

# Effects of War on Biodiversity and Sustainable Agricultural Development in Afghanistan

Abdiani Saidajan\*

Horticulture Department, Agriculture Faculty, Nangarhar University, Nangarhar, Afghanistan.

Afghanistan is a landlocked country of plains and mountains with a wide range of ecosystems. Its climate is continental, with cold winters and hot summers. Most of the country is semi-arid or arid, although the east is watered by the monsoon. The natural resources and associated biological diversity provide the basis of a livelihood for up to 80% of the population; agriculture, horticulture, animal husbandry, and forestry form the backbone of the economy. Afghanistan is rich in biodiversity and natural beauty, and is home to globally significant wildlife species such as Marco Polo sheep (*Ovis ammon polii*) and the snow leopard (*Uncia uncia*), which are under pressure from hunting, loss of habitat, and illegal trade. The most significant threats to natural resources are illegal hunting and trade, deforestation, desertification, and lack of law enforcement. In this situation, food security and sustainable agricultural development will remain a dream, and the causes of poverty and instability will be strengthened, both in Afghanistan and in the region. If Afghanistan is to develop into a vibrant nation with secure sustainable agricultural development, it must first halt the loss of its biodiversity, which requires international support and collaboration in national reconciliation, job creation, capacity building, raising of public awareness, and law enforcement. Healthy societies depend on a healthy environment that is rich in biodiversity, whose conservation is a must.

**Key words:** conflict, threatened species, awareness, conservation, strategies

## 1. Introduction

Afghanistan, a mountainous country with several ecological zones, is rich in biodiversity and landscape beauty. War, three decades of instability, and several recent years of drought have severely harmed these natural resources, on which the Afghan economy depends. The loss of biodiversity and habitat destruction can directly affect farming and agriculture. In fact, sustainable agricultural development depends on the conservation of biodiversity. The Afghan government, with international support, is working to conserve and rehabilitate biodiversity and ecosystems. The aim of this paper is to present the status of biodiversity in Afghanistan and attract the attention and support of the public, government, and the international community for the conservation of biodiversity and the maintenance and rehabilitation of habitat.

## 2. Afghanistan profile

### 2.1 Geography

Afghanistan is a landlocked country of plains and mountains that lies between 29° 40' and 38° 40' N and 60° 31' and 75° 00' E. Generally considered part of Central Asia, it is also grouped with the Middle East or South Asia. It has a total area of about 650 000 km<sup>2</sup> (Table 1). The population was estimated at 29.8 million in 2010, with a growth rate of 2.4% (ICARDA, 2011). The Hindu Kush mountain range, stretching nearly 1000 km from east to west, splits the country between north and south. The lowest point is Amu Darya (258 m a.s.l.), and the highest is Nowshak 7485 m a.s.l.) in Badakhshan Province (ICARDA, 2011). The mountainous areas are mostly barren or at most sparsely sprinkled with trees and stunted shrubs. Significant landscapes include Band-i-Amir in Bamyan Province and the Wakhan corridor in Badakhshan

Received: September 3, 2011, Accepted: October 27, 2011

\* Corresponding author: Horticulture Department, Agriculture Faculty, Nangarhar University, Nangarhar, Afghanistan.

Tel: (+93) 700 601 824, E-mail: saidajan\_abdiani@yahoo.com

Province. In addition, the country has many rivers, lakes, and deserts. The four major river systems are the Amu Darya, Helmand, Harirud and Kabul (ICARDA, 2011).

## 2.2 Climate

Afghanistan has a mostly subarctic mountain climate with dry and cold winters, except in the lowlands, which have an arid to semi-arid climate. It has clearly defined seasons, with hot summers and cold winters. Variations in temperature during the day may range from freezing at dawn to nearly 40°C at noon. Summer temperatures can reach as high as 54°C (in Zaranj). The lowest temperature recorded is -54°C (in Shark/ Ghor Province). Most of the precipitation falls from October to April. The deserts receive less than 100 mm a year, but the mountains receive more than 1000 mm, mostly as snow (ICARDA, 2011).

In general, most of Afghanistan is influenced by weather fronts from the Mediterranean, with low and erratic rainfall, typically in spring. The east of the country lies near the margin of the monsoon system that affects the Indian subcontinent. Here, higher and mountainous parts of the eastern provinces, including Kunar, Nuristan, Laghman, and Nangarhar, receive up to 1200 mm of rainfall in summer (roughly five times the national average) (UNEP, 2003).

## 2.3 Livelihood

Afghanistan is an essentially agrarian country, with around 80% of the population involved in farming, herding, or both. Only 12% of the land area, mainly in scattered valleys, is suitable for arable farming or horticulture, both irrigated and rainfed; 46% is under permanent pastures; and 39% is mountainous and remaining 3% is covered by forest, water bodies and urban areas (Table 1).

Before the Soviet occupation in 1979, it was estimated that 85% of the population derived their main livelihood from arable farming, horticulture, or livestock, commonly in combination. Agriculture remains the mainstay of the Afghan economy, accounting for about 32% of GDP and still supporting over 80% of the population. At least two-thirds of the arable land requires irrigation. Water is drawn from springs and rivers and is distributed through surface ditches and underground tunnels known as *karez* (or *qanat*) (Adil, 2000; ICARDA, 2011; Ministry of Agriculture, Animal Husbandry and Food, 2005).

Despite the dependence of most of the rural population on agriculture, arable land is limited, and a

**Table 1.** Land and crop areas in Afghanistan.

Land cover	Area in ha (000)	Percentage
Urban	29.5	0.05
Irrigated lands	3,207.8	5
Rainfed lands	4,517.7	7
Orchards	94.2	0.1
Forests	1,337.6	2.1
Rangelands	29,176.7	45.2
Barren lands	24,067	37.3
Marshlands	417.6	0.6
Water bodies	248.2	0.4
Snow	1,463.1	2.3
Total	64,559.4	100

Source: ICARDA (2011).

significant proportion of the population does not own farmland, yet these people account for a large part of the production, as sharecroppers, workers, or tenants. The average farm size ranges between 1 and 2 ha. About 80% of farming households cultivate less than 2 ha, and nearly 50% less than 1 ha. A significant deficit in food production results in food insecurity, particularly for poor and vulnerable households, creating the need for emergency food aid. For example, against a total wheat requirement of 5.25 million metric ton in 2009, the net import requirement was 191 000 t. Wheat is the main staple cereal and accounts for about 70% of the cropped area, 70% of cereal production, and 70% of total cereal consumption (ICARDA, 2011).

## 3. Biodiversity of Afghanistan

Afghanistan is rich in living resources and natural beauty. Its spectacular landscapes of mountains, deserts, woodlands, and forests are home to a wide range of flora and fauna in multiple ecological settings (UNEP, 2008). The biodiversity is manifested in many ways, including number of species, differences in groups of species in various areas, the widely differing ecosystems found in different parts of the country, and the genetic variation found in wild species and in crops and livestock.

Many cereal crops and fruit trees and all sheep and goats, which today are important food sources throughout the world, were first domesticated in nearby Western Asia and the Middle East. Afghanistan itself is one of the most significant centers of origin of domestic plants and animals, as evidenced by the numerous local

**Table 2.** Existing wildlife of Afghanistan.

Category of biodiversity	Number of species
Mammals	137-150
Birds	428-515
Reptiles	92-112
Amphibians	6-8
Fishes	101-139
Butterflies	245
Vascular plants	3500-4000

Source: UNEP (2008).

landraces of wheat and other crops and the nine local breeds of sheep, eight of cattle, and seven of goats.

The principal plant species whose wild ancestors are still found in Afghanistan are pistachio (*Pistacia vera*, *P. khinjuk*), pear (*Pyrus* spp.), apple (*Malus* spp.), plum (*Prunus* spp.), almond (*Prunus dulcis*), and cereals (e.g., *Triticum*) (Adil, 2000). The tree species grow in isolated patches along the rivers, and the cereals occur on the steppes and as weeds of cultivation. About 3500 to 4000 vascular plant species are native to Afghanistan (Table 2), of which about 20% to 30% are endemic (i.e., about 700-1200 species) (UNEP, 2008). There are three characteristic types of tree cover: forests of mixed oak and conifers (*Quercus* spp., *Cedrus deodara*, *Pinus* spp., *Abies webbiana*, *Picea smithiana*, *Juniperus* spp.), open woodland (pistachio, almond, juniper), and riparian (*Salix* spp., *Populus* spp.).

Many of the larger mammals in Afghanistan are categorized by the International Union for Conservation of Nature (IUCN) as globally threatened (UNEP, 2003). These include the snow leopard (*Uncia uncia*), wild goat (*Capra aegagrus*), markhor goat (*Capra falconeri*), Marco Polo sheep (*Ovis ammon polii*), urial (*Ovis orientalis*), and Asiatic black bear (*Ursus thibetanus*). Other significant mammals include ibex (*Capra ibex*), wolf (*Canis lupus*), red fox (*Vulpes vulpes*), golden jackal (*Canis aureus*), caracal (*Caracal caracal*), manul or Pallas's cat (*Otocolobus manul*), striped hyena (*Hyaena hyaena*), Rhesus macaque (*Macaca mulatta*), and brown bear (*Ursus arctos*). (UNEP, 2003)

Much of the available information on Afghanistan biodiversity is old and no longer reliable. Little significant information has been gathered since the onset of war in 1978. The range in numbers results from un-

certainty in taxonomy and the questionable validity of some records (UNEP, 2008).

#### 4. Biodiversity at risk

The decades of conflict and instability, low education, lawlessness, timber mafia, high unemployment, overall poverty, drought and other natural hazards, population increase, and the influx of displaced or returning peoples have all exacted a heavy toll on the environment and natural resources of Afghanistan. During over two decades of conflict, Afghanistan's natural resource base has been heavily damaged by military activities, refugee movements, overexploitation, and lack of management and institutional capacity. Recent years of drought have worsened this damage.

Desertification, particularly in the southwest, north, northeast, and center, and deforestation in the east are increasing at an alarming rate. The cultivation of pastures when rainfall is plentiful and subsequent fallowing cause erosion and loss of grazing land. Illegal hunting and natural disasters damage biodiversity and biological resources.

The IUCN's Red List lists 39 species (16 mammals and 19 birds) and 8 subspecies (all mammals) in Afghanistan as being globally threatened with extinction. There are 23 Afghan mammal species listed in Appendix 1 and 88 bird species in Appendix 2 of the Convention on International Trade in Endangered Species (CITES), of which 7 vertebrate species are endemic to Afghanistan (UNEP, 2008). No formal assessment has been made of species at risk at the national scale, but many species, in particular large mammals, are obviously at risk of extinction within Afghanistan. One Afghan taxon (species or subspecies) is considered globally extinct (the Caspian tiger), 7 are critically endangered, 8 are endangered, and 31 are vulnerable (UNEP, 2008).

Afghanistan is home to globally significant wildlife species such as the Marco Polo sheep and snow leopard. Both are under pressure from hunting, loss of key habitat, and illegal trade. However, with its diversity of habitat, Afghanistan retains a wide variety of fauna. Conifers (primarily *Cedrus deodara*) in the eastern mountains are currently being illegally harvested at a rapid rate. Between 1977 and 2002, Nangarhar province lost 71% of its forest cover, Nuristan lost 53%, and Kunar lost 29%. Similar losses were predicted in Paktya, Khost and Paktika provinces (UNEP, 2003).

The World Database of Protected Areas (UNEP-WCMC 2006) lists 15 protected areas in Afghanistan. Seven were formally recognized by the government of Afghanistan in the 1970s and are recognized by IUCN (1 Category II national park and 6 Category IV wildlife or waterfowl reserves) (UNEP, 2008). However, none are officially recognized by the current government (as they were never formally gazetted), none have official boundaries, and none are managed. The lack of effective and stable government, of human resources, and of finance prevents the formulation of plans and strategies to maintain and conserve biodiversity (Adil, 2000).

## 5. Importance of biodiversity to Afghanistan

History shows that environmental degradation often contributes to the collapse of civilizations, and that a vibrant, healthy society depends on a healthy environment that is rich in biodiversity. The primary value of biodiversity to Afghans lies in the tangible goods and services that it provides. The most obvious of these are traditional crops, fruits, grazing, fuel, timber, fishing, and hunting.

The variety of living things is sometimes called the wealth of the poor, because rural people living close to the land depend on biodiversity to provide natural goods and ecological services. Less obvious are the ecosystem services provided by diversity. These include soil fertility, erosion control, crop pollination, and climatic stability. The natural resources and associated biological diversity provide the livelihood basis for up to 80% of the Afghan population (UNEP, 2008).

The traditional landraces and livestock breeds still raised in Afghanistan yield less than modern improved cultivars and breeds, but they are a valuable resource of genetic resistance to disease and environmental stress. These and their wild relatives can provide valuable material for the genetic improvement of crops and livestock. Their conservation should therefore receive high priority.

### 5.1 Effects of war in Afghanistan on biodiversity

After the occupation of Afghanistan by the former Soviet Union, the Soviet-installed regime on the one hand and the Mujahedeen on the other engaged in destructive war for over a decade. When the Soviets retreated, the Mujahedeen were not able to establish an effective rule in the country because of their internal differences and because of foreign intervention.

Instead, the Taliban emerged and immediately took over about 90% of Afghanistan; out of 29 provinces, 25 were totally controlled by the Taliban, and the rest by their opposition, mostly in the north. The Taliban, who were mostly religious students with no political experience, no skills, and no interest in promoting social and economic transformations, focused solely on expansion of their rule and bringing the country under one jurisdiction. (Adil, 2000)

All the vital social, economic, and educational institutions were either totally destroyed or crippled by the ongoing war. Most of the factories, about half of the agricultural land, and more than half of the livestock sector were eliminated. About 75% of the infrastructure was damaged. A third of the population with all their skills and capacities fled. All of these factors placed Afghanistan's environment and ecosystems under great pressure. Agriculture, horticulture, animal husbandry, and forestry formed the backbone of the economy before war began in 1979. All of these sectors, particularly forestry, have suffered badly since. (Adil, 2000)

Laws and regulations were all violated in the absence of an effective central authority and legislation. As a result of the war, firearms fell into the hands of irresponsible persons who shot at every moving object. Although the Taliban imposed a ban on carrying firearms in their territories, the hunting of big animals and birds in other areas may have continued for want of education and awareness about conservation and ecological principles. Ignorance and lack of education are largely responsible for the depletion of natural resources (Adil, 2000).

The following are the major concerns for biodiversity conservation in Afghanistan today:

- Deforestation.
- Overgrazing and destruction of rangelands.
- Loss of protection of protected areas and of their significance as reservoirs of biodiversity.
- Loss of vegetative cover and associated problems.
- Loss of all of the achievements in the conservation of biodiversity, and no plans to redress this loss.
- Acute shortage of technical expertise and institutions specialized in biodiversity.

## 6. How to improve the biodiversity situation

The most significant threats to Afghanistan's natural

resources are illegal hunting and trade, deforestation, desertification, lack of law enforcement, and lack of public awareness. In this situation, food security and sustainable agricultural development will remain a dream, poverty will spread, communities will dissolve, rural migration will increase, and cultural connections will be lost, harming the region and the global community (Adil, 2000).

Nine priority actions are suggested for the conservation of Afghanistan's biodiversity:

1. Establish legally protected areas with effective management. Priority areas should be Band-i-Amir, Ajar Valley, Pamir-i-Buzurg, and Dashte Nawar.
2. Develop a protected areas system plan to protect representative areas of high biodiversity in all major eco-regions.
3. Survey all 21 recognized wetlands and potential protected areas to determine current status and suitability for inclusion in the protected areas system plan.
4. Initiate a national Red List process for Afghan mammals with the technical assistance of the IUCN, incorporating targeted surveys to establish the current status of priority species.
5. Encourage national and international scholars to compile a comprehensive flora of Afghanistan.
6. Develop plans to intervene in the destruction of the remaining monsoon-dependent forests of eastern Afghanistan.
7. Develop plans for preserving and recovering remnant pistachio and juniper forests in northern Afghanistan.
8. Develop programs to preserve native Afghan landraces and livestock breeds.
9. Develop a national biodiversity strategy and action plan for Afghanistan.

For now, some progress has been achieved through the establishment of the National Environment Protection Agency (NEPA) in 2005. Afghanistan's first environmental law was drawn up in the same year, and subsequently promulgated in 2007. In June 2009, NEPA announced the establishment of the first protected species list (UNEP, 2008).

These detailed actions must be undertaken within the context of broader institutional initiatives to conserve biodiversity, including the following:

1. National reconciliation, political stability, and

securing the territorial integrity of the country following the war and the establishment of an effective central government.

2. Environmental legislation and regulations and their enforcement for the protection of the environment and the setting of standards.
3. Improving the capacity of government institutions to effectively manage biodiversity.
4. Increasing public awareness of biodiversity and its value to the Afghan people.
5. Developing a national biodiversity strategy and action plan for Afghanistan.
6. Poverty alleviation and implementation of income-generating projects to create job opportunities.
7. Support and cooperation of the international community in the conservation of Afghan biodiversity.

## 7. Conclusion

The degradation of natural resources has directly and severely harmed the environment and ecosystems, affecting the livelihoods of the majority of the Afghan population, as well as the country's agriculture and economic development as whole.

Healthy societies depend on a healthy environment that is rich in biodiversity. Therefore we must overcome the challenges and threats facing biodiversity. If Afghanistan is to develop into a vibrant nation and achieve sustainable agricultural development, it must first halt the loss of its biodiversity, for which international support and collaboration in poverty elimination and capacity building are needed.

## References

- Adil, A.W., 2000. National Biodiversity Strategies and Action Plans for Afghanistan. 1<sup>st</sup> Workshop on National Biodiversity Strategies and Action Plans in North East and Central Asia, Experiences and Lessons, Beijing, China.
- ICARDA, 2011. Focus on Seed Program, the Afghanistan Seed Industry. International Center for Agricultural Research in the Dry Areas. Aleppo, Syria. <http://www.icarda.cgiar.org/seedunit/seed>
- Ministry of Agriculture, Animal Husbandry and Food, 2005. National Seeds Policy, Islamic Republic of Afghanistan, Kabul, Afghanistan. <http://www.mail.gov.af/en>
- UNEP, 2003. Afghanistan Post-Conflict Environmental Assessment. United Nations Environmental Programme, Nairobi, Kenya. <http://www.unep.org>
- UNEP, 2008. Biodiversity Profile of Afghanistan. United Nations Environmental Programme, Kabul, Afghanistan. <http://www.unep.org>