

Guidelines for the Conservation and Sustainable use of biodiversity

By: Mohamed M. Mirreh¹ & Douglas Williamson²

(A paper presented to the workshop “Activating the Convention on Biological Diversity and the Arab coordination on Biodiversity” organized by AOAD in Tunis 21-24 September 2004)

Abstract

There is considerable habitat and ecosystem diversity in the Arab region which is a host to significant number of plant and animal species providing variety of products that support livelihood for many people in the region. Domestication of many plant and animal species took place in this part of the world and members of their wild progenitors are still endemic in the area. There are indications that there has been a severe depletion of certain types of biodiversity in the region. Habitat pressures and lack of awareness of the importance and value of biodiversity conservation are major threats. The aim of this paper is to propose a number of guidelines that, if followed, would facilitate the conservation and sustainable use of biodiversity.

The Arab countries have an area of more than 14 million km² in the two continents of Asia and Africa and lie between 17°W to 59°E and 0° to 37°N.

There are various climatic conditions in the region such as winter precipitation and dry summer characteristic of countries in North Africa and the Middle East with Mediterranean climate, hot and rainy summers for inter-tropic countries and monsoonal (in some parts of Oman, Yemen and Somalia)

The vast land area of the Arab world have considerable topographic diversity which include mountain ranges, plateaus, high dunes, wadis, rivers and very low depressions (below sea level in the dead sea).The region has also wide diversity of fauna and flora with habitat types of deserts, steppe, savanna, oasis and rainforests. In view of the diverse climatic, environmental and biotic influences these main types have different vegetation and plant communities with variable abilities to produce products of considerable importance to humanity.

It is this part of the world where domestication of many wild plants and animals took place (Ghabbour 1997). Approximately 83 species of the world's cultivated crops originated from the eastern side of the Mediterranean basin “ Fertile Crescent”(Kassas 1998).Some of the wild progenitors of founder groups such as wild Elmer, wild chickpea, wild bitter vetch were reported to be endemic to the region (Zohary 1986). Kassas (1998) listed einkorn wheat(*Triticum turgidum subsp.diocum*), barley(*Hordeum vulgare*), lentil (*Lenis culinaris*), Pea (*Piscum sativum*), bitter vetch (*Vicia ervillia*), broad bean (*Vicia faba*) flax (*Linum usitatissimum*) and fodder crops and range plant species of medicago, Trifolium, Panicum, Pennesitum as founder groups with their wild relatives as components of the flora of the region.

Conservation of natural resources was inherent in the culture of the societies to support livelihood of resource dependent grass root communities. The *Hema* system in Saudi

¹ FAO Range Management and Fodder Crop Production Officer. Regional Office for the Near East and North Africa. Cairo Egypt

² FAO Forestry Officer , Rome

Arabia, the Oasis of many countries in the Arab world, the *Ghutta* in Syria and the *Aqwar* (wetlands) of Iraq are good examples of conservation practices in the region.

Population pressures and considerable demands from natural resources resulted in the decline in the capacity of the natural environment to provide its optimum production and perform its function. Each country is now facing severe erosion of genetic resources of both flora and fauna. Lack of awareness of the value of biodiversity and taking its sustainability for granted is the root cause of degradation of biodiversity in the Arab countries.

The purpose of this paper is to propose a number of guidelines that, if followed, would facilitate the conservation and sustainable use of biodiversity.

To provide a context for these guidelines biodiversity is defined, its value is explained and threats to biodiversity are outlined.

Biodiversity defined

The terms “biodiversity” and “biological diversity” have the same meaning and are a relatively recent invention. They are so broad in scope and so abstract that they are incomprehensible to many people (Koziell, 2001). An attempt will therefore be made to describe biodiversity (as it will be referred to hereafter) in terms which make it more understandable to people who are neither conservationists nor biologists.

Whether one lives in the country or the town one will see different kinds of trees, shrubs, flowers, birds, animals like goats, dogs and cats, and insects like flies, mosquitoes and so on. This is the most obvious and familiar form of biodiversity. It is what specialists call the *species* level of biodiversity. Each different type of plant and animal is regarded as a separate species and has its own scientific name. In the world as a whole there are so many different species that we don't even know what their total number is. About 1.5 million species have been described by scientists, but we know this is only a small fraction of the total number.

The individuals of each species are similar to each other, but usually not exactly the same. In humans, who are a biological species like all the other forms of life on earth, obvious differences between individuals include height, weight, eye colour and hair colour. These differences result from the influence of the invisible genes which are hidden within the cells that make up our bodies. We inherit our genes from our parents, half from our mother, half from our father. The genes can be thought of as instructions which the body follows when it creates a baby from a fertilized egg, when the baby grows into an adult and which also control how the body itself works throughout our lives.

The genes have a vital role not only for individual members of a species but also for the species as a whole. The fact that individuals have different genes means that when the environment changes, as it inevitably does sooner or later, it is more likely that some individuals will be able to survive and that the species as a whole will persist. In other words the differences between the genes of individuals enable the species to *adapt* to environmental change.

The differences between the genes of individuals are referred to as *genetic* differences and this kind of variation is regarded as a form of biodiversity, which is referred to as *genetic* diversity.

Genetic diversity is important not only because it allows species to adapt to changing environments but also because it allow humans to consciously select for characteristics of plants and animals that are considered to be useful or valuable.

Another form of biodiversity which is more difficult to recognize than species diversity, is what is referred to as *ecosystem* diversity.

An inland lake is a clear and simple example of an ecosystem. The lake ecosystem includes the following: all the different plant and animal species that live in the lake and depend on it for their survival, the water and the soil and rock which lie under the water, plus all the processes that link the different parts of the ecosystem with each other. For example there might be reeds, water weeds, insects, birds, otters, water rats, and fishes in the lake. The growth of the plants depends on chemical nutrients which are dissolved in the water or are in the soil and rock at the bottom of the lake. The insects feed on the reeds and water weeds, the water rats feed on the insects, some fish feed on plants, other fish feed on insects and smaller fish, the birds and the otters feed on the fish, and so on. In this way all the components of the lake ecosystem are linked with each other.

One important feature of the lake ecosystem is that it is changing all the time. The water level probably changes often, the numbers of the different plant and animal species change through time, some species may disappear, and new species may appear. Because of all these changes, the ecosystem is described as being *dynamic*.

Another important feature of the lake ecosystem is that it is linked to other ecosystems and is influenced by them. For example, there will probably be a river flowing into the lake. If this river is polluted with agricultural chemicals that have been washed into it from fields along its bank, then the plants and animals in the lake will be affected by this pollution.

The rather long description of an ecosystem that has been given here is concisely summarized in the technical definition of an ecosystem that is given in the Convention on Biological Diversity (UNEP, 1994), which is as follows:

“Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

In a similar way the Convention on Biological Diversity (widely known as the CBD) provides a technical definition of biodiversity as a whole, which is as follows:

*“Biological diversity” means the variability among living organisms from all sources, including, **inter alia**, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species (i.e. genetic diversity), between species and of ecosystems.*

Why should we care about biodiversity?

One important reason for caring about biodiversity is that it has value for humans in a number of different ways which are summarized in the table below (from Koziell, 2001):

Value	Description	Primary beneficiaries
Direct use		
Subsistence	Biodiversity supports and provides a selection of products that can be gathered or hunted for subsistence use, such as food (meat, fish, and fruits), building and clothing material, medicines, fodder for livestock, dyes, gums, resins and so on.	Mostly rural people – especially poorer groups, indigenous peoples, traditional healers and those most reliant on common property resources.
Tradable/commercial	Biodiversity supports and provides a range of products that can be gathered or hunted to be traded or sold in markets outside the area of origin, such as , crops, timber, fish and genetic resources	Small and large scale commercial enterprises and their employees, e.g. artisans, hunters, collectors, timber companies
In direct use		
Environmental services	Biodiversity is the medium through which air, water, gases and chemicals are moderated and exchanged to create environmental services such as watershed protection, carbon storage, nutrient cycling, and pest and disease control. It ensures the continued functioning, resilience and productivity of ecosystems which provide 'direct use' goods.	Everyone
Informational and evolutionary	Biodiversity comprises genetic diversity and associated information used by people to create new crops or animal varieties or pharmaceutical derivatives. It plays a critical role in enhancing agricultural productivity, is a key source of medicines and cosmetics. It also enables natural selection to take place	Farmers, both subsistence and commercial, plant and animal breeders, scientists, agro-chemical, food and pharmaceutical companies
Non-use		
Future options	Biodiversity includes genes and species that can help to insure against future risk and uncertainty; for example the genetic resources needed to combat new diseases and climate change	Future generations
Existence	Biodiversity has a value in its own right that can be used to justify its existence. This value transcends its use and financial values, whether for aesthetic, cultural, philosophical or religious reasons (sometimes activities associated with existence values, e.g. tourism, can have impacts ranging from limited to quite severe and cannot then be considered as non-use activities but could be classified as direct use)	Urban dwellers. People practicing religions that hold nature in reverence. Indigenous peoples, artists, poets, photographers and conservationists. Tourists and tourism companies.

It is extremely important to understand that in natural areas the value of biodiversity comes from the indigenous species, which are adapted to local environments and to living with each other. It is dangerous to introduce into a natural environment exotic species which have evolved in a different environment, because this can result in the extinction of valuable local species. This can happen if exotic species have advantages over local species, such as having no predators in the local environment or being able to out-compete local species.

Apart from its actual or potential value to us, another reason why we should care about biodiversity is that our own activities are having an enormous negative impact on it. Although this is an issue that many people do not care to think about, there are a growing number of people who believe that it is morally wrong for humans to ignore the needs of other species and to destroy them in a reckless and unnecessary way.

Threats to biodiversity

In all countries of the region, biodiversity is directly threatened by processes such as:

Habitat destruction such as, burning or cutting down of forests, uprooting shrubs for fuel, converting rangeland into cropland, and so on. Habitat destruction is one of the most serious causes of biodiversity loss, because species are adapted to particular habitats, so if these disappear the survival of the species that depend on them is put at risk

Overexploitation such as, overgrazing of the rangelands; or uncontrolled hunting of birds and animals. Common results of overexploitation are degradation of the environment, including reduced productivity and diversity, and loss of bird and animal populations or even loss of bird and animal species.

Pollution such as that produced by factories, motorcars, and by run off from agricultural land. Pollution can damage human health, damage forests and other plant communities through acid rain, and increase the levels of disease and death among fish in aquatic ecosystems which are fed by polluted sources.

Global climate change One form of climate change is the greenhouse effect, which is caused by increases in the levels of carbon dioxide and other so-called greenhouse gases, and which leads to global warming and more extreme weather events.

Introduction of alien invasive species The values of biodiversity are often due to the way in which local plants and animals are adapted to local conditions. These values can be reduced if alien species from other parts of the world are introduced to local environments. The effects of introducing alien species include the displacement of native fish species by alien species; or the displacement of native birds by alien bird species, e.g. the European starling in the United States and the introduction of alien plants such as mesquite (*Prosopis juliflora*) causing considerable threats to the biodiversity in many countries of this region.

In the region there are indications that there has been a severe depletion of certain types of biodiversity. For example, deforestation of mountain areas and degradation of

rangelands have reached an advanced stage, and uncontrolled hunting has had a devastating effect of populations of native birds (such as Houbara bustard) and other animals (such as gazelles).

Initiatives to address biodiversity issues began only in the recent past. They have included national surveys of biodiversity, establishment of protected areas and the implementation of a number of projects. These are encouraging developments, but a vast amount needs to be done to establish the effective conservation and sustainable use of biodiversity.

It is in the light of this great need that guidelines are being proposed to facilitate conservation and sustainable use of biodiversity. Some of these guidelines are of a general nature and applicable to most countries, but all of them are directly relevant to prevailing conditions in countries in the Arab world. Each of the guidelines is presented and discussed below.

In essence the guidelines are an attempt to express in accessible language the most important aspects of current conservation thinking.

Guidelines

The order in which the guidelines are presented is not related to their importance. They fall into three broad categories, all of which are important: (i) the organizational basis of conservation (which includes sustainable use); (ii) the practical implementation of biodiversity conservation; (iii) the involvement of civil society.

(i) The organizational basis of biodiversity conservation.

Guideline 1: *Biodiversity conservation should be based on a clear and coherent set of strategic objectives*

Developing strategic objectives is helpful because “Stating your strategic objectives very clearly and unambiguously can give you a stable point of reference to guide all of your decision making for a long time. It is a very sound place to begin your thinking when faced with a situation in which you don’t even know where to begin” [Keeney, 1992].

Among various possible ways of developing strategic objectives, one option is to use an existing framework for decision-making, such as the value-focused thinking approach developed by Keeney (1992). This approach has a logical basis which is particularly appropriate to conservation, in the sense that it is based on the understanding that “Values are what we care about. As such, values should be the driving force for our decision-making.”

In terms of conservation and sustainable use, a set of strategic objectives would need to clearly and concisely capture at least four types of value - cultural and religious, ecological, ethical, and socio-economic. A set of strategic objectives that reflects these values, might thus be as follows:

1. to use and document indigenous and traditional knowledge and practice of biodiversity use, and to implement biodiversity conservation and

- sustainable use with due respect for cultural and religious values [this objective reflects cultural and religious values]
2. to maintain existing levels of indigenous biodiversity and, where possible and appropriate, to restore degraded ecosystems and indigenous biodiversity that is locally extinct [this objective reflects ecological values];
 3. to recognize that species other than humans have a right to life, and as far as possible to provide them with the living space they need, and to minimize the suffering that is caused by the hunting and harvesting of animal species [this objective reflects ethical values];
 4. on the one hand, to include consideration of biodiversity in plans for economic development, and on the other hand, to maximize the contribution that the conservation and sustainable use of biodiversity can make to poverty alleviation [this objective reflects socio-economic values].

Strategic objectives like this provide a framework for developing specific objectives for particular activities or projects. These specific objectives will seldom if ever be the same as the strategic objectives, but they must not be in conflict with the strategic objectives. By having specific objectives which are based on and linked to core values through the strategic objectives, action on the ground reflects the best available understanding of what is needed and success can be distinguished from failure. Success can also be measured by selecting appropriate variables to measure the achievement of objectives. Thus if, for example, if the objective is "to minimize overgrazing by reducing the stocking density of sheep", an appropriate variable would be "stocking density of sheep".

Guideline 2: *The effective conservation and sustainable use of biodiversity requires the political support and commitment of senior national leaders.*

Without strong political support the prospects of successfully implementing the conservation and sustainable use of biodiversity are severely reduced. Such support and commitment can take various forms, such as public expressions of support for biodiversity conservation on television and radio and in the press, well publicized visits to important conservation areas by senior political figures, and allocation by the government of the human and financial resources that are required for the conservation and sustainable use of biodiversity. Regional examples of countries in which energetic and successful conservation programs have been initiated and implemented with the support of senior national leaders include Oman, Saudi Arabia and Jordan.

Guideline 3: *Biodiversity conservation needs a supportive policy and legal framework and coherent and effective institutional arrangements.*

Policies and laws determine which activities and arrangements are encouraged and or permitted and therefore have an enormous influence on biodiversity conservation. Issues which often arise in this context include the legal rights and powers of conservation officials, use rights to resources in areas designated for protection, types of activity

permitted in conservation areas, and sharing of benefits from income generating activities.

Because they are so influential, it is extremely important that policies and laws are periodically reviewed and updated to accommodate new developments and new thinking in conservation.

Institutional arrangements are problematic in many countries in the sense that responsibility for the conservation and sustainable use of biodiversity is often fragmented and distributed through a number of different institutions. This creates difficulties in coordinating activities and frequently leads to conflicting or contradictory activities.

To avoid such problems, responsibility for the conservation and sustainable use of biodiversity should ideally be given to one institution. If this is not possible, which is often the case, then coordination between the various institutions involved in this area is vital.

Guideline 4: *There are important advantages in creating and using flexible mechanisms for financing biodiversity conservation.*

In an increasing number of countries biodiversity conservation agencies are being made financially autonomous, both because this gives them at least the potential to reduce their dependence on government funding and because this gives them a strong incentive to identify and exploit alternative sources of funding. Such funding can take a variety of forms, for instance having capital developments like tourist accommodation paid for by private sector operators who wish to implement tourist operations in the area.

Experience has shown that where revenues generated by protected area entrance fees, ecotourism and other revenue generating activities are simply paid into the central government revenue fund, this has a strong inhibiting effect on the initiative displayed by the conservation agency.

Guideline 5: *Biodiversity considerations should be included in the Environmental Impact Assessments which should precede all major physical developments.*

Environmental Impact Assessments (EIAs) are a cost effective way of avoiding unnecessary environmental damage and it thus serves the interests of all countries to implement them. It is a simple matter to include biodiversity considerations among those that are addressed in the course of a wider ranging EIA.

It is also the case that Article 14 of the Convention on Biological Diversity [CBD] requires parties to implement biodiversity impact assessments when physical developments are planned

(ii) The practical implementation of biodiversity conservation.

Guideline 6: *Trained staff is required for implementing conservation and management activities and enforcing laws.*

Biodiversity conservation involves a large number of activities, including administration, law enforcement, public relations, negotiation with local communities and other interest groups, conservation education, conservation and management in the field and applied scientific research. Trained staff is required for the implementation of all these activities.

Guideline 7: *To perform their functions conservation officers depend on the provision of adequate infrastructure and equipment for implementing conservation and management activities and enforcing laws.*

Conservation activities occur both inside and outside of protected areas. Inside protected areas there is a need for infrastructure, such as roads, offices, tourist facilities and so on, and for equipment like vehicles, radios, computers, office furniture, audio-visual equipment for conservation education and so on.

Outside protected areas a conservation agency may require a fully equipped headquarters building and will need vehicles and communications equipment to coordinate its activities.

Guideline 8: *Because conservation activities are often constrained by lack of relevant information and understanding, there is a need for research in many different disciplines which have a bearing on conservation.*

Conservation depends on many different kinds of information and understanding, including, for example, the biology and ecology of the plants and animals in the areas under protection, ecosystem science and management, conservation education, and the value of goods and services provided by the natural world. Often there is either a general shortage of the type of information and understanding required or it is not locally available. In both situations research is required to supply the information and understanding that is required.

[iii] The involvement of civil society

Guideline 9: *Biodiversity conservation cannot achieve sustainable success without the support of civil society.*

A numbers of cases have shown that conservation programs which are imposed on civil society are not sustainable. This means that civil society has to be educated and informed about biodiversity conservation and also involved in it.

Education and information can be provided by television, radio and printed material for the general public and by the inclusion of biodiversity conservation in the curriculum of schools. Involvement in conservation can be facilitated by creating attractive facilities for tourists to protected areas, and making visits to conservation areas both enjoyable and informative, for instance by developing nature trails and wilderness trails. Giving the

public the opportunity to volunteer their time or labour to implement conservation activities and works is another way of generating involvement which has been very successful in some countries.

Guideline 10: *The involvement of local people and communities, and other stakeholders is essential when their rights and interests are affected or likely to be affected by conservation measures or activities.*

Conservation measures, such as the designation of protected areas, and conservation activities, such as the management of protected areas, often have an effect on the lives of people who live in or near such areas, or who have a legitimate interest in them. Such people are often referred to as stakeholders.

Experience in many different countries has shown that the results of ignoring the interests of legitimate stakeholders are often negative, taking forms such as conflict and illegal and unsustainable resource use. Over the last few decades a large body of practical skills for dealing with such situations has accordingly been developed. This provides methods for reconciling the claims of the various stakeholders, including the conservation agency operating in the affected area.

Guideline 11: *Partnerships with groups who have an interest in conservation activities can make an important contribution to sustainable success of conservation projects and programs*

Shortages of money or trained staff can be overcome when conservation agencies form partnerships with groups interested in conservation, such as Non-Governmental Organizations [NGOs] or the private sector. Conservation NGOs may be able to provide both money and skilled people. The private sector may be prepared to invest money to develop a business opportunity, such as an ecotourism venture.

Suitable partners are not always available, but in situations where conservation activities are limited by shortages of money or trained people, the possibility of working with one or more partners is always worth considering.

An example of a working partnership in the region is that between the Government of Jordan and the Royal Society for the Conservation of Nature [RSCN], which is a Jordanian conservation NGO. The RSCN implements many conservation activities which in other countries in the region would be implemented by the government.

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