3 Managing the world's longest-living palms: Chile

Background and justification

The Chilean sclerophyllous forest, located in the semi-arid region of the country, is characterized by trees with small, tough evergreen leaves. The Chilean palm (*Jubaea chilensis*) is one of the forest's most beautiful endemic species. It grows to as much as 35 metres in height and 2 metres in diameter and has leaves that are 4 to 5 metres long. It is also the longest-living palm species in the world, with a life expectancy of up to 2,000 years. However, this longevity makes the palm particularly vulnerable. For a start, it must survive a long period as a fragile seedling or juvenile plant that grows extremely slowly, taking up to 15 years to reach a height of 1.5 metres. In addition, it does not produce any fruit for the first 80 to 120 years of its life, which makes it very difficult to regenerate successfully.

The Chilean palm is, however, highly resistant to fire damage and drought and can survive minimum temperatures of -18°C. In the wild, it grows in the semi-arid region of Chile, between the Limari and Mataquito rivers, mostly in coastal and coastal mountain range areas. Since pre-Columbian times, people have been harvesting its nutritious, pleasant-tasting nuts, and it also produces a sweet honey-like sap, which is harvested by cutting the top off the tree. The sap is exuded for the next four to twelve months, but the tree ultimately dies. Such sap harvest-

ing is another major cause of the decline of Chilean palm populations. Owing to its ornamental beauty, the tree is cultivated in the United Kingdom, Mediterranean Europe, California and other parts of the world.

Chilean palm populations are dwindling rapidly and dramatically. Of the estimated five million specimens at the time of the Spanish conquest in the sixteenth century, only about 120,000 remain, dispersed among seven scattered and geographically isolated areas. Although there are over 4,000 species of palm worldwide, the Chilean palm is the only representative of the genus Jubaea and if it dies out, so, too, does the entire genus. Apart from honey-harvesting, other main reasons for the palm's decline in numbers are: a growing demand for agricultural land; cattle grazing, which prevents young plants from growing; nut harvesting, which reduces the species' natural regeneration capacity; and a lack of plantations. The Chilean palm is not the only sclerophyllous forest species at risk. However, it is considered a species that is emblematic of Chile's semi-arid ecosystems. The Chilean palm can, therefore, be considered as a kind of protective shield for such fragile ecosystems and can be used to promote the protection of its surrounding environments. For these reasons, the recovery of the palm throughout its former distribution range was seen as a valuable aid to the protection and recovery of the other vulnerable flora and fauna of Chile's sclerophyllous forests.

DESCRIPTION

Following the 1992 Chilean Palm Congress, which gave priority to the in situ protection of this genetic resource, a group of entrepreneurs created the *Fundación para la Recuperación y Fomento de la Palma Chilena* (Chilean Palm Foundation) in 1997. The Foundation's aim is to conserve and protect this unique natural resource—and the ecosystem in which it lives—as both a useful natural resource that local communities can use sustainably to improve their livelihoods and, because the tree's unusual beauty attracts a lot of attention, a way of boosting general interest in environmental protection. The Foundation's goals are to:

- promote propagation and planting activities in both the private and public sectors as a way of saving the palm from its present vulnerable status;
- raise public awareness of the palm and the associated native forests;
- cooperate in the development of a national policy for the protection of native forests; and
- develop, promote and coordinate scientific research directed towards saving the species and make the results of that research available to all interested parties.

The Foundation started its activities on a donated plot of 1,000 hectares in Ocoa, the most extensive area in Chile where the palms survive. The area also lies within one of the Global Biosphere

Reserves of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Although the vegetation of the plot is classed as deteriorated sclerophyllous forest, there are some 4,206 adult Chilean palms on the site.

As the first step, the Foundation excluded cattle from the area, which caused an almost immediate improvement in the natural regeneration of the Chilean palm and other species. In the meantime, Chilean palms and another 24 native species from related ecosystems are being raised at a nursery. During its first five years of operation, the nursery has already produced 300,000 palm trees and 300,000 specimens of other forest plants, and production is expected to reach 100,000 palm trees and 200,000 other native trees each year. The first specimens from this nursery were used to replant the project area, but since then, more than 18,000 palm trees have been donated to projects and reforestation programmes in other regions. In one outreach programme, three trees were donated to each of the police precincts within the Chilean palm's original distribution area. This latter initiative means that the geographical distribution has been restored in a way that ensures the plants' protection—by no less a body than the local police force.

Within the project area, a combined afforestation and direct seeding programme is helping vegetation to recover in eroded areas. This system is low in cost and more effective than straightforward afforestation efforts, and the Foundation plans to develop it for use in other areas of the Chilean palm's natural distribution once it has raised the necessary funds for doing so. The idea is to use seeds from the ecosystems in which the palm grows in order to ensure that natural biodiversity is maintained and protected.

Throughout its work, the Foundation has taken care to involve local communities by helping them to develop greenhouses and assisting their afforestation efforts. Among the greatest of its achievements in this area has been the Chilean palm's reintroduction to Easter Island, where it had been extinct since the fifteenth century, when the local people erected their famous stone sculptures (the Moais). Today's inhabitants of Easter Island are now enthusiastically looking after two adult and 400 juvenile palms, which are said to be flourishing spectacularly.

The Foundation has also provided seeds, information and practical courses on how to grow, reproduce and plant palm and other sclerophyllous forest trees to six communities, three psychiatric hospitals and five schools for socially vulnerable children. These initiatives have provided people with an additional source of income and have also helped to spread awareness of the project's initiatives. Similar, long-lasting effects are resulting from tree donations to 25 primary schools, where children are involved in week-long tree projects that culminate in tree-planting ceremonies.

Partnerships

In order to protect and restore the Chilean palm effectively, one of the Chilean Palm Foundation's main objectives has been to collaborate on scientific research as a way of increasing understanding of the species and its ecosystem. Researchers from several universities (including the *Universidad de Chile, Pontificia Universidad Católica de Chile, Universidad Mayor*) are therefore collaborating in a multidisciplinary and multi-institutional group to share expertise and knowledge. The Foundation has also worked with students on senior research projects and is looking for ways of establishing more permanent links with universities through providing facilities, expertise and economic support.

The Foundation also has contact with Chile's National Environment Commission (CONAMA) and National Forest Corporation (CONAF) as well as The Nature Conservancy (TNC), the Trust for Public Lands (TPL), the World Wide Fund for Nature (WWF), and the Global Environment Facility (GEF), among others.

Lessons learned

One of the main lessons learned in the course of this project is the valuable role that a private, independent group, such as the Chilean Palm Foundation, can play in generating and managing development projects. Such bodies pay particular attention to ensuring that economic and other resources are used efficiently and that goals and the ways of achieving them are analysed carefully. They are also in closer contact with other private bodies, which makes it easier for them to involve private investors in biodiversity and ecosystem recovery projects, especially because such activities often help to improve the image of private commercial companies both at home and abroad. Its independence from state organizations also gave the Foundation flexibility in its decision-making and actions, leaving it free to take advantage of interesting opportunities as they arose. In addition, the involvement of a multidisciplinary group resulted in an open-minded approach to each goal, and collaboration with a wide range of institutions expanded the project's reach and its involvement with communities. The value of this lesson was underlined by problems that the project faced in its early stages, when some actions were implemented without sufficient knowledge or a consistent methodology—gaps that were filled through collaboration with research institutions and other expert bodies.

Three main conclusions can be drawn from this project:

- The Chilean palm and many other endangered species can be saved by implementing basic actions, especially when researchers pass on their knowledge to the local communities and other people involved. The validity of this conclusion is supported by, for example, the dramatically beneficial results that followed the

simple exclusion of cattle from the project area.

- Success is possible only when efforts are coordinated. In the case of this project, the combination of expert knowledge (from universities, etc.) with the resources and management of the private sector was vital.
- In developing countries such as Chile, governments usually lack the financial resources to support conservation and biodiversity activities, so there is a need to encourage the private sector to become involved.

Impact

The exclusion of cattle from the study area and the protection of its vegetation have resulted in increased populations of native fauna. Every year, more and more bird species are observed on the Foundation's 1,000-hectare plot and mammals such as foxes and wild cats are also returning. A four-hectare reservoir built to supply water to local communities as well as for the needs of the project area is now home to many newly returned native bird, frog and other species.

Future plans

The Foundation has identified several activities that need to be developed in order to manage and protect the Chilean palm more effectively and sustainably. A baseline study of the project area's entire ecosystem needs to be carried out, including details of its geological resources, climatic conditions, and flora and fauna distributions. Geographic information systems and the support of universities are needed for this initiative.

Next, concrete guidelines for the management of the flora and fauna will have to be developed so that the Chilean Palm Foundation can help the recovery of the area's original flora. A coherent strategic plan of afforestation needs to be drawn up that should take account of micro-site conditions, appropriate mixes of species, genetic biodiversity management, and the regeneration of bush and flower species, especially as current regeneration programmes focus mainly on tree species. Plans are also under way to reintroduce some of the area's lost species of fauna, with help from the universities, which will provide advice on the best way to manage newly restored ecosystems. The multidisciplinary research team will also advise on how best to revegetate the area around the reservoir to encourage the re-establishment of indigenous fauna.

At present, useful information about the Chilean palm is dispersed in different publications, research articles, university projects and other sources, making it difficult to carry out further research and occasionally resulting in the duplication of research efforts. To counter this problem, the Foundation plans to establish a documentation centre, which will hold all the existing relevant information that is of interest to researchers and project

workers. The centre will also act as a communication hub for the exchange of information among different researchers and institutions.

Although much research into palm reproduction and afforestation practices and theory has already been carried out, further research is required. Specific topics for research and development are the nutritional requirements of different species, improved management practices (including silviculture management) and how to involve local communities in the protection and reproduction of vulnerable species. There is also a huge gap in the knowledge of the genetics of the Chilean palm. The Foundation intends to promote research into Chilean palm productivity, including genetic breeding for nut and sap production and for accelerating the species' growth rate. In this way, the Chilean palm can begin to play a larger role in the economic development of rural communities.

Equally pressing is the need to develop non-destructive techniques for harvesting sap, which currently depends on killing the tree. In the meantime, harvesting is allowed only by companies that have agreed to plant 10 new trees to replace every harvested tree. Now, these companies are not only exporting the honey but also demonstrating that sustainable management of the Chilean palm tree can be profitable. Related to this are the Foundation's plans to increase the transfer of technology to local communities and other stakeholders, and once again, help in achieving this goal is being sought from the universities. Collaboration with, and the involvement of, the private sector are also expected to increase.

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