In-situ conservation

DEFINITION

The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Convention on Biological Diversity (CBD) 1992[1]

KEY POINTS

- In-situ conservation is one of two basic conservation strategies, alongside ex-situ conservation. Article 8 of the Convention on Biological Diversity (CBD) specifies in-situ conservation as the primary conservation strategy, and states that ex-situ measures should play a supportive role to reach conservation targets.
- In-situ conservation aims to enable biodiversity to maintain itself within the context of the ecosystem in which it is found.
- In-situ management approaches can either be targeted at populations of selected species (species-centred) or whole ecosystems (ecosystem-based).
- Traditionally, protected areas have been seen as the cornerstone of in-situ conservation. Conservation approaches that are more adaptable to individual situations and applicable beyond protected areas, are being increasingly applied.

INTRODUCTION

In-situ (‘on site’, ‘in place’) conservation is a set of conservation techniques involving the designation, management and monitoring of biodiversity in the same area where it is encountered. The in-situ concept is best understood in contrast to ex-situ conservation. Ex-situ (‘off site’) conservation techniques are implemented away from the conservation target's natural habitat. While the identification of ex-situ initiatives leaves little room for ambiguity (e.g. zoos, seed banks, captive breeding), the notion of in-situ conservation covers a broad spectrum of situations ranging from the establishment of a protected area to the design of a sustainable management strategy for a particular habitat.

PURPOSE AND USE OF IN-SITU CONSERVATION STRATEGIES

In-situ management approaches can either be targeted at populations of selected species (species-centred approaches), or whole ecosystems (ecosystem-based approaches) [2]. Both approaches follow the same purpose: To enable biodiversity to maintain itself within the context of the ecosystem in which it has been found, ie. to enable a species population to self-replicate and maintain its potential for continued evolution [3]. This requires conservation of the components of the natural system (populations, species, communities and biophysical systems) as well as the ecological and evolutionary processes occurring within that system. Conservation measures are aimed at the surroundings where a target-species developed its distinctive properties. This could be a natural habitat, or an environment heavily modified by human activity. For instance, agricultural or domestic species may have evolved characteristic traits in human dominated environments. The conservation of agricultural biodiversity therefore requires the conservation of agro-ecosystems by farmers, commonly using traditional farming practices [2, 4].

EXAMPLES OF IN-SITU CONSERVATION INITIATIVES

Protected areas are the cornerstone of in-situ conservation, as is outlined in Article 8 of the CBD. A protected area network may contribute to conservation targets through the maintenance of target species and their habitats, as well as the conservation of natural or semi-natural ecosystems. There is a however growing awareness of the importance of extending in-situ conservation beyond protected areas [5, 6]. The socioeconomic and political context around a threatened habitat may prevent the establishment or success of a protected area, and the development of alternative in-situ conservation management approaches may prove more useful in these situations. For instance, it was shown that the protection of Indonesian coral reefs could be enhanced through the implementation of a management plan which included a cycle of open and closed harvesting of reef resources within prescribed locations [7]. In-situ initiatives beyond protected areas may include [2, 5]:

- Habitat restoration, recovery or rehabilitation;
- Strategies for the sustainable use and management of biological resources;
- Recovery programmes for nationally or sub-nationally threatened or endangered wild species;
- On-farm agricultural biodiversity conservation targeted at traditional crop varieties and crop wild relatives [8, 9];
- Genetic reserve conservation, ie. monitoring of genetic diversity in natural wild populations within a delineated area (known as genetic sanctuaries or gene management zones) [2];
- Control of threats to biodiversity such as invasive alien species, living modified organisms or over exploitation;
- Preservation and maintenance of traditional knowledge and practices; and
- Implementation of the regulatory, legislation, management or other frameworks needed to deliver the protection of species or habitats.

THE RELATIONSHIP BETWEEN IN-SITU AND EX-SITU CONSERVATION

Historically, in-situ conservation was the preferred biodiversity conservation approach over ex-situ conservation [10]. In-situ measures are perceived as more holistic in their approach and allow the conservation of processes or habitats which can't be protected through ex-situ measures (e.g. soil microbial processes, evolutionary processes, specific ecosystems such as coral reefs or species with highly specialised needs). The Convention on Biological Diversity (CBD) recognizes the complementary role of both conservation strategies (in-situ and ex-situ). Article 8 and 9 of the CBD set out guidelines for the use of in-situ and ex-situ measures, respectively. In particular, the CBD specifies that ex-situ

facilities and techniques should predominantly be implemented for the purpose of complementing and supporting in-situ measures [11].

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Nets protecting turtle nests. Goa, India.

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