESO & PACI													
4.3 Develop and implement a comprehensive training program to build a qualified team capable of managing and protecting TK	SQU & IUCN & ESO & PACI													
4.4 Provide the team the required equipment and materials.	SQU & IUCN & ESO & PACI													
5. A comprehensive awareness and educational program is developed and implemented effectively to ensure better understanding of TK concept and the importance to conserve it.		100,000												
5.1 Define target groups to promote TK related to biodiversity awareness.	ESO & IUCN													
5.2 Develop and implement a national awareness-raising campaign to promote better understanding of TK Concept and the urgent need to document and protect such knowledge; which is subject to erosion due to rapid globalization.	ESO & IUCN													

Outputs	Resp.	Cost \$	Y1				Y2				Y3			
5.3 Carry out national campaigns with the right messages and the right tools.	ESO & IUCN													
5.4 Promote the culture of civil work among the members of the country.	ESO & IUCN													
5.5 Develop an informal educational material to raise the awareness and understanding of universities and schools students.	Ministry of Education & IUCN													
5.6 Develop informal curriculum to include TK concept in the schools curriculum with applied examples related to biodiversity conservation and the TK.	Ministry of Education & IUCN													
6. Traditional Knowledge is mainstreamed in the relevant laws, bylaws and national strategies and policies.	National Committee & IUCN	50,000												
6.1 Review, prepare and issue specific legislative protection for TK related to biodiversity including law for IPR	National Committee & IUCN													
6.2 Advocate including the TK concept in the mandate of the Ministry of National Heritage and Culture Law.	National Committee & IUCN													
6.3 Advocate mobilizing greater involvement of the civil society in protecting TK, hand in hand with a capacity-development program for that purpose.	National Committee & IUCN													

Outputs	Resp.	Cost \$	Y1				Y2				Y3			
7. Pilot conservation project to demonstrate the documentation and protection of TK is developed and achieved with adequate promotion of the best practices and lesson learnt.		500,000												
7.1 Prepare and implement a pilot biodiversity project/s dedicated for biodiversity and TK protection	ESO & IUCN													
7.2 Evaluate and assess this/these project/s for to ensure better protection for TK and to promote of the best practices and lessons learnt.	ESO & IUCN													
8. Successful regional and international cooperation mechanisms are in place and operational and existing multilateral, regional and international agreements and initiatives are employed for effective documentation and protection of TK related to biodiversity.	GOs & NGOs & IUCN	50,000												
Total		1,250,000												

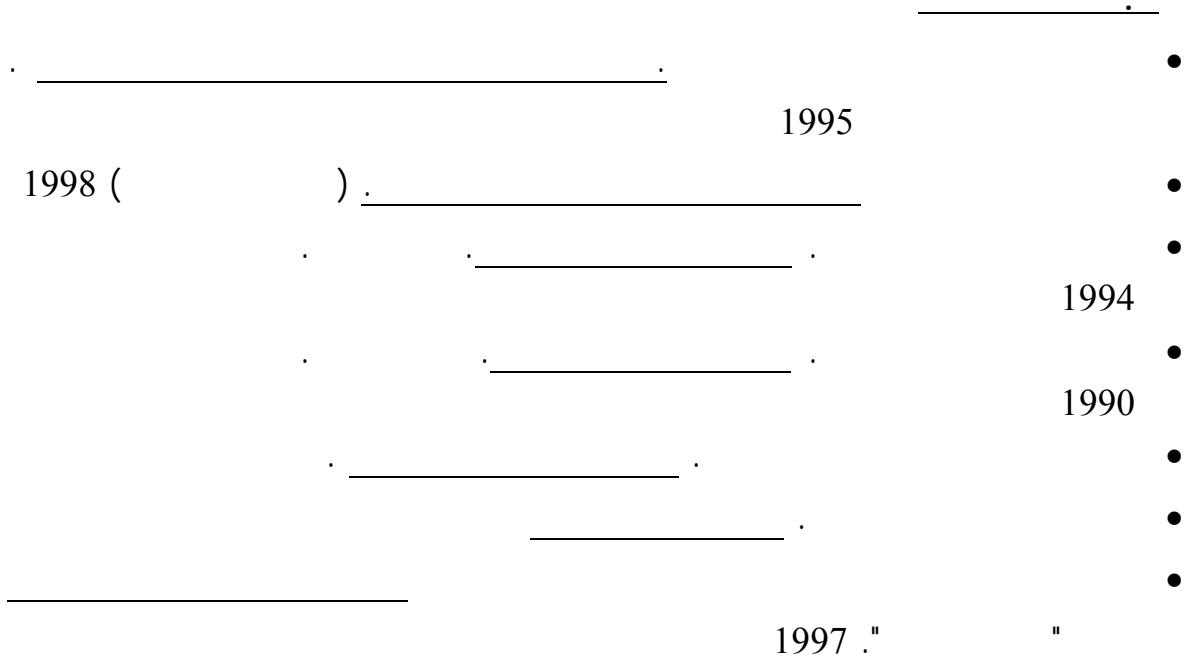
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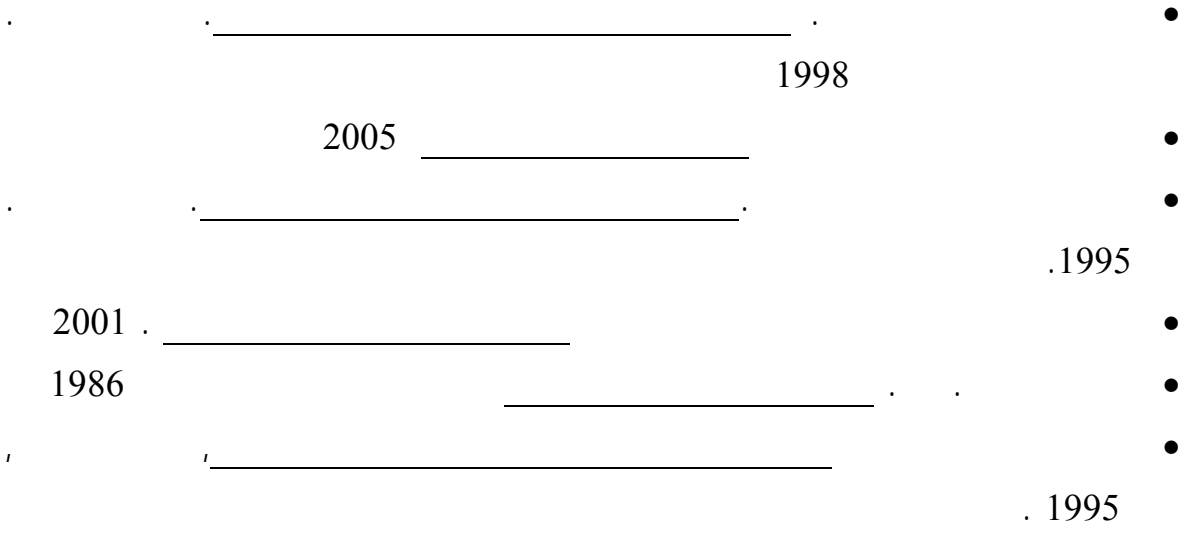
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7. Annexes

Annex (1): Interviewees List

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6	Dr. Sultan Mohammed Al-Hashmi	Head of Sociology and Social Work Department	College of Arts & Social Science	+9682441519	-----	-----	sultanm@squ.edu.om	-----
7	David Insall	Environmental consultant	-----	+96824603154	-----	+96899324158	insall@omantel.net.com insall@supanet.c	P.O. Box 405 Madinat As Sultan Qaboos

							om	Postal code 115 Sultanate of Oman
8	Dr. Mohammed Ali Al-Belushi	Head of Archaeology Department	College of Arts & Social Sciences	+96824141665	+96824141851	+96899835300	belushi@squ.edu. om	Sultanate of Oman P.O. Box 42 P.Code 123 alKhoudh
9	Hassan Mohammed Ali Al-Lawati	Director general Of Archaeology & Museums	Ministry of Heritage & Culture	+96824604973 +96824641357	+96824641359	----	hassan.lawati@ hc.gov.om	-----
10	Mehdi Ahmed Jaffar	Advisor, Center for Environmental studies and research, (C.E.S.A.R)	Sultan Qaboos University	+96824141442 +96824143100 +96824601269	+96824414012	+96899433038	mehdi@squ.edu.o m	
11	Nasser M. Ali Al-Mukhainy	Deputy D.G. of Nature Conservations & wild life	Ministry of regional Municipality, Env. & Water Resources	+96824693922 +96824810054	-----	96899360361	nasseralmukhainy @hotmail.com nassero973@yah oo.com	P.O. Box 616 – Wadi Kabir Postal Code 117 Sultanate of Oman
12	Andrew Spalton PhD	Adviser for Conservation of the Environment	Diwan of Royal Court	+96824963536 +96824693537 +96824693538	+96824693883	+96824993832 27	acedrc@omantel. net.om	P.O. Box 246 Muscat 113 Sultanate of Oman
13	Majek. O. Fatope	HM strategic Project: Natural Products	Chemistry Department Sultan Qaboos University	+96824141491	+96824141469	+96899624464	majek@squ.edu.o m	P.O Box 36 Postal Code 123 Al-Khod Muscat Sultanate of Oman
14	Dr. Suliman S. Al-Khanjari	Associate Researcher	Department of corp sciences	+96824143675	+96824413418	96899314388	israa@squ.edu.o m	P.O. Box 45 Postal code 123 Al- Khoud, Muscat Sultanate Qaboos University

Annex (2): Consulting Team detail, RSCN, KHF and IUCN-WECANA Background

1. Mr. Mohammad Yousef

Director of Conservation

The Royal Society for the Conservation of Nature (RSCN)

MS.c in Horticulture

Mr. Yousef is currently managing the Conservation Division at the Royal Society for the Conservation of Nature (RSCN). For the past 12 years as an ecologist, he has attended various training courses related to biodiversity and conservation. He conducted and managed many ecological surveys to assess species and habitats status and distribution. He has supervised the development of the biodiversity database at RSCN. In addition, he prepared many strategies and conservation management plans for threatened species in Jordan. Mr. Yousef has the opportunity to lead the revision of the protected areas network and the development of criteria for protected areas selection in Jordan. On various occasions he has been consulted for advice on issues related to biodiversity on the national and international levels.

RSCN Background

The Royal Society for the Conservation of Nature (RSCN) is a non-governmental organization created in 1966 under the patronage of His Majesty King Hussein. It is devoted to the protection of nature through the instruments of sustainable development. During the 1970s, it was given responsibility by the Government of Jordan for the establishment and management of protected areas and for the enforcement of wildlife protection laws. It has also been very active in environmental research and education. Among its achievements are:

- the establishment of 6 protected areas covering over 1000 square kilometers
- The successful conservation of threatened species, including the Arabian Oryx.
- Raising awareness and the creation of over 1000 conservation clubs in Jordanian schools, helping students to understand environmental issues.
- Introduction of biodiversity conservation concepts in schools curricula.
- The creation of a national database on habitats and species as a basis for conservation strategies and action plans.
- The regulation of hunting throughout the Kingdom.
- Provision of training and capacity building programs covering a wide spectrum of topics related to protected areas management planning and establishment, ecotourism, public awareness and environmental education, project management and institutional building.

- The development of large-scale conservation projects designed to integrate environmental protection with the socio-economic development of local people.

In 1993, RSCN established the Dana Nature Reserve in southern Jordan, under a three-year Global Environment Facility program, funded by the World Bank and UNDP. This program was used to develop the Dana Reserve into a regional model of integrated conservation and development. It involved the preparation and implementation of a protected area management plan, the initiation of income generating schemes for local people and the development of eco-tourism as a means of supporting both local communities and the running costs of the reserve. It also involved intensive training and capacity building for RSCN staff in the management of protected areas. The project as a whole proved to be highly successful and has received international recognition and acclaim.

The RSCN is funded through a variety of sources, notably fund-raising activities, membership fees, sponsorship, international projects, tourism and an endowment fund. It also receives a small annual donation from the Government (less than 25% of its turnover).

RSCN currently has 285 permanent staff within 4 functional divisions:

- Conservation: it includes Reserve Management, Research and Survey and Enforcement sections
- Outreach: it includes Environmental education and Public Awareness, Public Relations and Regional and Internal training sections.
- Wild Jordan: it includes Socio-economic, Ecotourism, Production, Marketing and Sales sections.
- Administration and Finance

2. Ms. Lamia Raei

M. A Social Anthropology

Executive Director at the Information and Research Center

King Hussein Foundation

A policy research institute aiming at linking policy to practice in the fields of: Poverty, culture, Children and women rights, research capacity building and community development. The Center provides its services to the Government of Jordan, local governance bodies, International donors and regional organizations in the above fields.

IRCKHF Background

IRCKHF is a policy research center, established in the year 2000 under the King Hussein Foundation law number (22) for the year 1999; with the objective of providing research to practitioners and policy makers both in Jordan and the region.

IRC aims to produce rigorous policy research to inform policy makers and development practitioners in Jordan, with the ultimate goal of demonstrably improving outcomes for children, youth and families. To achieve the above goal, IRC has adopted the following approach:

- Enhance role of research in policy design, national plans and decision making.
- Establish local partnerships and networking that make research accessible to practitioners.
- Develop practice tools based on research.

IRC Record

IRC has had an outstanding record in bringing to public attention a number of issues related to social development in Jordan and the region. Major successes were noted in the following areas:

- Combating Child Labor
- Improving parental skills of poor parents (Family Education)
- Mainstreaming culture as an enabling force in development

All areas have involved research, recommendations on policy and practice level and the design tools based on research results. As for the child labor, IRC has produced the first national study on child labor in Jordan. The study highlighted an issue, which was absent from the public discourse. Also, it resulted in the establishment of a Child Labor Department in the Ministry of Labor and a national action plan to combat the phenomena.

Meanwhile, the National program for combating poverty has adopted the Family Education practice tools to be part the national program to combat poverty in two Jordanian Governorates.

Partnerships

IRCKHF has invested in creating partnerships with like-minded partners nationally and internationally on both operational and technical level. IRC perceives those partnerships as invaluable in exchanging research, experience and information. Current partners include:

- Chapin Hall Center for Children- Chicago
- Dartington Research Unit -UK
- Child Watch International- Norway
- Ministry of Culture- Jordan
- Higher Council for Youth-Jordan
- National Council for Family Affairs
- Jordan Hashemite Fund for Human Development (JOHUD)
- Queen Zein al Sharaf Institute for Development (ZENID)
- The Royal Institute for Interfaith Studies
- Department of Statistics - Jordan
- Amman Greater Municipality (GAM)
- Irbid Greater Municipality
- Rene Moawad Foundation (Lebanon)
- UNESCO

3. IUCN-WECANA Background

Annex (3): The list of conventions and protocols that were sanctioned by royal decrees.

No.	Royal Decrees	Royal Decree No
1	Sanctioning Kuwait Regional Convention for Combating Pollution	8/79
2	Sanctioning the Accession of the Sultanate of Oman to the International Convention for the Regulation of Whaling	55/80
3	Sanctioning the Accession of the Sultanate of Oman to the International Convention for the Prevention of Pollution from Ships, 1973	25/81
4	Sanctioning the Accession of the Sultanate of Oman to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	26/81
5	Sanctioning the United Nations Industrial Development Organization Charter	40/81
6	Accession of the Sultanate of Oman to the two International Conventions for Rules Preventing Collision at Sea and Safety of Life at Sea	60/84
7	Sanctioning the Accession of the Sultanate of Oman to the International Convention Relating to Intervention on the high Seas in Cases of Oil Pollution for 1969 and its Protocol for 1973	92/84
8	Sanctioning the Accession of the Sultanate of Oman to the International Convention on Civil Liability for Oil Pollution Damage and its protocol, 1976	93/84
9	Sanctioning the Accession of the Sultanate of Oman to the International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage, 1971	94/84
10	Accession of the Sultanate of Oman to the two International Conventions for Rules Preventing Collision at Sea and Safety of Life at Sea	90/84
11	Sanctioning the United Nations Convention on the Law of the Sea	67/89
12	Sanctioning the Protocol Concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf	92/89
13	Sanctioning the Accession of the Sultanate of Oman to the United Nations Convention on Terms and Conditions of Ships Registration	64/90
14	Sanctioning the Accession of the Sultanate of Oman to the International Convention on Levels of Training, Issue of Certificates and Shifts for Workers at Sea, 1987	65/90
15	Concerning the Accession of the Sultanate of Oman to the Convention on Suppression of Illegal Acts against the Safety of Marine Navigation and the Protocol on Suppression of Illegal Acts towards the Safety of Fixed Platforms Existing in the Continental Shelf	66/90
16	Sanctioning the Accession of the Sultanate of Oman to the International Convention on Salvage, 1989	30/91
17	Accession of the Sultanate of Oman to Some Protocols Related to Marine Navigation	36/91
18	Sanctioning the Accession of the Sultanate of Oman to the Marine Environment Protection Protocol	90/91
19	Sanctioning the Convention on Environmental Cooperation between the Sultanate of Oman and Denmark	36/94

20	Sanctioning the Accession of the Sultanate of Oman to two Protocols on Environment Protection	57/94
21	Sanctioning the Accession of the Sultanate of Oman to Basel Convention on the Control of the Transboundary Movement of Hazardous Wastes and Their Disposal, the United Nations Framework Convention on Climate Change and Convention on Biological Diversity	119/94
22	Sanctioning the Convention on the Prohibition of the Use and Stockpiling of Chemical Weapons and Their Destruction	122/94
23	Sanctioning the Accession of the Sultanate of Oman to the United Nations Convention on Combating Desertification in Countries Suffering Severe Drought and/or Desertification Particularly in Africa	5/96
24	Accession of the Sultanate of Oman to the Agreement to Implement Section Eleven of the United Nations Convention on the Law of the Sea, 1982	77/96
25	Accession of the Sultanate of Oman to the Non-proliferation Atomic Arms Treaty	91/96
26	Sanctioning the Accession of the Sultanate of Oman to Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer	73/98
27	Accession of the Sultanate of Oman to the Rotterdam Convention Related to Application of Prior Informed Consent to Certain Hazardous Chemicals and Pesticides in International Trade	81/99
28	Sanctioning the Protocol on the Transboundary Movement of Hazardous Wastes and Other Wastes and Their Disposal	24/2002
29	Sanctioning Cartagena Protocol on Biosafety of the Convention of Biological Diversity	55/2002
30	Sanctioning the Convention on Conservation of Wildlife and its Natural Resources in the GCC States	67/2002
31	Sanctioning Resolution 3/1 Adopted by the COP to Basel Convention on the Control of the Transboundary Movement of Hazardous Wastes and Their Disposal	88/2002
32	Sanctioning Montreal and Beijing Amendments to Montreal Protocol on Substances that Deplete the Ozone Layer	106/2004
33	Sanctioning Protocol Kyoto Protocol to the United Nations Framework Convention on Climate Change	107/2004
34	Sanctioning Stockholm Convention on Persistent Organic Pollutants (POPs)	117/2004