

CHAPTER 8

Conservation Approaches and Strategies II: Ex Situ Conservation Methods

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INTRODUCTION

It is apparent that *in situ* conservation of species requires large expanses of land which often have to be managed effectively to attain their objectives. It is also true that for some species, the existence of large expanses of land may not be enough to guarantee their survival. Various large mammal species such as the rhinoceros, African hunting dog and cheetah continue to decline dangerously despite the continued existence of viable habitat. It is in such instances that various forms of *ex situ* conservation can be useful. This is a form of conservation whereby species or their germplasm are removed from the natural surroundings and are maintained elsewhere in artificial circumstances. There are a number of ways in which this can be done depending on the species in question.

Gene Banks

Botanists and agriculturalists preserve genetic information and endangered plant species by storing their seeds in refrigerated environments with low humidity. Currently gene banks of most known and many potential varieties of agricultural crops and other plants exist in various parts of the world. Unfortunately, these are mostly in developed countries because gene banks are expensive to maintain. Another problem is that not all species can be preserved in such circumstances.

Botanic Gardens

In many African countries, botanic gardens were initiated by the colonial administrators as a means of introducing crop plants from various parts of the world to determine how well they would perform in the host countries. In many cases this legacy continued well after independence but increasingly, the role of these gardens in conservation of biodiversity is being recognised. Attention is being focused on over-harvested species, rare species and potentially-useful species of plants. Staff of botanical gardens are often engaged in research in nutritional or pharmacological properties of plants. It is possible to collect seeds of threatened species so that they

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can be propagated for re-introduction into wild areas where they originally occurred. Gardens that are exclusively devoted to the cultivation of trees and other woody plants are called arboreta (singular: arboretum).

There are about 1,500 botanical gardens and arboreta in the world, holding about 90,000 plant species. They help in preserving some of the world's genetic diversity. However, the storage capacity they have is limited and funding available to them is too little to preserve most of the world's rare and threatened plants.

Zoos and Animal Research Centres

As botanic gardens attempt to conserve plant diversity, so do zoos try to conserve animal diversity. Worldwide, zoos house about 540,000 individual animals. However, most of these belong to species that are not threatened or endangered. Increasingly though, zoos and animal research centres are being used to preserve a representative number of individuals of critically endangered animal species. They do this either by captive breeding or, in the case of some species, egg-pulling. In captive breeding some, or at the extreme all, individuals of a threatened species are taken into captivity and encouraged to breed. The young may then be re-introduced into the wild. This happened for example with the Arabian Oryx which had been hunted almost to extinction in the late 1960s but was saved by captive breeding programmes in American zoos. The Giant Panda is also faced with extinction and attempts are under way to breed it in captivity. Golden lion tamarins, threatened in Brazil, have been bred in the National Zoo in Washington for reintroduction to the wild. In the case of birds, it may be possible to collect eggs from the wild and hatch them in zoos or research centres.

As with plants, keeping populations of endangered animals species in zoos and research centres is limited by lack of space and money. First of all, it is necessary that a minimum viable population be kept in captivity to prevent extinction through accident, disease or loss of genetic variability through inbreeding. Since caring for animals is such an expensive undertaking it is often impossible for individual zoos to keep a minimum viable population. They overcome the problem of inbreeding by co-operating in exchanges of individuals.

Ex situ conservation is encouraged by the Convention on Biological Diversity in Article 9 as an adjunct to *in situ* measures. It is important to realise that, although it makes significant contribution to the conservation of biodiversity, especially as far as critical species are concerned, it cannot be a substitute for *in situ* conservation.

FURTHER READING

Magambo Z. L. K. and J. H. Seyani 1995 *The Role of the National Herbarium and Botanic Gardens of Malawi in Plant Genetic Resource Conservation in Malawi* in Bennun L. A. *et al* "Conservation of Biodiversity in Africa"

Bovey M. 1995. *The potential role of African botanic gardens in urban-based environmental awareness programmes*

N.B. Herbaria and Natural History Museums also have a role to play in biodiversity conservation. The visits to the Botany Herbarium and Zoology Museum at Makerere should illustrate this.