PROJECT SITE

SHOUF BIOSPHERE RESERVE (LEBANON)

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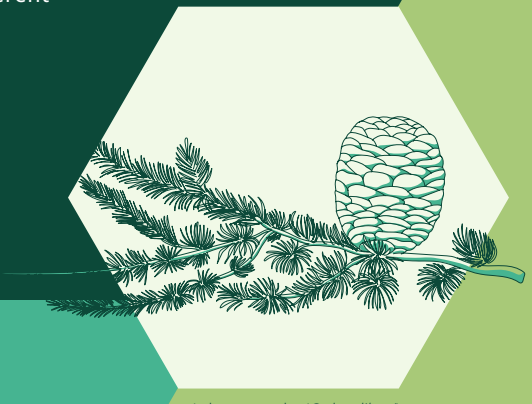
THE SHOUF BIOSPHERE RESERVE WAS ESTABLISHED IN 1996 AND IS ONE OF THE LARGEST PROTECTED AREAS IN THE MIDDLE EAST AND THE EASTERN MEDITERRANEAN.

It is located in the centre of Lebanon, stretching from Dahr Al-Baidar in the north to the Niha Mountains in the south. Spanning an area of approximately 50,000 hectares, the Shouf Biosphere Reserve includes the Shouf Cedar Nature Reserve, 22 surrounding villages and Ammiq Wetland, a Ramsar site and one of the last remaining wetlands in the Middle East.

The Shouf Cedar Nature Reserve is a popular destination for hiking and trekking, with many visitors attracted to the magnificent cedar forests of Maasser Al-Shouf, Barouk and Ain Zhalta-Bmohary. These cedar forests account for a quarter of the remaining cedar forest cover in Lebanon, and some trees are estimated to be 2000 years old.

The Shouf Biosphere Reserve is under the authority of the Lebanese Ministry of Environment (MOE), which manages it through the Appointed Protected Area Committee (APAC). The members of the committee include the Al-Shouf Cedar Society (AC), the mayors of the larger villages and independent environment experts. In July 2005, the Shouf Biosphere Reserve (SBR) was declared a protected area by UNESCO.

Over 170,000 people live around the core zone of the reserve, belonging to 24 different municipalities that stretch over 2 *Muhafazat* (districts). The main conservation objective of the core zone are the protection and rehabilitation of the natural and cultural values of the Shouf Biosphere Reserve. Traditional farming systems, including the agricultural terracing systems in Mount Lebanon and the *hima* governance system for transhumant livestock management, have historically contributed to high landscape and biological diversity.



Lebanese cedar (*Cedrus libani*)

SHOUF BIOSPHERE RESERVE
محمية الشوف المحيط الحيوي

IUCN

Tour du Valat

Alliance for Mediterranean Nature & Culture

MAVA
FONDATION POUR LA NATURE

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CURRENT CHALLENGES

The Shouf Biosphere Reserve is experiencing the impact of climate change. Several changes have been witnessed in recent years. Increasing temperatures have led to less snow fall and residence in the mountains, reducing winter tourism. The snow melts earlier in spring, affecting the recharge of most springs, and thereby reducing the supply of water for irrigation during the summer. The reduced water availability, combined with increasing drought periods because of the high temperatures, greatly affects the agricultural productivity. The forest areas are at risk from fragmentation, pest outbreaks, forest fires and unsuitable agricultural practices. Higher temperatures also lead to a higher demand for energy, with the local communities having to resort to new methods to locate energy materials.

The intensification of farming methods causes a loss of land pattern heterogeneity, many of the semi-natural land components (scrublands, hedgerows, freshwater habitats) that provide ecosystem services for native species. Intensive irrigation and the intensified use of agro-chemicals (pesticides, herbicides, fertilisers) is causing problems for biodiversity and human well-being. The current socio-political crisis and the lack of opportunities for the younger generation is leading to the abandonment of agricultural land, with resulting soil erosion problems and higher risks for forest fires in the reserve. Many abandoned lands are also sold to population living in the urban areas, causing uncontrolled housing in agricultural and natural lands. These modifications, combined with extreme weather conditions, are causing irreversible shifts toward undesirable conditions, all affecting human well-being and the biodiversity.

NEGATIVE IMPACTS ON BIODIVERSITY

The Shouf Biosphere Reserve is home to 520 species of plants with 25 international and nationally threatened species. It is one of the last remaining areas in Lebanon where large mammals that once roamed the entire region, such as the grey wolf (*Canis lupus*) and the jungle cat (*Felis chaus*), can still be found in the wild. The Ammiq wetland attracts a large variety of bird species, and 31 species of reptiles and amphibians have been recorded.

Agro-biodiversity and native species that depend on open farmland habitats are disappearing because of the landscape homogenization by the conversion towards intensive agriculture. This conversion also leads to the loss of locally adapted crop and livestock varieties and the loss of crop-livestock integration.

The disappearance of the wide range of semi-natural habitats corresponds with a loss of unique species communities and the removal of the main refuge for significant number of farmland species. Intensively managed terraces have about half the number of species as abandoned, restored or lowly managed terraces. Many aromatic small shrubs and high value legume plant species were found in abandoned and restored terraces with traditional agricultural practices.

Planting of Lebanese cedar (*Cedrus libani*) © Shouf Biosphere Reserve

Nubian ibexes (*Capra nubiana*) © Shouf Biosphere Reserve

CULTURAL SUSTAINABLE LAND-USE PRACTICES

Agriculture is mainly being practiced at low altitudes up to 1100m. The slopes are characterized by dry-stone wall agricultural terraces, for the cultivation of cereals, vegetables, olives, fruits and vines. Local varieties of cultivated plants are maintained and seed banks are alimented. To repel pests in the terraces, aromatic shrub plants are planted along the crops. Dry-stone structures are built to construct hedges or for storing water, benefitting both the agricultural crops and the wildlife.

Biodiversity benefits from the natural habitat strips altong the cultivated crops, the presence of aromatic crops and in agricultural terrace, forest and shrub lines in the border of terraces, isolated trees inside farmland plots or at the border. The low impact agricultural terraces are characterized by shallow tillage, natural compost made of remains of thinning and pruning forest trees and agricultural waste mixed with manure used as fertilizer, a low use of pesticides and rainfed irrigation.

Traditional pastoral systems with a livestock of 15,000 are present in the region, involving both low mountain and high mountain pastures under a short-distance transhumance movement. Local goat breeds (*chabli* and *bardie*) are the most common, and grazing is done in natural meadows and forests. Overall management plans and agreements with the shepherds guide grazing in the Shouf Biosphere Reserve.

Semi-domesticated forest systems are present at higher altitudes (900-1200m). These pine and oak forest are used for the collection of non-timer forest products. The adaptive forest landscape restoration plan of the Reserve turns abandoned woodlands into old-growth stand. The thinning of woodlands for the production of biomass and eco-briquettes has decreased the number of autumn fires in the Reserve. The eco-briquettes provide an ecological alternative to firewood and diesel for the local population, converting waste into an economic and rural development opportunity.

BENEFITS OF SHOUF BIOSPHERE RESERVE AS A CULTURAL LANDSCAPE

The Nubian ibex (*Capra nubiana*), a species that disappeared from Lebanon in the 18th century, was introduced in 2017 in the Shouf Biosphere Reserve. This wild goat species, listed as vulnerable on the IUCN Red List, is vital for the restoration of wildlife corridors at high altitudes. The Lebanese cedar (*Cedrus libani*) is a highly symbolic conifer in Lebanese history and mythology. Being protected from overgrazing and human interference, it is showing signs of natural regeneration in the reserve. Plant nurseries are set up to grow seedlings, and reforestation actions focus on the land preparation and follow-up of the seedlings.

The forests of the Shouf Biosphere Reserve are an important carbon sink, helping to balance the CO_2 concentration in the atmosphere. These forests also help stabilize and protect the soils on the steep slopes and produce wood and charcoal for the population. Shepherds with their flocks promote the spread of wild plants and the fertilization of the soils. The agricultural terraces avoid soil erosion and rainwater runoff. Aligned with semi-natural elements, they provide a heterogenous landscape that promotes a rich diversity in wildlife.

The forest and landscape restoration (FLR) approach has been adopted by Shouf Biosphere Reserve as a comprehensive ongoing process aimed at recovering the landscape affected by ecological, socioeconomic and cultural modifications. The FLR approach is based on eight principles, among others addressing root causes of degradation, engaging all concerned actors, and maintaining and enhancing the natural ecosystems within the landscape for long term resilience.

The local community organizes farmers markets, promotes the production of high value products with a minimal impact on the environment and has introduced on-farm ecotourism activities. The Shouf Biosphere Reserve has a high attraction factor for tourists, with the Beiteiddine Art Festival taking place in the Shouf Mountains in the summer months. Environmental awareness for the younger generations and capacity building workshops improve the knowledge on the importance on the conservation of the Shouf Biosphere Reserve.

Pine nuts
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