

THE WEALTH OF ISLANDS

A Global Call for Conservation

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Cristina Mittermeier



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FOREWORD



Dr. Ahmed Djoghla
Executive Secretary of the
Convention on Biological Diversity



H.E. Tommy E. Remengesau, Jr.
President of the Republic of Palau

Tourism brochures and postcards have long portrayed the island environment as paradise on Earth; images of sun, sand and sea have become well-worn clichés. In truth, islands are far richer and their problems far graver than what these simplistic images indicate. Islands comprise some of the most unique life forms on the planet, with an exceptionally wide range of species, many of which are endemic. Many islands are also home to people with unique cultures, who derive much of their livelihood and well-being directly from their natural environment.

But there is trouble in paradise. Islands are home to more threatened species and recorded species extinctions, than their continental counterparts. Their economies, particularly those of small island developing States, are among the world's most vulnerable and can ill-afford the degradation of their natural ecosystems.

The Millennium Ecosystem Assessment recently confirmed that islands have been under intense pressure over the past century from invasive alien species, habitat change and over-exploitation, and that climate change and pollution are becoming increasingly serious threats.

Clearly, there is an urgent need for action. The programme of work on island biodiversity, recently adopted by the Conference of the Parties to the Convention on Biological Diversity, sets out almost 50 priority island-specific actions aimed at achieving the three objectives of the Convention and, more specifically, at reducing significantly the rate of island biodiversity loss by 2010 and beyond as a contribution to poverty alleviation and the sustainable development of islands, particularly small island developing States.

The programme of work also calls for increased financial and technical resources for its effective implementation. Fortunately, there is support and momentum within the international community to make islands a conservation priority. In this context, the Secretariat of the Convention has committed itself to enhancing its technical assistance to small island developing States.

Developing a shared vision for the future of the world's islands starts with increasing public awareness at all levels of society. I hope this introduction to island biodiversity will provide a better understanding of what is at stake, what is being done and what remains to be done to ensure that island ecosystems truly become paradise on Earth.

The island nations of this world are currently under a monumental threat to their economic health, cultural identity, unique marine and terrestrial biodiversity – indeed to their very existence. Our people, 600 million strong in 47 countries, with 16% of the planet's known plant species, are faced with exceptional struggles as a result of our unique vulnerabilities stemming from our isolation, lack of resources, small populations and susceptibility to natural phenomena and disasters.

My country, the Republic of Palau, a small island group in the Western Pacific, has chosen to fight for the future of its economy, its resources, its culture, and, most importantly, its children through a strong and integrated domestic approach that recognizes that ultimately, our future must rest in our own hands and rely on our own deeds. Most other island countries of the world have also come to this same conclusion and have begun to act accordingly.

While we recognize that each island nation must put into place internal measures to combat the threats that we face, we acknowledge our limitations in dealing with external forces beyond our control. We have therefore begun to work together, at the regional and international level, to bridge the gap between our domestic capabilities, regional cooperative actions and international assistance to achieve our ultimate goals.

I therefore call upon my island friends and the international community to work together to put into place appropriate measures to protect our biodiversity. As part of this commitment, we must establish comprehensive, practical protected-area-network schemes that take into account our own cultures and our own governmental systems and that focus on managing and enforcing these networks. Our Governments must demand strong biodiversity-inclusive environmental impact assessments of all developmental projects and trade activities that may have an impact on island biodiversity, supported by international cooperation.

Ultimately, the success of the island nations in responding to and combating the maze of modern environmental threats and dangers will stand as a litmus test for the rest of the world. If we fail this test in our small island communities, we will fail the test on a global level. And time is running out for all of us.

For our sake, and for the sake of future generations, failure cannot be an option.





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1

ISLANDS ARE UNIQUE AND VULNERABLE

Islands have always received attention for their natural beauty, exciting tourist destinations, unique landscapes and exotic wildlife. However, they deserve global attention as a conservation priority for they are unique and vulnerable.

Islands are home to the world's most active volcanoes, the tallest sea cliffs, the clearest blue waters, and rare and wonderful plants and animals, such as orangutans, giant monitor lizards, carnivorous plants, and colourful birds of paradise. They feature most of the Earth's major ecological regions, from coral reefs and sand dunes to rain forests and high alpine deserts (Box 1).

Lush green forests, vibrant coral reefs and crystal-clear waters provide immeasurable scenic value for tourism, which is a major revenue source for many island communities.

Box 1. The World's islands

- ↳ Forty-seven of the world's nations are island countries, and many nations include islands within their boundaries.
- ↳ Islands are distinct bounded ecosystems ranging from small isolated atolls and low-lying islands to large island nations.
- ↳ Small island developing States (SIDS) are defined by both size and demographic and political criteria including:
 - ↳ small population;
 - ↳ lack of resources;
 - ↳ remoteness;
 - ↳ heavy dependence on international trade;
 - ↳ high transportation and communication costs;
 - ↳ costly public administration and infrastructure.
- ↳ Islands are classified as either continental or oceanic islands depending on the process through which they were formed.
- ↳ Globally more than 100,000 islands provide homes and livelihoods to approximately 600 million people.
- ↳ The 150 largest islands on Earth have a landmass equal to the size of Europe.
- ↳ Thirty six of the 143 terrestrial Global 200 Ecoregions are comprised of islands.



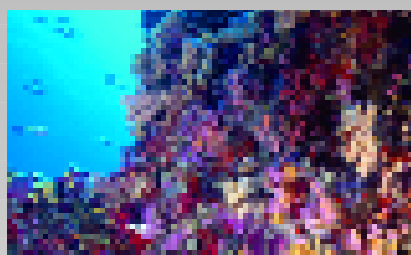
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Island ecosystems offer opportunities for livelihoods of island people

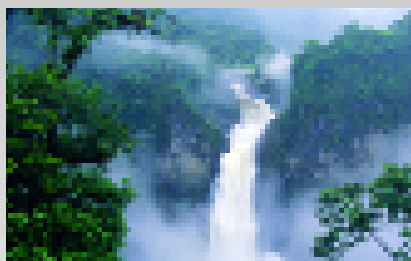
Islands consist of discrete and numerous ecosystems – from mountain forests to wetlands and beyond – which are key to the subsistence and economic development of island communities (Box 2). In particular, island biodiversity provides food, freshwater, wood, fiber, medicines, fuel, tools and other important raw materials to support island livelihoods, economies and cultures. Island ecosystems also contribute to the maintenance of ecosystem functions: they provide defense against natural disasters, support nutrient cycling, and soil and sand formation; they contribute to the regulation of climate and diseases; and they have aesthetic, spiritual, educational and recreational values.

Islands and their exclusive economic zones cover one sixth of the world's surface and one in 10 people on Earth lives on islands, including many living in extremely limited economies.

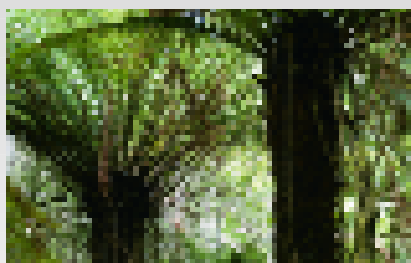
Box 2. Importance of biodiversity in thematic areas



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Marine and coastal areas are important sources of income. The continental shelves and coastal ecosystems of many small island developing States are of major economic significance for settlement, subsistence and commercial agriculture, fisheries and tourism. Coastal ecosystems also fulfill many ecological roles, ranging from shoreline protection to buffer zones from land-based activities and pollution, to feeding, breeding and nursery grounds to many marine species.

It is estimated that coral reefs provide approximately US\$ 375 billion per year in goods and services to the world. This includes support for marine fisheries which provide the principal protein source for many island populations, especially amongst SIDS.

In general, small islands depend heavily on groundwater resources which typically exist as **freshwater** lenses, containing limited quantity of water. In most SIDS, wetlands, in the form of swamps and mires, are small in extent and often ephemeral. Freshwaters and associated habitats are important for freshwater fish production; they provide breeding grounds for large number of waterfowls, and supply potable water for livestock, wildlife, and human consumption.

Forests, as critical regulators of freshwater supply, are associated with inland water ecosystems. Forest cover of small islands may be insignificant in global terms, but forest resources are of global importance for the conservation of biodiversity. Forest cover prevents erosion and, as such, is important for the health of marine and freshwater environments. Forest biodiversity contributes directly to food security through the provision of edible forest products and to livelihoods through timber and non-timber forest products.

Much of **agricultural activity** on islands is of subsistence type, but a portion of the production in SIDS is an important source of export earnings. Agricultural production in many SIDS has been a primary occupation for hundreds of years, although intensification and diversification are now constrained by ecological and economic circumstances, such as poor soils, a limited capacity to support intensive crops and animal production, and difficult product storage. The most important food crops grown in SIDS include cassava, sweet potato, yam, potato, cocoyam, taro, plantains and bananas. Island agriculture provides important livelihood opportunities for many islanders.

It is critical to maintain this "living capital" for current and future generations.

Many island genetic resources and species are unique and irreplaceable

Islands and their surrounding near-shore marine biodiversity constitute unique ecosystems, often containing limited assemblages of irreplaceable plants, animals and natural communities. The limited sizes of islands and their distance from the mainland are the main causes of the unique evolutionary dynamics that characterize island biota and that led to unusual phenomena such as gigantism, dwarfism and flightlessness. Amongst island species, genetic diversity and population sizes tend to be restricted and species often become concentrated in specific small areas.

The greatest evidence of this phenomenon is the fact that many of the areas with large quantities of endangered endemic

species are found in islands. With increasing isolation, island size and topographic variety, the number and proportion of endemics increase. Thus, collectively, islands can be thought of as hotspots i.e., some of the richest and most threatened reservoirs of plants and animals on Earth (Box 3).

Islands also include atolls and other small low-lying islands that constitute some of the world's most species-poor ecosystems, which scientists call "cool spots", with virtually no endemic species, but some of the world's most highly endangered biotas. Island biodiversity conservation and sustainable use are global priorities in both hot and cool spots.

Island biota have evolved more fragile than on the mainland because island species evolved in competition with relatively few other species under the influence of natural selective forces

Box 3. Endemism: species found naturally nowhere else

The unique evolutionary environment on islands has resulted in higher concentrations of endemic species than their continental counterparts. Here are some examples of endemism:

- ✧ The islands of the Indian Ocean (including Madagascar) account for only 1.9% of the land area of Africa but they house more than 13,000 species of plants, 310 species of birds and 384 species of reptiles.
- ✧ Madagascar is home to more than 8000 endemic species making it the nation with the highest number of endemic species in sub-Saharan Africa.
- ✧ Cuba is home to 18 endemic mammals while nearby Guatemala and Honduras have only 3 each.
- ✧ 104 of the 218 endemic bird areas are confined entirely to islands.
- ✧ 10 of the 34 biodiversity hotspots wholly comprise islands, and many of the rest also include islands.
- ✧ At least 218 of the 595 individual sites holding the entire global population of one or more critically threatened species are found on islands.
- ✧ More than half of the world's tropical marine biodiversity is found around islands, with 12 of the 18 centres of marine endemism, and 7 of the 10 coral-reef hotspots surrounding islands.

peculiar to insular conditions. Furthermore, native species populations tend to be highly specialized and tend not to have developed defense mechanisms against a broad range of predators and competitors.

These characteristics, coupled with isolation, small geographic range and endemism, make island ecosystems especially vulnerable to almost all types of natural, technological and anthropogenic threats, and island species prone to extinction at rates that often exceed those of continental systems. As a matter of fact, **islands claim the greatest number of extinctions in the world and are home to greater concentrations of threatened species than continental systems.** Of the 724 known animal extinctions in the last 400 years, about half were island species, including at least 90 per cent of bird species that have become extinct in that period. Extinction is irreversible because once all the members of a species have disappeared, they cannot be recovered.

Islands are also typically much more vulnerable to natural disasters than continental systems because they are surrounded by water, their coastal zones are very

large relative to their total area, making small islands especially prone to erosion. This is particularly true amongst low-lying islands, many of which have average elevations of less than 7 metres. Finally, the size of small islands reduces their ability to maintain critical ecosystem functions in the face of population growth and increased exploitation needs. This leads to problems with water production and storage, and waste management. Small island developing States are often economically, environmentally and socially vulnerable to risk factors that are largely beyond their control.

Islands are microcosms that offer great scope for the application, testing and refinement of a wide range of conservation tools and approaches, and for monitoring some global changes. Due to their isolation from more widespread continental species, islands are ideal places for unique species to evolve. Evolution in an island population happens at an accelerated rate. The study of islands has provided evidence that could help answer several important questions, such as speciation, methods of dispersal, and past events. Islands also provide an opportunity to gain experience with the ecosystem approach, the primary framework for action under the Convention on Biological Diversity, because distances from the centre of the island to the ocean are often short, and impacts on biodiversity in one area are often rapidly reflected in nearby ecosystems. Finally, for their fragility and vulnerability, islands and their biotas are global bellwethers of change – canaries in the coal mine – providing early indicators of global impacts of threats, such as invasive species and climate change, to the quality of life on Earth.

Finally, islands are home to **unique cultures.** They have developed traditional resource-management methods that have, in many cases, enabled people to live in harmony with biodiversity. Many islands' cultural traditions reflect a close and long-standing relationship with their islands' landscape, native species and ecological processes. Nature is often celebrated in the chant, song and dance of native islanders.



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2 ISLAND WEALTH IS UNDER THREAT

Island biodiversity provides vital goods and services that support livelihoods, food security and health care of islanders and visitors to islands. The various services include, *inter alia*, the provision of food, fuel, fiber, medicines and clothing, regulation of climate change, flood and diseases, nutrient cycling in agricultural lands and soil fertility improvement, and cultural benefits. One characteristic of islands is that their ecosystems, species and genetic resources are particularly sensitive to natural and human-induced disturbances, and are under serious pressure from both natural phenomena and human activities (Box 4).

The stresses imposed on island systems are often the result of the interplay and cumulative effect of environmental, socioeconomic and cultural factors that together have the potential to reduce the resilience of island ecosystems, in other words, their ability to cope with changes and their ability to withstand or recover from severe disturbances. Natural hazards and anthropogenic disturbances, such as deforestation, unsustainable agricultural practices, mariculture and habitat fragmentation, as well as the release of invasive alien species, assume a disproportionate importance on island systems relative to mainland ecosystems (Box 5).

Early in 2005, the Millennium Ecosystem Assessment, the first ever and most comprehensive inventory of the status of the Earth's ecosystems in relation to human well-being, documented that in the past 50 years:

- ✿ The natural land cover of island systems has changed drastically under the pressure of growing human populations and consequent exploitation of the landmass. On some islands, the impact has exceeded critical thresholds, particularly along the coastal fringe;
- ✿ Watershed modification on islands has had a negative impact on water resources in terms of water quality and quantity as well as flow regime;
- ✿ Low-lying island systems are under threat from climate change and predicted sea level rise. These in turn are expected to have serious consequences on flooding, coastal erosion, water supply, food production, health, tourism, and habitat depletion;
- ✿ The coastal systems of islands, such as coastal forests, dunes, mangroves, coral reefs and seagrass meadows, are being altered through unsustainable agriculture, aquacul-

Box 4. Islands, in particular small island developing States, constitute a special case for both the environment and development

As articulated in Chapter 17 of Agenda 21 and emphasized in the Barbados Programme of Action as well as in the Plan of Implementation of the World Summit on Sustainable Development, SIDS rely significantly on the conservation and sustainable use of island biodiversity for their sustainable development, but they experience a number of specific challenges and vulnerabilities arising from the interplay of such socio-economic and environmental factors as:

- ✿ small populations and economies;
- ✿ weak institutional capacity in both the public and the private sector;
- ✿ remoteness from international markets;
- ✿ susceptibility to natural disasters and climate change (including in particular sea level rise from global warming and extreme weather events);
- ✿ fragility of land and marine ecosystems (particularly affected by tourism development and unsustainable agriculture);
- ✿ high cost of transportation;
- ✿ limited diversification in production and exports;
- ✿ dependence on international markets, export concentration, and income volatility; and
- ✿ vulnerability to exogenous economic shocks.

ture, coastal urban sprawl, industrialization, and resort development; and

- ☛ Coastal fisheries, a particularly important and traditional source of food, protein and employment on many islands, are seriously depleted.

As a consequence, many island States are now highly dependent on outside sources for food, fuel and even employment, which together increase their economic fragility.

Box 5. Major pressures on biodiversity include both direct and indirect threats to biodiversity

Direct threats are essentially:

- ☛ Introduction and establishment of invasive alien species;
- ☛ Unsustainable tourism development,
- ☛ Climate change and variability, and the subsequent global warming and sea-level rise;
- ☛ Natural disasters;
- ☛ Overexploitation of biodiversity resources; and
- ☛ Land degradation and land-based sources of marine pollution.

Underlying causes of island biodiversity loss include:

- ☛ Population growth and outmigration of qualified personnel;
- ☛ Limited integration of conservation issues into economic and development planning;
- ☛ Lack of financial resources, and institutional and technical capacity; and
- ☛ Inadequate knowledge and policy frameworks.

Major direct drivers of island biodiversity loss

Invasive Alien Species

Invasive alien species have been known to be one of the principal causes of biodiversity loss – expressed either as population declines, species extinctions or ecosystem/habitat degradation – in island ecosystems. On many islands, there are now as many or, primarily in highly disturbed areas, more introduced plants, higher vertebrates and invertebrates than native species. Most islands evolved over thousands of years in great isolation from continental land masses, and their plants and animals have had to compete with only a limited range of species. Island species populations tend to be small, localized and highly specialized. They often have either not developed or lost dispersability and defense mechanisms against a broad range of potential predators, competitors and disease organisms.

Invasive alien species cause significant ecological and economic damage and high social costs:

- ☛ The introduction of the brown snake (*Bioga irregularis*) into the formerly snakefree island of Guam in the 1940s brought to extinction almost all of the indigenous forest birds and endangered the fruit bats, geckos and lizards of Guam. The cost to the island's economy from the establishment of this single invasive alien species is estimated at US\$ 5 million a year.
- ☛ The introduction of mongooses, cats and rats has eliminated many ground-nesting birds and amphibians from some islands;
- ☛ Introduced exotic weeds such as Lantana (*Lantana camara*), the trailing daisy (*Wedelia trilobata*) and miconia



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(*Miconia calvescens*) known as "the green cancer" in Tahiti, all introduced as ornamentals from tropical America, have choked out thousands of hectares of native rain forest, and grazing and coastal land from indigenous species in the Pacific Islands;

- The carnivorous snail *Euglandina rosea*, introduced to control the giant African snail (*Achatina fulica*), another introduction, brought to extinction most of the endemic partiid land snails of the island of Moorea in the Society Islands;
- Insects, particularly fire ants, have endangered birds and a wide range of endemic or indigenous insects and other invertebrates, especially in Hawai'i, which had no indigenous ants. Fire ants also have the potential to wreak havoc on islands where tourism is a major economic force;
- Alien fish species, such as tilapia (*Oreochromis mossambica* and *O. niloticus*), have out-competed many indigenous freshwater fish and have made difficult the aquaculture of milkfish in Kiribati and Nauru;
- Marine invasives introduced accidentally either as encrusting organisms or in ballast water, can out-compete indigenous marine organisms and seriously disrupt marine ecosystems. Many of these marine invasives are potential parasites, pests and disease organisms.

In theory, the ecological impacts of invasive alien species on islands can occur in the same manner as on mainland ecosystems. However, these impacts are usually more rapid and more pronounced on islands due to their vulnerabilities and lack of co-evolution of island species with more competitive outside organisms.

Unsustainable tourism development

Tourism is an expanding economic activity in many islands, but its expansion poses significant socioeconomic and environmental challenges. Unplanned and uncontrolled tourism threatens island biodiversity in different ways, including:

- ✎ The destruction of wildlife habitats in both terrestrial and marine areas for the development of tourism infrastructure such as hotels, roads and amenities like golf courses and marinas;
- ✎ The deliberate or unintentional introduction of invasive alien species facilitated by the movement of people and goods;
- ✎ The degradation of habitats from solid and liquid waste associated with large-scale developments, sewage and cruise ships; and
- ✎ Tourism activities such as destructive diving, illegal or unregulated fishing activities, off-road driving, collection of souvenirs, and anchoring on reefs.

The impact of unsustainable tourism development is nowhere more sudden and pervasive than on islands. Tourism adds pressure on energy, fuel and demands for imported food and raw material that have contributed to pollution of different natures. However, although tourism is considered one of the major direct and indirect threats to island biodiversity, tourism is also being recognized as having a high potential for biodiversity conservation and sustainable use, given its dependency on, and therefore its need to preserve, the natural environment. Indeed, ecotourism is among the industries with the highest economic growth rates.



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Climate change and variability, with subsequent global warming and sea-level rise

The full impact of climate change on islands is far from certain, but scientists have already predicted possible adverse consequences. The most significant impacts of current climate change are sea level and sea surface temperature rise.

Islands are especially susceptible to the impacts of global climate change and climate variability, the resulting rise in sea-surface temperature and sea level. Most small islands are low lying and have a larger exposure of coasts in relation to land mass, as well as a high concentration of population in coastal zones. They are therefore extremely susceptible to **sea-level rise** and associated flooding. Experts predict that the average sea level could rise as much as 21 centimetres by 2025 and 66 centimetres by 2100, mainly attributable to the thermal expansion of the upper ocean layers and the melting of glaciers and ice caps. Furthermore, with populations, agricultural activities and major infrastructure investments concentrated in coastal areas, a rise in sea levels has the potential to destroy island economies, as a result of inundation, storm surge or shoreline erosion. Sea-level rise will also cause increased salinity due to encroachment of the sea and salt water intrusion into freshwater lenses contributing to an increasing shortage of the water supply and loss of agricultural production. The pressure on forest reserves will increase as coastal agricultural land will be lost; and wildlife species will be lost or migrate

Several small islands, such as the Maldives in the Indian Ocean and the Marshall Islands and Tuvalu in the Pacific, could face total inundation within this century if rates of sea-level rise

accelerate. This impact is also predicted for archipelagos such as the Philippines and Indonesia, where millions of inhabitants face displacement from their homes due to sea level rise. In Vanuatu an entire village has already been forced to relocate as a result of sea level rise. Flooding of low-lying areas will also lead to the loss of a number of endemic species.

Scientists predict that by the end of the 21st century, the Earth's mean surface temperature will warm 1.4 to 5.8°C. **Rises in sea temperature** can cause **coral bleaching**. This phenomenon has a major impact on the health of marine ecosystems, affecting fish, sponges, giant clams, mollusks and other sea creatures that rely on reefs to survive. Coral bleaching also leads to the loss of revenues from key sectors such as tourism and fisheries. Over the last two decades, coral bleaching has increased in intensity, frequency and geographic distribution, and experts predict this trend will continue. The 1998 El Niño caused unparalleled coral bleaching, killing 85% of the corals in the western Indian Ocean. **In Palau**, one of the Seven Underwater Wonders of the World, 99% of the corals on some reefs died. Bleaching events and subsequent reef mortality are expected to become more frequent, potentially leading to a decline in reef fisheries and a long-term reduction in coastal protection.

In terrestrial ecosystems, changes resulting from climate change are likely to include alteration in the ranges of species; increases in forest and agricultural pests and diseases; reduced availability of food and water for wildlife; and an increase in forest fire frequency, especially where precipitation is reduced. With the current climate change, scientists believe that the frequency and severity of typhoons/hurricanes will increase and negatively impact most island habitats.



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Natural disasters

Natural disasters are linked to the aforementioned phenomena of climate change and variability. With few exceptions, small islands are extremely prone to damaging cyclones, storm surges, volcanic eruptions, earthquakes, tsunamis, forest fires, landslides, prolonged droughts and extensive floods. The tsunami in the Indian Ocean in 2004 is the most dramatic example in recent years. Of the 25 most disaster-prone countries, 13 are SIDS. SIDS have limited capacity to prepare for, respond to and recover from disasters. Many of them have become more vulnerable to disasters because of environmental degradation caused by various human activities, including, *inter alia*, poor land use, coastal and inland deforestation, degradation of protective coral reefs and pollution from mining and sewage.

These unsustainable practices, together with various economic and social pressures, have undermined the traditional resilience of island communities to natural disasters. Since damage often occurs on a national scale, a single disaster can cripple an island's infrastructure and economy. Because of the consequent diversion of resources from long-term development, plans to deal with reconstruction and rehabilitation after natural disasters continue to pose a grave challenge to sustainable development and the conservation of biodiversity in many SIDS. Expensive or lack of insurance coverage and high rehabilitation costs are major financial constraints for SIDS to address natural disasters.

Tropical cyclones, also referred to as hurricanes or typhoons, are frequent on islands. With global warming, the likelihood of weather extremes is expected to increase. The impacts of cyclones on native wildlife include, *inter alia*, mortality due to the cyclone itself; starvation as a result of food disappearance, for long periods after the cyclone; predation of grounded wildlife by domesticated animals; hunting by humans; failure to breed because of stress and the destruction of broods; and degraded health of habitats and ecosystems. In Samoa, cyclones Ofa (1990) and Val (1991) defoliated up to 90 per cent of all trees and may have caused a drastic population decline of some species. The impacts of cyclones on biodiversity are most severe on atolls and other very low-lying islands.

Ecosystem degradation exacerbates the impact of hurricanes on islands. A case in point is the island Hispaniola, divided into two countries, Haiti and Dominican Republic. It was reported that on 18 September 2004, Hurricane Jeanne hit northern Haiti, bringing with it high winds and torrential rains that sparked floods and mud slides, killing over 3,000 Haitians and affecting over 300,000. Hurricane Jeanne also swamped the Dominican Republic with the same potentially devastating forces, however only 20 deaths were reported there. In the Dominican Republic the health of forest ecosystems has been improving over the past three decades as a result of concerted efforts to conserve forest

biodiversity. Haiti, on the other hand, contains virtually no forest cover due to logging, conversion to agriculture, and intensive use of firewood.

On small islands, **droughts and floods** are localized and ephemeral problems often related to the El Niño Southern Oscillation phenomenon. On small low-lying limestone islands where surface water resources are limited or lacking, such as the atolls of the Central Pacific, drought can have a devastating impact on biodiversity. **Floods and landslides** caused by storms, tsunamis, tidal waves or heavy rainfall are common on small islands. They can devastate agricultural and other areas of biodiversity importance. While native forests are somewhat immune to flood damage, rainfall runs off much more rapidly from degraded forests, often resulting in soil erosion and flooding downstream with impacts on coastal zones and lagoon ecosystems.

Forest, land and bush fires can cause problems for human health, disrupt major social and economic activities, be detrimental to biodiversity, pollute the atmosphere and aggravate greenhouse effects. Forest fires can be caused by natural events (such as lightning or volcanic eruptions) but are mainly by human carelessness or design (such as the slash-and-burn for land clearing). **Volcanic eruptions** can affect agriculture over a wide area through the deposition of ash and other volcanic materials that destroy crops and grazing areas, and damage irrigation systems.



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Overexploitation and unsustainable uses of biodiversity

Overexploitation and unsustainable use of resources are major causes of biodiversity loss in island ecosystems. Reports indicate that:

- ✦ Overfishing is a major factor for coral reef degradation in many areas of the Caribbean, Pacific and other SIDS. The use of **destructive fishing practices** (e.g., dynamite, cyanide and poison weed), although outlawed in most SIDS, continues to be common in some islands. Catches of non-target endangered species, especially turtles, dolphins and dugongs, resulting from dynamite fishing, purse-seining and drag-netting, are also cause for concern in the island regions.
- ✦ *Intsia bijuga*, known as "vesi" and "ifilele," formerly widespread in Fiji and Samoa, is threatened because its wood is highly valued for house posts, canoe parts and carving kava bowls;
- ✦ Overgrazing by livestock (mainly goats, sheep, cattle and donkeys) also poses a serious threat to the biodiversity of many SIDS, particularly in upper watershed areas.
- ✦ **Uncontrolled hunting** is a threat to species such as the coconut crab (*Birgus latro*), fruit bats (mostly *Pteropus* spp



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exported from Palau and Samoa to Guam, where they are a culinary delicacy), pigeons (mostly *Ducula* and *Ptilinopus* spp) and other large birds that are traditional food sources;

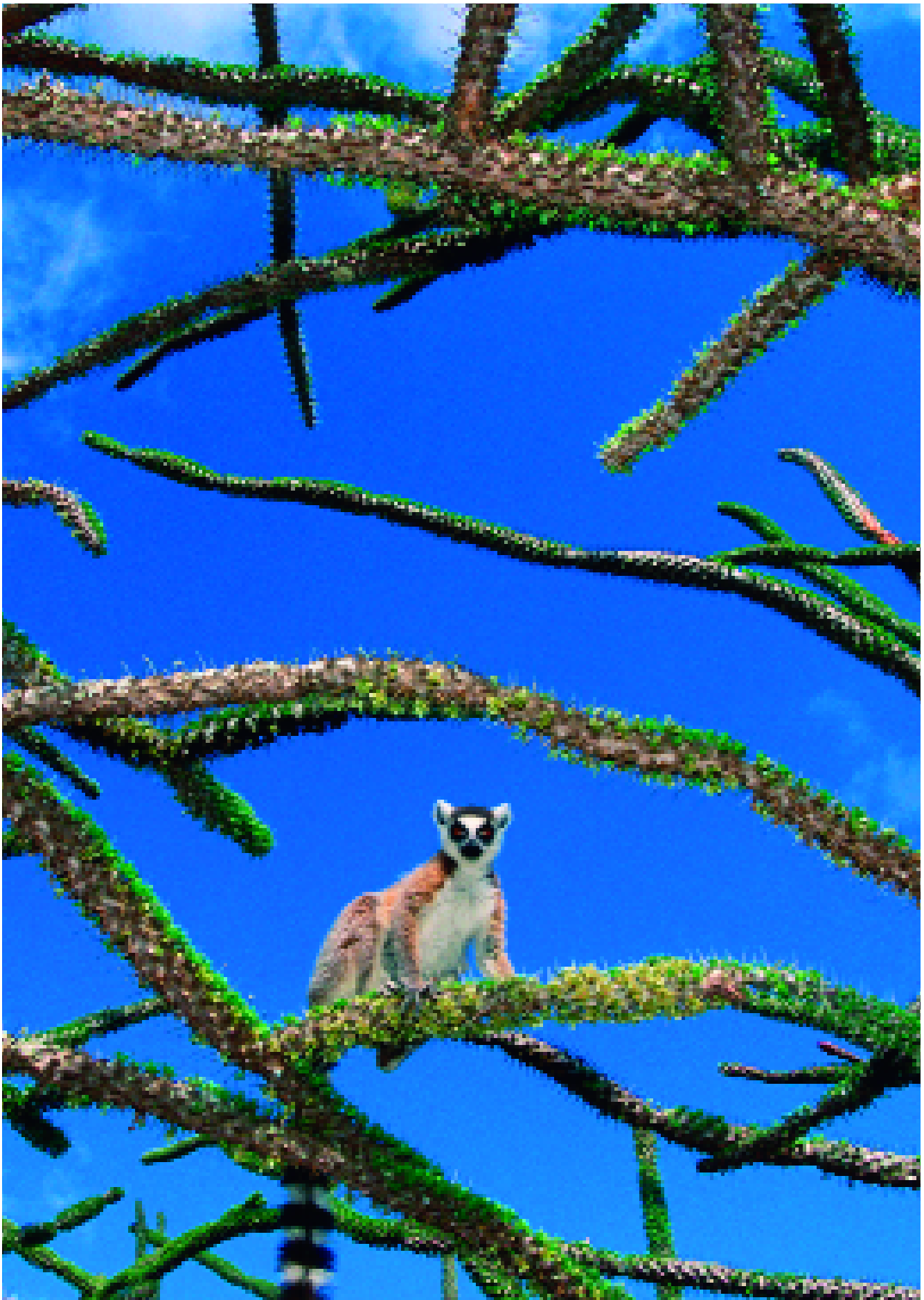
- ✦ The **extraction and refinement of mineral resources**, such as gold in Fiji, manganese in Vanuatu, bauxite in Haiti, phosphate in Nauru and oil in Trinidad and Tobago, have been reported to contribute to pollution and negatively impact on local biodiversity.

Unsustainable use of ecosystems endangers important "key-stone" species in many islands. The loss of these species can lead to the breakdown in fragile interspecies relationships, entire food chains and reproductive cycles. It can also result in the collapse of entire ecosystems and the breakdown in local subsistence economies that depend on terrestrial and marine biodiversity. The average deforestation rate remains high in many SIDS and this phenomenon, combined in some cases with an arid climate and steep terrain, has often resulted in widespread desertification and soil erosion. Soil fertility has also declined in many islands. A common trend in SIDS is the decline in land under arable use and a simultaneous increase in the area of land under urban development.

Pollution and waste disposal

The growing urbanization and industrialization of small islands have increased incidents of dangerous and illegal pollutants being discharged into streams and oceans. The use of agrochemicals has become standard practice in the agricultural production systems in SIDS to respond to export requirements. Chemicals imported for agriculture, industry, transportation, health services and households are a growing source of pollution on islands. A number of cases have been reported recently where agrochemical contamination of underground water supplies, near-shore waters and biota presents a serious risk to human and animal health. Also, poorly treated sewage emptying into coastal areas is a major chronic pollutant. On islands, although frequently overlooked, the cumulative impact of household runoff from baths and sinks that eventually drains into the sea is also a major contributor to freshwater and marine ecosystem degradation. In the Caribbean, the sugar, citrus and banana agro-industry produce large volumes of **liquid waste** that pose significant threats to rivers, and sub-surface and coastal water, leading to considerable changes in the temperature, chemical and/or physical state of the aquatic systems, and thus threatening ecosystem stability and biodiversity.

The last decade has seen an increase in the importation of goods in small island States, encouraged partly by the demands from tourists. That has resulted in dramatic increased in solid wastes such as plastics. Increased amounts of hazardous waste are often associated with limited facilities for waste disposal in island systems.



Major underlying causes of island biodiversity loss

Island biodiversity is intricately linked to island livelihoods and development. As such, the health of island biodiversity can be impacted by a number of indirect factors such as: lack of mainstreaming and integration of biodiversity issues into other sectors; lack of use of tools such as environmental impact assessments; inadequate institutional capacity; lack of financial and human resources; lack of transfer of technology and expertise; lack of appropriate policies and laws; poverty; and population pressure. Figure 1 (page 15) shows the linkages between the direct pressures and underlying drivers of biodiversity loss. Underlying drivers can cause or exacerbate the direct pressures described above. They have been identified in general by Governments in the Strategic Plan of the Conference of the Parties to the Convention on Biological Diversity, and in the context of small island States, in the Barbados Programme of Action (BPoA, 1994), the Mauritius Strategy (2005) and the Millennium Ecosystem Assessment (2005) in its reports on island systems.

Institutional, technical and capacity-related obstacles

Management of island biodiversity requires the involvement of a number of sectors including both marine-based sectors (e.g., oil and gas development, fisheries, coastal tourism, mariculture, marine mammal protection and port development) and land-based sectors that influence the coastal and marine environment (e.g. agriculture, forestry, mining, housing and tourism) in a coordinated manner and with important resources. Integration of marine- and land-based sectors hardly happens, as they usually operate under separate jurisdictions and management authorities.

Pressures and threats to the conservation and sustainable use of biodiversity are often exacerbated by a lack of awareness and appreciation of environmental issues on the part of the public and decision-makers. In addition, most SIDS lack sufficient resources, institutional capacity, and scientific and technical expertise for

effective national surveillance, monitoring and management of biodiversity, and for accessing and adapting appropriate technologies. Despite the recent strengthening of environment departments in many SIDS, a major constraint remains the shortage of staff to perform the wide and expanding range of environmental management functions. The lack of qualified scientists and associated institutions is further compounded by the exodus of qualified professionals.

Another challenge is the accelerating loss of traditional and contemporary knowledge about the uses, beliefs, management systems and languages related to biodiversity – sometimes called 'ethnobiodiversity' – which could be one of the most serious obstacles to successful biodiversity conservation on islands. At the local level, site-based biodiversity conservation will be problematic if the indigenous and local communities cannot marry traditional conservation strategies with modern scientific models as part of co-management systems. If local people have lost their ethnobiodiversity and no longer know the local names, uses and management systems for their biodiversity, chances are that they will not place a priority on its conservation.

Inadequate knowledge, policy frameworks and financial resources

A constraint to the development of effective environmental management strategies is the limited amount and consolidation of biodiversity information. Sound knowledge of the current populations and threat status of endangered species is particularly lacking, even for fairly well-known species. Furthermore, there are many threatened species that urgently require an assessment of their population and conservation status. The lack of information is one factor inhibiting the development of appropriate policies on biodiversity. Models of good practice for disaster preparedness and response, disaster communication and early-warning systems, coordination systems and practices are urgently needed.

Many SIDS, just like many other countries, tend to put economic considerations above environmental ones. Consequently, biodiversity is often perceived as a low priority issue and allocated insufficient budget.

Human population changes and impact of globalization

Referring to the data published by the United Nations, the Millennium Ecosystem Assessment warned in its 2005 report on island systems that, by 2025, 75% of the world's population will live within 60 kilometres of the sea. A high proportion of this occupancy will be on islands of developing countries. Many cities on some highly populated islands cannot currently provide the basic resources for the well-being of their inhabitants. This is a serious and growing problem compounded by the sociopolitical, cultural, and economic differences between the traditional inhabitants and the newly



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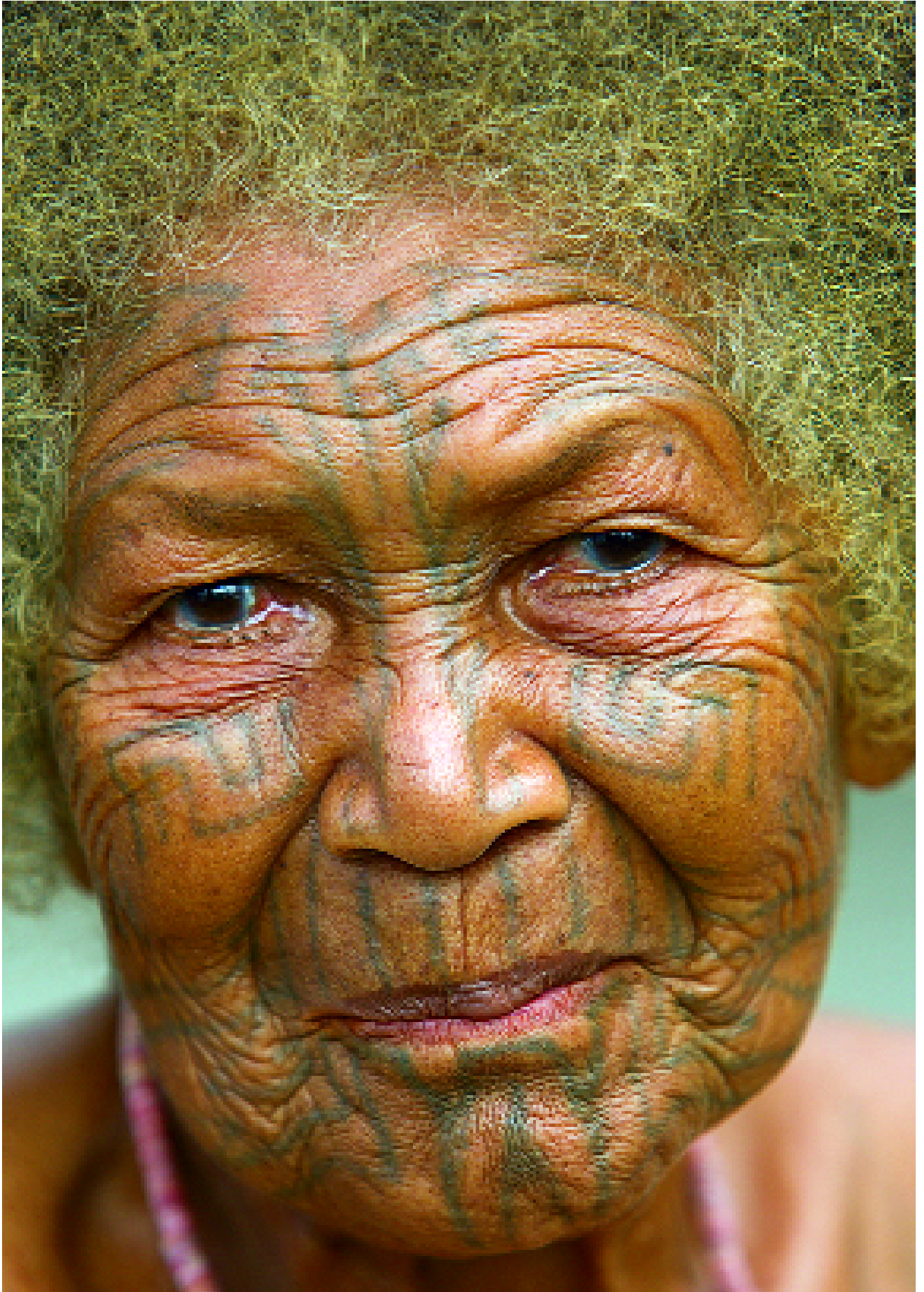
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arrived populations. Occasionally, for example subsequent to the failure of an important crop, outmigration can take place in some islands.

The Barbados Programme of Action, as well as the Mauritius Strategy recognize that energy issues are critical for islands. The availability, constraints or scarcity of energy sources are important drivers of change for island ecosystems and human well-being. This situation is, particularly enhanced by the geographical isolation and remoteness of islands relative to the continents.

Globalization presents both difficulties and opportunities for biological diversity. It has had negative impacts on many island resources particularly fisheries and agriculture. For example, long line fishery operations opened to foreign investors have negative

impacts on migratory fish species, such as tuna. Increasing fishing efforts and new technology have depleted many local fisheries. This is compounded by often-illegal access to and overexploitation of the marine resources in the exclusive economic zones of many island states... With the liberalization of trade and the progressive removal of trade preferences (tariffs), SIDS can be marginalized in a world economy, as they are unable to compete. For some islands with natural and primary resources, globalization presents an opportunity to gain access to new markets, facilitate the transfer of new technologies, and increase productivity. Finally, illegal trade in rare organisms found on islands is much encouraged by the fact that a number of island governments are not yet Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).



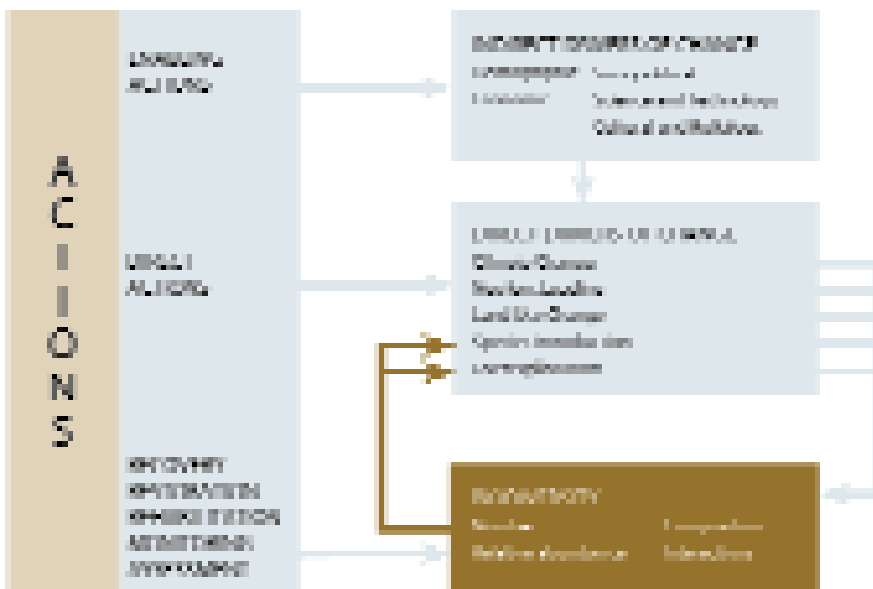
3

GLOBAL CALL FOR ACTION

Ensure continued health of island ecosystems and the people who depend upon them

Island ecosystem goods and services are unique and irreplaceable, but they are under a great deal of pressure, putting many genetic resources, species and communities in danger of extinction and degrading many ecosystems and habitats to the point where they can no longer adequately provide the services that sustain life on islands. Some of the drivers affect biodiversity directly, and others are underlying pressures. Successful strategies, plans and programmes have to address both the direct and indirect pressures (Figure 1).

Figure 1. Relationship between direct and indirect drivers of biodiversity change, and actions to address these drivers



The Barbados Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States (1994) is the blueprint for SIDS and the international community to address national and regional sustainable development in SIDS. The programme takes into account the economic, social and environmental aspects that are the pillars of the holistic and integrated approach to sustainable development. The Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States (2005) renewed the commitment on the part of the international community to assist SIDS in implementing

the BPoA. The Strategy recommends twelve actions to meet the 2010 target and other targets endorsed by the World Summit on Sustainable Development (WSSD, 2002). One of these recommendations was to address island biodiversity under the Convention on Biological Diversity in a manner that responds to the unique characteristics of SIDS and to the threats related to climate change, land degradation and their particular vulnerabilities (Box 6).

In March 2006, the Conference of the Parties to the Convention on Biological Diversity adopted a programme of work on island biodiversity, building on the BPoA, the Mauritius Strategy, the work of the scientific body of the Convention on Biological Diversity at its tenth meeting (2005) and taking into

account the goals and targets contained in the Convention Strategic Plan, the Plan of Implementation of the World Summit on Sustainable Development (2002), the Millennium Development Goals, and other relevant plans and programmes. The programme of work of the Convention on Biological Diversity addresses the underlying pressures and the direct drivers of biodiversity loss.

Addressing underlying pressures

Indirect threats can have a significant impact both on the state of island biodiversity and on the success of efforts to address direct threats, including efforts to recover threatened species and restore or rehabilitate degraded ecosystems.

Underlying threats can be addressed in many ways, which should include:

- adequate planning and implementation of the plans;
- mobilization of the needed human, financial and institutional resources; and
- a strong political will that sustains these endeavors.

Governments should establish enabling environments for planning and implementation of the plans.

All SIDS and most other countries that are small islands or have small islands are Parties to the Convention on Biological

Diversity. In the context of this Convention, they have to prepare their national biodiversity strategies and action plans, as an important requirement in implementation of the Convention objectives called for in Article 6 of the Convention. National biodiversity strategies and action plans contain targeted goals, objectives, and actions for the conservation and sustainable use of biodiversity, with specific actors, timeframes and expected measurable outputs. However, as of March 2006, only a bit more than 50% of SIDS had completed their national strategies and action plans. It is important for all island States and States with small islands to fulfill their commitment by completing their national biodiversity strategies and action plans, taking into account the international goals that should guide actions for biodiversity conservation on islands.

In accordance with their particular national and local conditions, and respective levels of development, countries may select from, adapt, and/or add to, the goals, objectives and actions sug-

gested in the programme of work on island biodiversity adopted by the Conference of the Parties to the Convention on Biological Diversity at its eighth meeting in March 2006. In planning national programmes of work, due regard should be paid to the socio economic, cultural and environmental costs and benefits of various options.

National strategies and action plans should not remain just ideas on paper. It is essential to translate them into programmes and projects, and implement them on the ground. Governments should therefore establish the most appropriate legislative, administrative and policy environment for the success of the plans and programmes. The guidance for the establishment of such an environment is provided in:

- ☛ The ecosystem approach of the Convention on Biological Diversity, which is a strategy for the integrated management of land, water and living resources, promotes conservation and sustainable use in an equitable manner, while

Box 6. International goals and initiatives that should guide actions relating to biodiversity on islands

The Barbados Programme of Action for the Sustainable Development of Small Island Developing States, adopted in 1994 called for national, regional and international action in the following 14 priority areas: (i) climate change and sea level rise; (ii) natural and environmental disasters; (iii) management of wastes; (iv) coastal and marine resources; (v) freshwater resources; (vi) land resources; (vii) energy resources; (viii) tourism resources; (ix) biodiversity resources; (x) national institutions and administrative capacity; (xi) regional institutions and technical cooperation; (xii) transport and communication; (xiii) science and technology; and (xiv) human resource development.

The Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States adopted in 2005 lists 14 actions needed by small island developing States, with necessary support from the international community, to meet the 2010 target and other targets endorsed by the World Summit on Sustainable Development in paragraph 54.

Relevant Millennium Development Goals:

- ☛ MDG1: Eradicate extreme poverty and hunger
- ☛ MDG6: Combat HIV/AIDS, malaria and other diseases
- ☛ MDG7: Ensure environmental sustainability
- ☛ MDG8: Develop a global partnership for development

The Plan of Implementation of the World Summit on Sustainable Development (2002):

- ☛ Oceans, seas, islands and coastal areas form an integrated and essential component of the Earth's ecosystem and are critical for global food security and for sustaining economic prosperity and the well-being of many national economies (paragraph 29)
- ☛ Small island developing States are a special case both for environment and development. Although they continue to take the lead in the path towards sustainable development in their countries, they are increasingly constrained by the interplay of adverse factors (paragraph 52)
- ☛ Establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas that contribute to achieving the 2010 target to significantly reduce the current rate of biodiversity loss (paragraph 32 c and paragraph 44)

The 2010 Biodiversity Target and specific targets adopted in the respective programmes of work relating to the following seven focal areas: (i) Status and trends of the components of biological diversity, (ii) sustainable use, (iii) threats to biodiversity, (iv) ecosystem integrity and ecosystem goods and services, (v) status of traditional knowledge, innovations and practices, (vi) status of access and benefit-sharing, and (vii) status of resource transfers.

recognizing that humans, with their cultural diversity, are an integral component of ecosystems. As such, ecosystem approach could serve as a tool to ensure and/or promote the mainstreaming of biodiversity into national policies and programmes for sustainable development and poverty alleviation, in particular by integrating all the economic sectors affecting biodiversity directly or indirectly, such as trade, fisheries, agriculture, tourism development and mining. Ecosystem approach shares the same principles as the "island systems management approach" developed by the Organization of the Eastern Caribbean States and adopted by the First Ministerial Meeting on the Implementation of the Barbados Programme of Action in 1997.

- Biodiversity-inclusive environmental impact assessment and strategic environmental assessment guidelines that ensure that all plans and actions are respective of the objectives of the Convention;
- The guidelines for the application of positive incentives; the removal of policies and programmes that generate perverse incentives and enhance pressure on biodiversity; and the application of tools for valuation of biodiversity and biodiversity resources and functions.
- The framework of goals, targets and indicators adopted by the Governments in 2004 at the seventh meeting of the Conference of the Parties to the Convention.

Clear and, as far as possible, measurable targets are essential for the development of concerted actions from all relevant sectors and enhancing accountability of the various stakeholders. Adoption of targets will also facilitate assessment of progress towards the goals.

A strong political will and greater awareness of the issues at all the levels of the society are important, so as to mobilize both domestic and external sources of financial resources needed for addressing the challenges of island ecosystems conservation. In addition, the use of appropriate and adaptive technologies should be encouraged to support conservation and sustainable use of island biodiversity. Finally countries with islands and island countries should develop and/or strengthen cooperation/partnerships particularly in their respective regions to meet the human, technological and institutional resource needs. At the national level, Governments should build capacity in support of an interdisciplinary and participatory approach to the management of island biodiversity in addition to facilitating the integration of indigenous and traditional management and conservation practices into national plans and policies. An acknowledgement of access rights and equitable benefit sharing at all levels can also provide incentives for the conservation of island biodiversity. The work of non-governmental organizations in implementing national strategies and action plans should be streamlined and encouraged, as appropriate. Well-led local organizations can be powerful catalysts for the conservation of island biodiversity.



Box 7. Indicative list of types of measures to control direct threats to biodiversity

Threat	Type of direct action
Introduction and establishment of invasive alien species	Identify invasive alien species, control pathways for invasion and eradicate populations where necessary
Unsustainable tourism development	Plan and regulate development taking into account inter alia the ecosystem approach and biodiversity-inclusive environmental impact assessment and the strategic environmental assessment, particularly in coastal areas
Climate change and variability, and the subsequent global warming and sea-level rise	Develop and implement sustainable agriculture, land restoration measures, and national adaptation strategies to enhance island ecosystem resilience, including by establishing protected area systems, and facilitate regional and interregional cooperation
Natural disasters	Improve national disaster mitigation, adaptation, preparedness, early-warning capacity and risk management including through inter alia interdisciplinary and intersectoral partnerships, and establishment of protected area systems
Overexploitation or unsustainable use of biodiversity resources	Apply sustainable use guidelines or code of conducts such as the Addis Ababa Principles and Guidelines for Sustainable Use, or the FAO guidelines for Responsible Fisheries in the Marine Ecosystem, biodiversity-inclusive environmental impact assessment and strategic environmental assessment, and the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization Restore/rehabilitate degraded ecosystems and recover threatened species and genetic resources, including through the establishment of protected areas systems. Protect traditional and indigenous livelihoods where appropriate and offer alternative livelihood options where previously sustainable activities become unsustainable
Land degradation and land based marine pollution	Develop and implement pollution management plans including: waste management, control of runoff and siltation, and prevention of eutrophication of island waters and coastal ecosystems
Trade	Apply CITES guidelines to halt illegal trade of endangered and threatened species Improve capacity for participation in international trade

Addressing direct drivers

Threats posed directly to island biodiversity can be addressed in various ways depending on a range of objectives, available resources and various geographical, ecological and socioeconomic considerations. Their listing is beyond the scope of this brochure however details can be found in the programme of work on island biodiversity of the Convention on Biological Diversity. Box 7 provides an indicative list of types of measures that can be taken to control the direct threats described in the previous section.

The following actions could accompany the implementation of the identified direct actions:

- ✎ Governments could consider adopting and implementing the goals, targets, timeframes and island-specific priority actions of the programme of work on island biodiversity, and use the agreed indicators to assess progress and report in the context of the national reports of the Convention on Biological Diversity.
- ✎ They should endeavour to establish and/or strengthen national and international island partnerships, including between small island developing States and developed

Box 8. GEF objectives for biodiversity projects

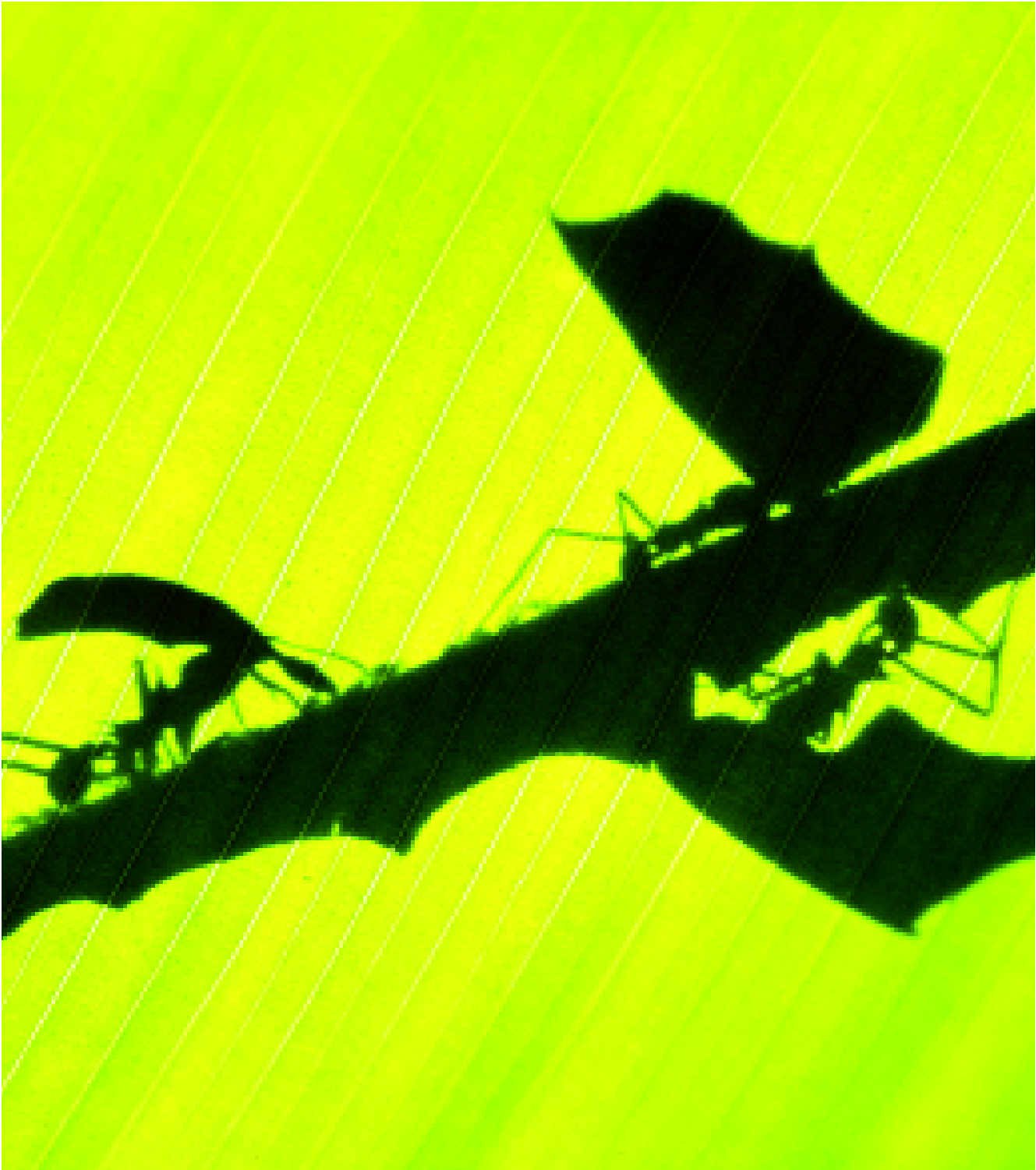
Specific objectives of biodiversity conservation and sustainable-use projects that have been funded by the GEF include:

- ✎ Protecting and strengthening representative ecosystem biodiversity of global significance, mainly in transboundary areas;
- ✎ Developing biodiversity protection programs with a range of activities, including management techniques for a variety of representative ecosystems, environmental education and awareness, and community support for managing protected areas;
- ✎ Developing conservation and sustainable use programs based on revenue generation mechanisms for protected areas, interactions with local communities and land managers, sustainable development strategies, and various forms of demonstration activities.

countries in the same region that bring governments and civil society organizations together to increase political, financial and technical support to accelerate the implementation of the identified actions.

- ✎ They should encourage the promotion of cooperation and synergy on climate change, land degradation and biodiversity issues at national, regional and international level;
- ✎ As recommended in the Mauritius Strategy, the international community should assist SIDS with technical and

financial support in their implementation of the programme of work and its targets. The Global Environment Facility, the financial mechanism of the Convention, and its implementing agencies could make island biodiversity a priority, particularly in SIDS (Box 8). In the same context, other financial institutions including regional development banks could provide or increase their assistance to SIDS and developing countries with small islands for the implementation of the programme of work on island biodiversity.



Achieving global goals

It is important for island governments to ensure that national strategies for both biodiversity conservation and sustainable development include actions to achieve key global targets such as

the Millennium Development Goals, the 2010 biodiversity target, the goals and targets adopted in the programmes of work of the Convention on Biological Diversity, and targets adopted in the Plan of Implementation of the World Summit on Sustainable Development (Box 9).

Box 9. Highlights of the Convention on Biological Diversity

Objectives of the Convention

- Conservation of biological diversity
- Sustainable use of its components
- Fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding

Acknowledgment of the unique situation of SIDS in the preamble and Article 20 on financial resources

Ratification: 187 country Parties and one regional economic integration organization (as of 7 March 2006)

2010 target: Parties commit themselves to a more effective and coherent implementation of the three objectives of the Convention, to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth.

Instruments developed by the Convention s Conference of the Parties:

- Seven thematic programmes of work: inland waters; marine and coastal areas; dry and sub-humid lands; forests; mountains; islands and agricultural lands;
- Other programmes of work: protected areas; technology transfer and cooperation; incentive measures; and Article 8j and related provisions

Programmes of work contain specific goals, targets and actions:

- Approaches and guidelines: ecosystem approach; Addis Ababa Principles and Guidelines for Sustainable Use; Access to genetic resources and Benefit Sharing; Guidelines on Tourism Development; and Guidelines on biodiversity-inclusive environmental impact assessment and strategic environmental assessment
- Strategies: Strategic Plan of the Convention; Global Strategy for Plant Conservation
- The Clearing-house Mechanism established to promote technical and scientific cooperation, which hosts the Convention website: www.biodiv.org
- The Cartagena Protocol on Biosafety for the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity

The **Global Environment Facility (GEF)**: As of June 2005, approximately US\$ 2.1 billion has been provided in grants in the area of biological diversity. These grants leveraged close to US\$ 4.4 billion of co-financing, bringing a total value of the GEF biodiversity portfolio to approximately US\$6.5 billion. Since its inception, the Facility has allocated to small island developing States:

- more than US\$ 179 million for 115 biodiversity projects that have attracted US\$ 192.5 million in co-financing from other sources.
- more than US\$ 79.9 million for nine international waters projects that have attracted US\$125.6 million in co-financing from other sources. A significant number of regional GEF projects that include SIDS are in the pipeline, representing more than \$100 million of additional GEF funding.
- As land degradation is a new GEF focal area, SIDS-specific GEF projects related to land degradation are currently in the project development phase. Now in the pipeline are at least two projects, representing US\$ 12.6 million of GEF funding.

4

A VISION OF HOPE

For all islands – small and large, island nations and nations with islands, large continental remnants and remote atolls – there are opportunities and challenges for the conservation and sustainable use of biodiversity. Most islands have identified and made commitments to implement clear goals and priority actions towards the conservation and sustainable use of their unique, yet fragile, biodiversity. The ultimate goal of their action is to become economically, socially and ecologically resilient and self-sufficient in this changing world. Island communities have demonstrated their ability to make major, rapid progress when they have the resources and tools to address their problems.

Islands are microcosms of their continental counterparts, where strategies, policies and management regimes for sustainable development can be applied, tested and refined; where the components of cause and effect are more readily assessed, outcomes more rapidly seen and results more specifically tangible. Focusing efforts and resources on the conservation and sustainable use of island biodiversity and the fair and equitable sharing of benefits arising from the utilization of island genetic resources can provide

rapid progress towards the reduction in the rate of biodiversity loss on Earth.

Success stories

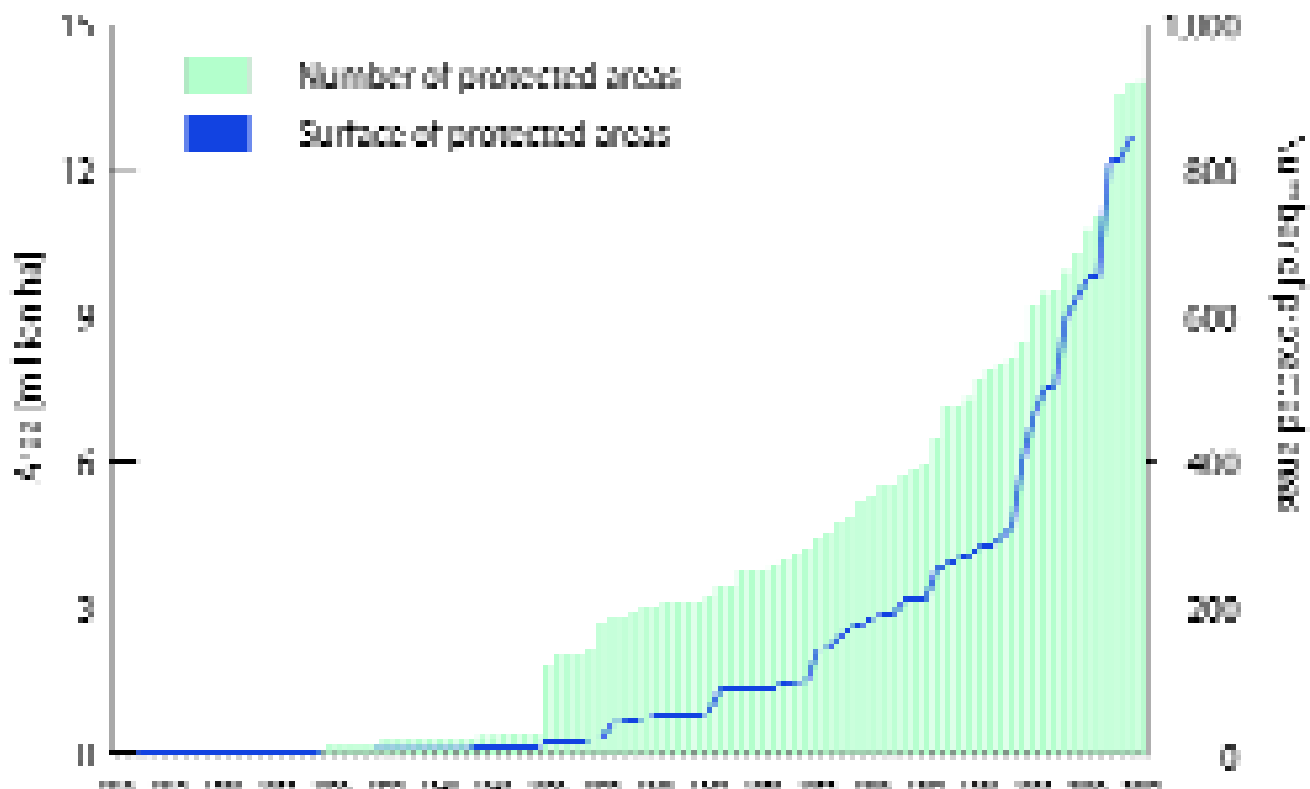
Increasing the number and coverage of protected areas

Many of the insular systems coincide with "hotspots", sites of high conservation priority. The importance of protected areas is therefore of paramount importance in island settings. As shown in Figure 2 below, the trend in the number and coverage of protected areas in SIDS has been almost exponential in the last 10 years. The management objectives have also been shifting from strict conservation to managed resource protected areas, which allow for the multiple uses of natural resources within those areas.

Palau's first nation-wide network of Marine Protected Areas underway

The network, which is part of the Transforming Coral Reef Conservation in the 21st Century (TCRC) initiative, integrates the concept of resilience incorporating coral reef bleaching

Figure 2. Growth in number and surface of protected areas in islands. Source: UNEP-World Conservation Monitoring Centre, World Database on Protected Areas



resistance, survivability, connectivity and sustainability to address both the local resource management concerns and broader global threats. Palau has a solid track record for establishing marine protected areas (MPAs), strong political support for the network concept from communities to the highest level of the national government, and access to research and conservation resources, scientists and facilities. Experience in Palau will help guide implementation of future MPA networks throughout the world.



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Successful reintroduction of nene goose (Branta sandvicensis) in Hawaii

Nene, or Hawaiian goose, (*Branta sandvicensis*) inhabits grazed pastures and upland scrub in Hawaii. In 1967, the nene was designated an endangered species due to its low numbers and lack of self-sustaining populations. Predation by introduced species (such as mongooses, feral cats and dogs) and commercial over-hunting contributed to the decline of this flightless goose. Only 30 individuals remained by 1950. Through captive breeding and careful re-introduction to lowland areas (with rich grass-foraging habitat and low densities of nonnative mongooses), it has now been possible to establish new viable populations. The U.S. Fish & Wildlife Service estimates the costs of the complete recovery of the nene at about US\$ 9.8 million.

Komodo National Park: Addressing direct and indirect pressures

Komodo National Park encompasses four islands as well as their surrounding waters in Indonesia. The park is the home for many endemic species including the famous "komodo dragons".

The threats to biodiversity include human population pressure, tourism, invasive alien species and, most importantly, destructive fishing practices. Park authorities assisted by the central government and environmental organizations have developed an adaptive management plan that applies a range of measures to address those threats. They include zoning, enforcement, capacity-building for alternative livelihoods (i.e. sustainable seaweed farming), awareness programmes, promotion of sustainable tourism as a means of financing, coral monitoring and research, and installation of mooring buoys. Participative marine and terrestrial patrols were established as enforcement means. The measures taken have reduced blast fishing by over 80% (<http://www.komodonational-park.org/>).

The Micronesia Conservation Trust: Capacity-building and financing

The Micronesia Conservation Trust (MCT) was established as the nation's funding mechanism to implement the archipelago's National Biodiversity Strategy and Action Plan (NBSAP). Through a grants system with clear criteria, it provides long-term funding to community and non-governmental organizations that work to conserve sites identified as Areas of Biodiversity Significance in the NBSAP. The MCT also contributes to the establishment of public-private partnerships to address the environmental challenges faced by the small islands as well as to share best practices. Twenty-four priority sites have benefited from the Micronesia Conservation Trust or will benefit in the near future (<http://www.mctconservation.org/>)

Transforming coral reef conservation: Building resilience

The Nature Conservancy, in collaboration with scientists and other organizations, has developed tools to promote and enhance the establishment of marine protected areas in order to conserve coral reefs and sustain the livelihoods they support. Attention is given to the factors which build the resilience of coral reefs in the face of anticipated climate change, coral bleaching and other threats. Amongst the tools developed by TNC is the Reef Resilience Toolkit which provides guidance to address coral bleaching and conserve reef fish spawning aggregations (<http://nature.org/initiatives/marine/strategies/art12286.html>).

SUGGESTED FURTHER READING

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"We have a vision. We have agreed goals. We have great knowledge and ever-greener technologies. What we need is high-level political commitment for marine conservation and protection areas....

Let us work together to help small islands survive and prosper; and to ensure that all people enjoy a sustainable future."

Kofi Annan, Port Louis, 13 January 2005

"Ultimately, the success of the island nations in responding to and combating the maze of modern environmental threats and dangers will stand as a litmus test for the rest of the world. If we fail this test in our small island communities, I can guarantee you, we will fail the test on a global level. And time is running out on all of us.

For our sake, and for the sake of future generations, failure cannot be an option."

H.E. Tommy E. Remengesau Jr., President of the Republic of Palau

"Developing a shared vision for the future of the world's islands starts with increasing public awareness at all levels of society."

Dr. Ahmed Djoghlaif, Executive Secretary, Convention on Biological Diversity