

RESILIENT CEDARS

*Centuries of exploitation
have decimated Lebanon's
forests, with its famous
cedars the hardest hit.
However, reforestation
efforts are showing
promising results.*



Although the Lebanon cedar, *Cedrus libani*, is endemic to mountains around the Eastern Mediterranean in Lebanon, Syria and Turkey, it is most closely associated with the former, as it is the national symbol of Lebanon and the central feature of the country's flag.

In Lebanon, like many other parts of the world, a combination of ecological, socio-economic and cultural changes has dramatically increased the vulnerability of ecosystems. These factors, combined with water shortages, extreme weather events and large-scale disturbances have seen Lebanon's green spaces shrink to just 13% of the country.

Lebanon's cedars have been particularly hard hit. Centuries of deforestation have seen the tree's former range of 500,000 hectares reduced to 2000 hectares (0.4% of original estimated forest cover). *Cedrus libani* is listed as vulnerable on the International Union for Conservation of Nature's (IUCN) Red List of threatened species.

Thankfully, government bodies, USAID's Lebanon Reforestation Initiative (LRI) and other environmental activists are making progress to reverse that trend – one seedling at a time. Last month, LRI championed its tree adoption scheme on World Environment Day, while in November 2017, more than 2000 people gathered on the summit of Lebanon's Arz Bcharre Mountain and planted 5000 cedar seedlings. Those volunteers came from Bcharre families and neighbouring communities, scouts and activists, representatives of civil society, private sector employees, as well as university and school students from across the country.

The event, organised by LRI and in close collaboration with the Municipality of Bcharre, was attended by Lebanon's First Lady Nadia Aoun, and was aimed at increasing public awareness of environmental protection, disseminating knowledge and instilling a national commitment to forest fire prevention and reforestation. It contributed to Lebanon's '40 million trees' >



Above (l-r): The history of Lebanon's cedar decline is lengthy; Lebanese cedar are slow growing and produces its first seeds at around 40 years of age



120,000
trees planted
by Friends
of the Cedar
Forest since
1990s

programme launched by the Agriculture Ministry in December 2014 with \$300,000 in funding from the United Nation's Food and Agriculture Organization.

A TREE STEEPED IN HISTORY

The history of Lebanon's cedar decline is lengthy. The cedar, with its unique tapered shape, has been a symbol of grandeur and strength in the Middle East since it was first mentioned 4500 years ago, making it the oldest recorded tree in human history.

The superb quality of cedar wood in terms of colour, hardness, fragrance, resistance to insects, humidity and temperature made it one of the most sought-after raw materials, resulting in mass deforestation from 1400BC onwards. The sheer significance of the cedar of Lebanon to various civilizations and religions can be illustrated through its uses.

Canaanites used it for home construction; Phoenicians employed it for building commercial and military ships, as well as houses, palaces and temples. Ancient Egyptians used its resin in mummification, with cedar sawdust found in the tombs of Egyptian pharaohs. *The Sumerian Epic of Gilgamesh* designates the cedar groves of Lebanon as the dwelling place of the gods.

In more recent times, Ottoman Turks axed many of Lebanon's surviving cedars, British troops used cedar wood to build railways in World War II, and the 2006 Lebanon war destroyed thousands of remaining trees.

One weakness of the Lebanese cedar is that it is slow growing and produces its first seeds at around 40 years of age. A typical ten-year-old specimen would be around six metres tall; after 40 to 70 years, it might reach 12 to 18 metres. These trees can grow to a maximum size of about 23 to 37 metres with an average lifespan of around 300 years. However, some specimens in Lebanon are thought to be 1000 years old.

Besides deforestation and a slow growth rate, *Cedrus libani* is particularly sensitive to climate change. Cedars need a minimum amount of snow and rain for natural regeneration. In Lebanon they grow best at elevations of 1300 to 2100 metres, in deep soil on slopes facing the sea. The trees require plentiful light and about 1000mm of rain annually.

Global warming has resulted in Lebanon's cedars being subjected to shorter winters with less snow. The Lebanese government projects that snow cover could be reduced by 40% by 2040 and that maximum temperatures will rise by 1°C on the coast and 2°C inland. This results in the uptake of cedar seedlings decreasing and the tree's habitable zone shifting higher up the mountainsides.

Climate change also has a secondary effect. According to Dr Nabil Nemer, Head of the Agricultural Sciences Department at Lebanon's Holy Spirit University of Kaslik: "Insects, due to the changing climatic condition, become more active and their development rate is faster thus causing more outbreaks. These weaken the cedar trees, making them more susceptible to other diseases and/or insects, which will ultimately kill the trees. At least one insect has been studied and



the results showed that outbreaks of this insect are due to climate change, less snow and low humidity in summer. This insect, the *Cephalcia tannourinensis*, is a serious cedar tree defoliator.”

Lebanon’s cedar trees are also victim of their fame. A 2016 report titled *World Heritage and Tourism in a Changing Climate*, published by the United Nations Environment Programme, documented the damage humans inflict on World Heritage sites around the globe.

The Qadisha Valley and the Forest of the Cedars of God (Horsh Arz el-Rab) comprise one of Lebanon’s five UNESCO World Heritage Sites. Confined to an area of around two hectares, the Forest of the Cedars of God in Zgharta is one site that the UN report identified as coming under “increasing stress” from conditions caused in part by excessive tourism. An estimated 20% of all visitors to Lebanon come to see the forest, according to the UN.

A GLIMMER OF HOPE

The Lebanese state has created several reserves, including the Chouf Cedar Reserve, the Jaj Cedar Reserve, the Tannourine Reserve, the Ammouaa and Karm Shbat Reserves in the Akkar district, and the Forest of the Cedars of God near Bsharri. Various sections of these reserves are now being expanded or linked through reforestation that creates biological corridors.

According to US Embassy Deputy Chief of Mission (DCM) Edward White: “Since 2011, USAID, through LRI, has planted nearly 720,000 native tree seedlings in various regions of Lebanon.” The goal of the initiative, launched in 2010 with help from USAID, the US Forest Service, the Lebanese government and local business sponsors, is to expand existing wilderness reserves and increase forest cover by 50% by 2020.

Top right: The survival rate of new plantings has increased to between 70% and 90%
Below: Forest of the Cedars of God



The infestations of insects such as *Cephalcia tannourinensis* have been brought under control by spraying insecticides from helicopters.

To protect the Forest of the Cedars of God, the Friends of the Cedar Forest are surrounding the old forest with a buffer zone of younger cedar trees. Aramo Faahry, the head of the organisation, said: “We have planted 120,000 new cedar trees since the 1990s and now we have the capacity to plant 100,000 new trees per year.” The organisation is also employing eco-friendly tourism.

Faisal Abu-Izzeddin, who was a consultant on the UN report, noted the positive changes at the Cedars of God forest. “We are seeing a natural regeneration of the cedar forests in all directions,” he said. “Somehow – miraculously – the cedar has survived centuries of abuse.”

Oregon forester and head of Pacific Stewardship consultancy Darin Stringer was brought in by the Forest Service as an adviser to the LRI. He said the Lebanese are “passionate in their desire to reclaim their forests”. Thanks to better methods the survival rate of new plantings has increased to between 70% and 90%.

“This project has a message of hope and caution. The hope is of communities and a nation rebuilding the forest against great odds,” Stringer said. “The caution is to societies with productive forest lands: it’s far easier to be a steward for an existing forest than to try to bring it back after it’s been heavily exploited.”

That is a lesson that Lebanon knows all too well. ♪

