

Chapter 11

Sustainable Management of Invasive Species for Small Island Developing States under Changing Climates

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ABSTRACT

The incidence and impact of biological invasions are increasing with the effects of climate change and globalization. Apart from the problems that invasive species cause as pests in agricultural and native ecosystems, they impact directly or indirectly on all aspects of food security. Climate change is predicted to increase the vulnerability of Small Island Developing States (SIDS), causing a range of effects on the biology and ecology of invasive species and on invasion pathways. Combating the potential or existing harmful effects of invasive species requires a multipronged response involving the entire food production industry, policymakers, government agencies, local communities, regional cooperation, international trade agreements, and research organizations. The management measures available are described under three categories—prevention, containment, and control—and the need for a sustainable, integrated approach is emphasized. Case studies are taken from the Caribbean and Pacific groups of SIDS, highlighting opportunities for and threats to good practice.

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INTRODUCTION

The threat of invasive species has been an ongoing and increasing challenge globally. It is anticipated that climate change will exacerbate this challenge. Being particularly vulnerable to invasion by alien species, Small Island Developing States (SIDS) will be further threatened under conditions of climate change. Therefore, in addressing these issues, in this chapter we seek to:

- Conduct a situational analysis of the problems of invasive species in various SIDS regions;
- Project potential impacts of climate change on existing situations;
- Review measures to combat invasive species threats;
- Suggest ways in which existing systems can be enhanced and integrated to enable SIDS to successfully deal with the growing threats of invasive species.

INVASIVE SPECIES AND THEIR IMPACTS

Definition and Examples of Invasive Species

Invasive species threaten the ecosystems they occupy. If they become established and expand, they pose a risk of degradation to the invaded habitats and/or suppression or extinction of other species (Kairo, Bibi, Cheesman, Haysom, & Murphy, 2003; IUCN, 2011). These invasives may also affect processes such as the nutrient and water cycles as well as fire regimes. Invasive species are alien, i.e. introduced from the geographic range where they have existed historically into territories which are ecologically/environmentally different and more conducive to their spread (e.g. in the absence of natural enemies and other species that would compete with them for resources). Some indigenous species can also become invasive if abiotic or biotic changes in their habitats, such as extinction of a major competitor or natural enemy, lead to greater availability of space, light or other resources. Species exhibit varying levels of invasiveness which are mainly influenced by environmental factors (CBD, 2013).

Crop related invasive species (IS) include, insects, viruses, microbes, protists, fungi, plants and animals. Through its association with human activity insects have become frequent invaders. Several invasive alien species (IAS) are associated with host organisms as predators or parasites; the hosts or vectors may be non-invasive but can carry pests or diseases that become invasive in new environments (Moutou

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