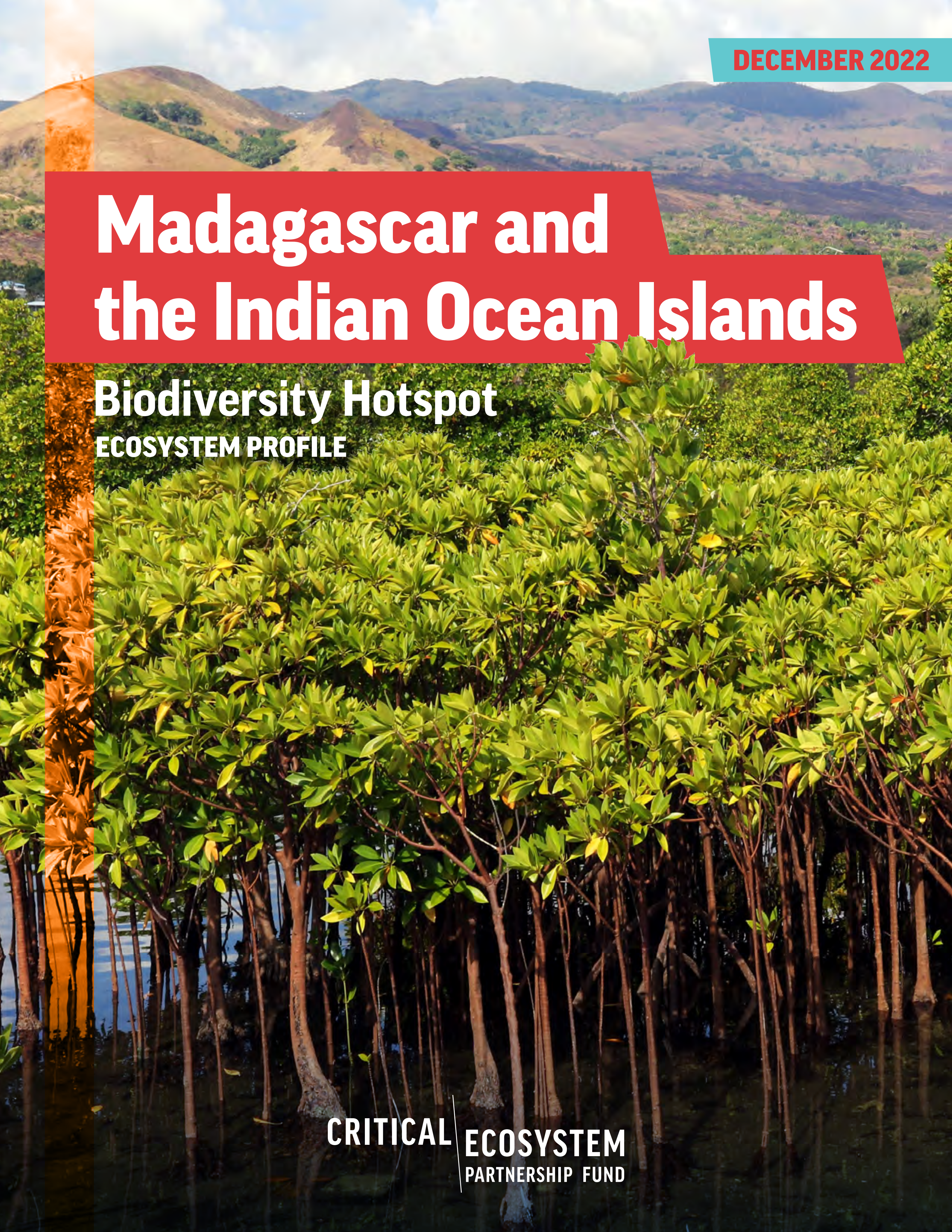
DECEMBER 2022

Madagascar and the Indian Ocean Islands

Biodiversity Hotspot

ECOSYSTEM PROFILE



CRITICAL ECOSYSTEM PARTNERSHIP FUND

Ecosystem Profile

Madagascar and the Indian Ocean Islands Biodiversity Hotspot

2022 Update

FINAL VERSION
DECEMBER 2022

Prepared by:
Conservation International - Biotope - Missouri Botanical Garden - ASITY Madagascar

under the coordination of:
Monique Vieille (CEPF)

and with technical support from:
Moore Center for Science and Oceans, Conservation Biology Institute, TCE Consulting, Ileiry Geospatial Service, Patricia Ramarojaona, Ny Koloina Ratianarivo

and the advice of:

the National Designated Authority within the National Office of Climate Change and Reduction of Emissions from Deforestation and Forest Degradation, Ministry of Environment and Sustainable Development, Madagascar

Team responsible for writing the various chapters:
Monique Vieille (CEPF), Sylvie Andriambololonera, Nadiah Manjato, Luciano Andriamaro, Michèle Andrianarisata, Harison Randrianasolo, Kellee Koenig, Monica Noon, Camila Donatti, Andriambolantsoa Rasolohery, Voninavoko Raminoarisoa, Andry Ravoahangy, Ny Koloina Ratinarivo, Eric Tombo, Lucien Ramiandrisoa, Patricia Ramarojaona, Chloé Arzel, Jean-Sebastien Philippe, Mathieu Souquet, Guillaume Crépin, Théodore Avena, Andry Randrianarisoa, Yahaya Ibrahim, Poonam Tatayah, Vikash Tatayah, Gérard Rocamora Magali Rocamora, Jude Bijoux, Bruno Senterre

CEPF thanks the following individuals and institutions that participated in the consultations and contributed to the update of the Ecosystem Profile:

Comoros

Union des Chambre d'Agriculture des Comores, Faculté des Sciences et Technique, Université des Comores, Parc National du Cœlacanthe, Université des Comores, Direction Generale de l'Energie, des Mines et de l'Eau, ONG Ulanga Ngazijdja, Parc National de Mohéli, Cap Biodiv, Association des Amis dd Nioumbadjou, ONG Ningha, IUT Université des Comores, Maison de l'écotourisme de Ngazidja, Centre National de Documentation et de Recherche Scientifique des Comores (CNDRS) de Moroni, CNDRS Antenne de Mohéli, CNDRS Antenne d'Anjouan, Projet "Renforcement de la Protection des Océans aux Comores (R-POC)"/WildOcean/AIDE/Parcs Nationaux des Comores, Biotope Sarl, Département de SIG Ministère de l'environnement ONG 2 Mains, Association Régionale Aménagement Sols forestiers (ARAF) d'Anjouan, ONG Dahari, Association Lac Dzialandze, ONG Action Comores, Parc National de Ntringui Anjouan, Direction National du Tourisme, ONG Association d'Intervention pour le Développement de l'Environnement (AIDE), Parc National de Bimbini, Projet Bassin versant, Mistamihouli Ndrounde National Park, Karthala National Park, NGO Bada Bitsi, Direction Générale de l'Environnement, Direction Générale des Ressources Halieutiques, Direction Régionale de l'Environnement d'Anjouan, University of the Comoros, Patsy Anjouan site, Association pour la protection du Gombesa, Maison de la Société Civile

Madagascar

Ministry of the Environment and Sustainable Development: General Secretariat, General Directorate of Environmental Governance, General Directorate of Sustainable Development, Coordinating Body for Green Diplomacy and Related Organizations, National Office of Climate Change and REDD+, Directorate of Protected Areas, Natural Resources and Ecosystems, Directorate for the Promotion of the Green and Blue Economy, Directorate of Programming and Follow-up-Evaluation; Ministry of Fisheries and the Blue Economy, Ministry of Mines and Strategic Resources: Directorate General of Mines; Ministry of Water-Sanitation-Hygiene: Directorate General of Water; Ministry of Transport and Meteorology: Directorate General of Meteorology, Ministry of Land Management and Services: Directorate General of Land Management, Directorate of Studies and Environmental Assessments; Ministry of Public Health: Directorate of Health Promotion, Health and Environment Service; Ministry of Fishing and the Blue Economy, Ministry of Higher Education and Scientific Research: Direction Générale de la Recherche Scientifique, Office National pour l'Environnement (ONE), Madagascar National Parks (MNP), Centre National d'Application et Recherche Scientifique (CNARP), Centre National de Recherche Appliquée au Développement Rural (FOFIFA), Centre National de Recherche Océanographique (CNRO), Center National de Recherches sur l'Environnement (CNRE), École Supérieure des Sciences Agronomiques, Institut Halieutique et de la Science Marine (IHSM), Laboratoire de Recherche Appliquée (LRA), Département de Biologie Animale (DBA) - Faculté des Sciences, Département de Biologie et Ecologie Végétales (DBEV), National Focal Points: APA/CDB, RAMSAR and Nairobi Convention; Conservation International, Fondation Tany Meva, Fondation pour les Aires Protégées et la Biodiversité de Madagascar (FAPBM), WWF, The Peregrine Fund (TPF), BIOTOPE Madagasikara, Wildlife Conservation Society (WCS), Ambatovy Mining Project, IMPACT Madagascar, Alliance Voahary Gasy (AVG), Réseau de la Biodiversité de Madagascar (REBIOMA), Association Vahatra, Missouri Botanical Garden (MBG), Kew Madagascar Conservation Center (KMCC), ASITY Madagascar, Madagasikara Voakajy (MAVOA) Association du Réseau des Systèmes d'Information Environnementale (ARSIE), Durrell Wildlife Conservation Trust, California Academy of Sciences (CAS), Turtle Survival Alliance (TSA), Service d'Appui à la Gestion de l'Environnement (SAGE), Association RENIALA, Groupe d'Etude et de Recherche sur les Primates (GERP), Moore Center for Science, Amphibian Specialist Group/IUCN Madagascar, Agence Française de Développement (Madagascar Office), World Bank (Madagascar Office)

Mauritius

Ministry of Fisheries - Acting Permanent Secretary, General Secretariat of the Chamber of Agriculture, Deputy Conservator of Forests-Forestry Service, Deputy Permanent Secretary (Water and Wastewater Sector) Ministry of Energy and Public Utilities, Water Resources Unit, Officer at OIDC-Outer Islands Development Corporation, Direction of Land Drainage Authority, The Mauritius Herbarium, Ferney Valley, Mauritian Wildlife Foundation (Mauritius), National Parks and Conservation Service, Ministry of Environment, Solid Waste Management and Climate Change, Mauritius Tourism Promotion Authority,

Le Morne Heritage Trust Fund, University of Mauritius, Reef Conservation, Lagon Bleu, Mauritius Oceanography Institute, Ministry of tourism, United Nations for Development Program, Mauritius meteorological services Enforcement Officer, Mauritian Wildlife Foundation (Rodrigues), Ter Mer Rodriguez, Conservation Unit - Mourouk Botanical Garden, Forestry Service Rodr, Shoals Rodrigues

Seychelles

Department of Climate Change - Ministry of Agriculture, Climate Change and Environment, Director General Biodiversity and Conservation Division, Seychelles Parks and Gardens Authority, Ministry of Local Government & Community Affairs, Commonwealth National Climate Finance Adviser; Seychelles Islands Foundation (SIF), Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), Plant Conservation Action group (PCA), Island Biodiversity Conservation center (IBC) University of Seychelles, Seychelles Fishing Authority (SFA), Blue Economy Research Institute (BERI) Marine Conservation Society Seychelles (MCSS), The Nature Conservation (TNC), Nature Seychelles, Island Conservation Society (ICS), Sustainable Tourism Foundation (SSTF), Bee Ecological Consulting, Indian Ocean Tortoise Alliance (IOTA), GOS-AF-UNDP Ridge to Reef Project, Save Our Seas Foundation

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EXECUTIVE SUMMARY

Founded in 2000, the Critical Ecosystem Partnership Fund (CEPF) is a joint initiative of l'Agence Française de Developpement (AFD), Conservation International (CI), the European Union (EU), the Global Environment Facility (GEF), the Government of Japan and the World Bank that supports civil society actors in their efforts to conserve the world's most severely threatened ecosystems, known as biodiversity hotspots. Funding from the Green Climate Fund (GCF) has been made available to CEPF for Madagascar and the Indian Ocean Islands through AFD as an accredited entity to the GCF.

The fundamental purpose of conserving ecosystems is to enable them to perform their various functions, called ecosystem services, for the benefit and needs of people, including: food security; water supply; energy supply; health security; material and economic comfort; and the maintenance of cultural values and social cohesion.

In recent decades, however, in the face of massive and accelerated exploitation perpetrated by humans to satisfy these needs, ecosystems have undergone transformations tending towards forms of degradation that risk becoming irreversible, because the rate of exploitation largely exceeds the capacity for regeneration that these ecosystems have.

This trend of irreversible degradation is exacerbated in a context where other factors have come into play: climate change, on the one hand; and COVID-19 and other possible unexpected health hazards, on the other. As a result, pressures on ecosystems are increasing, at the risk of losing their functions and at the expense of the development and wellbeing of local populations.

Ecosystem Profiling Process

The Madagascar and the Indian Ocean Islands (MADIO) Biodiversity Hotspot has often been considered a priority among other hotspots globally, and, as a result, benefited from CEPF investment as early as 2000.

The first phase of CEPF investment in the MADIO Hotspot ran from 2000 to 2005, supporting 40 projects implemented by 18 organizations. The geographic focus was limited to Madagascar. Following this phase, the CEPF Donor Council approved a consolidation phase, which was implemented between 2009 and 2012.

Then, in 2012, the MADIO Hotspot, covering four countries (the Comoros, Madagascar, Mauritius and the Seychelles) was recognized by the CEPF Donor Council as an eligible region for the development of an ecosystem profile. This was consequently prepared in 2013-2014, under the leadership of Conservation International in Madagascar.

The preparation of an ecosystem profile is carried out through desk studies, as well as consultations with relevant stakeholders, including researchers, conservation and development actors, and local communities. An assessment of biological priorities and the underlying causes of biodiversity loss in given ecosystems is then made. These two elements are combined with an inventory of existing investments in conservation and other key elements. Thus, each profile highlights the most relevant priorities for conservation and for CEPF investment.

An important step is to assess the results of previous conservation efforts and to define the conservation goals to be achieved in order to prevent biodiversity loss (habitats, fauna, flora). CEPF's niche and investment strategy is based on the results of these efforts, first to ensure that investments are well targeted, and second to be able to evaluate the success of these investments. On the other hand, the impacts of climate change cannot be ignored, and must be given a prominent place, given their influences on biodiversity and human wellbeing. The relatively recent involvement of the GCF in CEPF's program reflects this obvious need to integrate the fight against climate change (mitigation and adaptation) into conservation approaches. As a result, the intervention logic of the GCF and the strategic investment directions of CEPF must be consistent with each other.

By specifically targeting civil society, CEPF provides a flexible and adaptable mechanism for these structures to implement concrete actions to protect biodiversity in the Hotspot. The idea is also to be complementary to government efforts (policies, strategies and funding) by ensuring links between government authorities, community groups, non-governmental organizations, academic institutions and the private sector, thereby identifying and building on each sector's strengths and avoiding duplication of effort. CEPF encourages transboundary cooperation to facilitate exchange of experience among nearby countries.

The process to update the ecosystem profile prepared in 2014 was led by a consortium among Conservation International (CI), Missouri Botanical Garden (MBG), ASITY Madagascar and Biotope, with the support of consultants recruited locally. Consultations were held in all four countries. In Madagascar, a total of 187 stakeholders from 112 institutions were consulted. In the Comoros, sub-national consultation workshops were organized on Grande Comore and Anjouan, with the participation of 15 and 12 people respectively, while a national consultation was held with the participation of 11 people. In Mauritius, a national consultation workshop brought together 20 stakeholders. In the Seychelles, a consultation workshop was held with 30 participants. Finally, a regional consultation workshop was held, bringing a selection of stakeholders together from all four countries.

These subnational, national and regional consultations were the main source of information for documenting and analyzing the competencies and needs of civil society organizations (CSOs), and for analyzing threats to biodiversity, as well as root causes of biodiversity loss and barriers to conservation. Data on conservation investments and the impacts of climate change were also collected, mainly through literature review, and analyzed. These analyses informed the definition of a niche for CEPF investment in the hotspot and an investment strategy for the next five years.

The Madagascar and the Indian Ocean Islands Biodiversity Hotspot

The MADIO Hotspot includes the Comoros, Madagascar, Mauritius (including the island of Rodrigues) and the Seychelles. The land area of the hotspot is about 600,000 km^2, of which 592,040 km^2 consists of the island of Madagascar alone. The evolution of a diversity of fauna and flora with a very high rate of endemism at the level of species, genera, and even families, on Madagascar is striking. The terrestrial biodiversity of the other archipelagos is closely linked to that of Madagascar. Despite covering a much smaller land area, the other island groups of the western Indian Ocean contribute much to the biological diversity of the hotspot with high rates of endemism. African influences are especially marked in the biota of the Comoros, while Asian ones are especially evident in the Seychelles. Although the hotspot is defined in terms of its importance for terrestrial biodiversity, its marine biodiversity is also exceptional, both in terms of levels of endemism (corals, coastal species and marine trenches) and in terms of the international importance of populations of certain widely distributed species, such as cetaceans and marine turtles.

In terms of extent of original natural vegetation, MADIO ranks tenth among the 36 biodiversity hotspots globally. and eighth in terms of remaining intact habitat, according to recent estimates of forest cover.

The MADIO Hotspot covers a set of extremely varied habitats, resulting from climatic variability linked to latitude, altitude and steep relief, which due to foehn effects linked to trade winds, concentrates precipitation on the eastern slopes of the massifs. The geological and pedological differences (granitic base, ancient or recent volcanism, atolls and sandy formations, sedimentary formations) add to the diversity of habitats.

Investment niche and strategic directions

The approach to identifying the niche for CEPF investment in the hotspot was based on a combination of thematic and geographic priorities, to maximize impact and reduce the risk of duplication with initiatives already underway. The niche was defined without forgetting that CEPF investment also aims to strengthen the participation of civil society (community groups, NGOs, academic institutions, private companies, etc.) in efforts to conserve biodiversity and fight against climate change.

Based on the analyses presented in the ecosystem profile, the strategic directions for the new phase of CEPF investment in the MADIO Hotspot are presented in the following table:

Strategic direction	**Investment priorities**
1- Empower communities and civil society to implement actions to improve the resilience of species, ecosystems, and human populations to climate change in priority KBAs	1.1 Implement EbA actions, including agroforestry, "climate smart agriculture", eradication of IAS, restoration of degraded watersheds and coastal ecosystems (including wetlands, mangroves, reefs and seagrass beds), and promotion of sustainable management of coastal and terrestrial ecosystems. Priority will be given to the following approaches: i. Promoting resilient agroforestry and developing "Climate Smart Agriculture"; ii. Promoting the sustainable management of freshwater, wetlands, and marine and coastal ecosystems (mangroves, coral reefs, seagrass beds); iii. Strengthening management of intact watershed forest ecosystems through the implementation of protected area management plans in collaboration with local communities; iv. Enhancing resilience and adaptation of ecosystems; v. Restoring degraded coastal ecosystems (wetlands, mangroves, coral reefs, sea grass beds); vi. Restoring degraded watershed forest ecosystems; vii. Promoting control and eradication of invasive alien species; and viii. Strengthening the capacity of local communities in participatory ecological monitoring of KBA target species and their habitats.
	1.2 Support the establishment and development of economic models that improve the resilience of local communities to climate change and support value chains for natural products, while strengthening ecosystem services that contribute to EbA
2- Support local communities and civil society to strengthen the integration of the EbA approach, ecosystem resilience and biodiversity conservation into political and economic decision-making processes and education	2.1 Develop engagement strategies with private sector actors for the integration of EbA into their activities, and also for the conservation and sustainable use of biodiversity and renewable natural resources
	2.2 Support civil society to disseminate information and influence political and economic decision-making processes in favor of biodiversity conservation priorities, ecosystem services and EbA
	2.3 Support civil society in the development and implementation of disaster risk reduction measures
3- Strengthen the capacities of local communities and civil society at regional and local levels to enhance adaptive capacity and reduce exposure to climate change risks	3.1 Strengthen the technical, administrative and financial capacities of local CSOs with missions related to the environment and the fight against climate change
	3.2 Promote exchanges and partnerships (at the national and regional levels) among CSOs working in priority KBAs, to strengthen technical, organizational, management and fundraising capacities

Strategic direction	Investment priorities
	3.3 Support the emergence of a new generation of conservation professionals and organizations specializing in biodiversity conservation, ecosystem services and climate change by supporting, with small grants, technical and practical training and exchange visits
4- Support research and ensure the dissemination of results for the promotion and improvement of knowledge on EbA actions and related good practices	4.1 Support applied research activities that improve understanding of the role of specific ecosystems and test the effectiveness of promising EbA techniques
	4.2 Support research activities that measure and verify the impact of the grant portfolio on ecosystem services
	4.3 Support civil society to promote public awareness and education on biodiversity, conservation priorities, climate resilience, ecosystem services and EbA
5- Provide strategic leadership and effective coordination of CEPF investment across the hotspot through a regional implementation team	5.1 Build a broad constituency of civil society groups that work across institutional and political boundaries to achieve the shared conservation goals outlined in the Ecosystem Profile
	5.2 Improve operational and monitoring processes and coordination of CEPF grant resource allocation to ensure effective implementation and strategic guidance in an accountable and transparent manner that is fit for purpose on a country-by-country basis

The following steps were followed to rank Key Biodiversity Areas (KBAs) based on their importance for the provision of ecosystem services that reduce the vulnerability of local populations to climate change:

- Identification and prioritization of ecosystem services.
- Standardization of ecosystem services.
- Assignment of scores based on the relative importance of each ecosystem service.
- Aggregation of scores for multiple ecosystem services, according to the weightings assigned by experts and stakeholders.

This exercise, conducted through a combination of analysis of spatial data and expert opinion, resulted in the identification of priority KBAs for CEPF investment in Ecosystem-based Adaptation (EbA): 10 in the Comoros; 30 in Madagascar; 10 in Mauritius; and 20 in the Seychelles.

Since the main objective of the exercise was to prioritize areas where EbA activities could be implemented, some of the KBAs in Madagascar ranked highly for their ecosystem services values were not considered priorities for CEPF investment. These comprised:

- 10 KBAs that do not have a manager, project partner or institutional structure to support the implementation of EbA activities: Mangoky River; Lake Itasy; Mahatsara (Mahambo Foulpointe); Ivoloina River; North Pangalane; Maevatanana-Ambato-Boeny Wetlands; Ankafina (Ambohimahasoa); Mananjary River; Angavokely Forest Station; and Ambila-Lemaintso Wetlands.
- One KBA whose ecosystem services had been degraded beyond reasonable recovery efforts: Ranobe PK32 Protected Area.

Priority sites for CEPF investment in Madagascar

KBA code	KBA name	Multi-criteria score	Rank
MDG-199	Mangoro-Rianila Rivers	4.75	1
MDG-111	Sahafina Forest (Anivorano-Brickaville)	4.18	2
MDG-98	Analamay-Mantadia Forest Corridor	3.43	3
MDG-131	Nosivolo Wetlands	3.29	4

KBA code	KBA name	Multi-criteria score	Rank
MDG-67	Amoron'i Onilahy and Onilahy River	3.17	5
MDG-99	Forest Corridor Fandriana - Marolambo National Park	3.11	6
MDG-95	Ambositra-Vondrozo Corridor	3.11	7
MDG-179	Mangerivola Special Reserve	2.88	8
MDG-164	Betampona Strict Nature Reserve	2.80	9
MDG-96	Ankeniheny-Zahamena Corridor	2.79	10
MDG-230	Nosivolo River and Tributaries Ramsar Site	2.61	11
MDG-28	Belalanda	2.58	12
MDG-155	Zombitse-Vohibasia National Park	2.52	13
MDG-11	Tsinjoriake-Andatabo	2.48	14
MDG-129	Vohibe Ambalabe (Vatomandry)	2.43	15
MDG-90	Lake Ihotry-Mangoky Delta Complex	2.42	16
MDG-73	Analavelona	2.41	17
MDG-153	Ranomafana National Park	2.37	18
MDG-217	Faraony Headwaters	2.26	19
MDG-57	Makay	2.21	20
MDG-71	Analalava Special Reserve	2.20	21
MDG-107	Vohibola Classified Forest	2.17	22
MDG-92	Mangoky-Ankazoabo Complex	2.14	23
MDG-46	Toliary Great Reef	2.06	24
MDG-200	Namorona-Faraony River	2.02	25
MDG-89	Mahafaly Plateau Forest Complex	2.01	26
MDG-34	Three Bays Complex	1.97	27
MDG-175	Beza-Mahafaly Special Reserve	1.97	28
MDG-187	Pic d'Ivohibe Special Reserve	1.97	29
MDG-54	Lake Tseny	1.97	30

Priority sites for CEPF investment in the Comoros

KBA code	KBA name	Multi-criteria score	Rank
COM-7	Mount Ntringui (Ndzuani highlands)	0.54	1
COM-5	Karthala mountains	0.45	2
COM-20	Coelacanth area	0.43	3
COM-1	Moya forest	0.27	4
COM-14	Domoni area	0.25	5
COM-4	La Grille mountains	0.22	6
COM-8	Mohéli Marine Park	0.21	7
COM-12	Bimbini area and La Selle islet	0.19	8
COM-19	Pomoni area	0.18	9
COM-16	Moya area	0.17	10

Priority sites for CEPF investment in Mauritius

KBA code	KBA name	Multi-criteria score	Rank
MUS-2	Bamboo Mountain Range	0.655	1
MUS-5	Relict Forests of the Central Plateau	0.550	2
MUS-14	Plaine des Roches - Bras d'Eau	0.537	3
MUS-12	Black River Gorges National Park and surrounding areas	0.520	4
MUS-3	Chamarel - Le Morne	0.503	5
MUS-8	Mauritius Island's South-Eastern Islets	0.395	6
MUS-16	South Slopes of Grande Montagne	0.364	7
MUS-17	Yemen-Takamaka	0.353	8
MUS-11	Corps de Garde Mountain	0.343	9
MUS-6	Rodrigues' Islets	0.308	10

Priority sites for CEPF investment in the Seychelles

KBA code	Group of islands	KBA name	Multi-criteria score	Rank
SYC-43	Inner	Morne Seychellois National Park	0.719	1
SYC-38	Inner	Planneau Mountain (Grand Bois-Varigault-Cascade)	0.633	2
SYC-41	Inner	Praslin National Park	0.586	3
SYC-42	Inner	Silhouette National Park	0.563	4
SYC-36	Inner	Burnt Mountain-Piton de l'Eboulis	0.500	5
SYC-50	Aldabra	Aldabra Special Reserve	0.469	6
SYC-47	Inner	Port Launay Marine National Park and coastal wetlands	0.469	6
SYC-15	North edge	Bird Island (Ile aux Vaches)	0.469	6
SYC-5	Cosmoledo	Cosmoledo	0.453	9
SYC-51	Inner	Aride Island Special Reserve	0.445	10
SYC-52	Inner	Cousin Island Special Reserve	0.445	10
SYC-48	Inner	Sainte-Anne Marine National Park	0.438	12
SYC-20	North edge	Denis Island	0.430	13
SYC-46	Inner	Curieuse Island Marine National Park	0.406	14
SYC-32	Amirantes	Saint-François and Bijoutier Islands	0.406	14
SYC-3	Cosmoledo	Astove	0.398	16
SYC-18	Inner	Curieuse Island	0.391	17
SYC-19	Amirantes	D'Arros Island and Saint Joseph Atoll	0.383	18
SYC-6	Farquhar	Farquhar - South Island and islets	0.375	19
SYC-9	Inner	Fond Ferdinand	0.352	20

1. INTRODUCTION

Natural ecosystems, because of their multiple components and functions, are at the heart of the social and economic development of humanity, thus justifying the need to preserve them. However, ecosystems have been constantly transformed because of the uses and modifications that men and women make to meet their different needs: food, health, money and energy, as well as for their comfort.

As a result, the original foundations of ecosystems and the services they provide (healthy soils, fresh water, clean air, a climate favorable to the development of all forms of life, etc.) are disappearing progressively. A disappearance that is all the more threatening with the phenomenon of global warming and, more recently, the COVID-19 pandemic. As a corollary, the disappearance of ecosystems inevitably implies that of species too.

To reverse this trend, efforts to develop approaches and strategies have been made at all levels and at different scales for decades, and in recent years have systematically included consideration of the impacts of climate change on biodiversity. Within this framework, Ecosystem-based Adaptation (EbA) is the most promising approach. EbA consists of maintaining or strengthening the capacities of ecosystems to protect people and deliver the services they are expected to provide, to improve infrastructure and to ensure the balance of biodiversity, particularly in "biodiversity hotspots".

The concept of biodiversity hotspots is one approach to prioritizing the world's most biodiverse and threatened regions (Myers *et al.* 2000)[1]. It is, therefore, important to focus these priorities in order to optimize the concentration of conservation investments. The latest analyses identify 36 biodiversity hotspots around the world (Mittermeier *et al.* 2004, Zachos and Habel, 2011, Noss *et al.* 2014).

Founded in 2000, the Critical Ecosystem Partnership Fund (CEPF) supports NGOs and the private sector to influence and participate in the conservation of the world's most critical ecosystems. CEPF is a joint initiative of l'Agence Française de Developpement (AFD), Conservation International (CI), the European Union (EU), the Global Environment Facility (GEF), the Government of Japan and the World Bank. In the Madagascar and the Indian Ocean Islands (MADIO) Biodiversity Hotspot, funding has been made available to CEPF from the Green Climate Fund (GCF) through AFD as the accredited entity.

CEPF provides grants to nongovernmental and private organizations to preserve biodiversity hotspots. Place of high biodiversity value are often inhabited by people who are highly vulnerable socially and economically, and whose livelihoods depend heavily on healthy ecosystems. This convergence is even more evident in the biodiversity hotspots.

Two decades ago, the MADIO Hotspot first benefited from CEPF investment. At that time, the extent of the hotspot was limited to Madagascar. Following an updated global analysis in 2005, the hotspot was extended to include islands in the western Indian Ocean, including the independent countries of the Comoros, the Republic of Mauritius and the Seychelles. The MADIO Hotspot has often been considered a priority among the other global hotspots, due to its extreme diversity (the hotspot supports about 15,000 vascular plant species, of which more than 12,000 are endemic) but also due to the high level of endemism (linked to the hotspot's isolation) and, above all, the high level of threat to biodiversity.

The first phase of CEPF investment in the Hotspot ran from 2000 to 2005, with a total of \$4.25 million supporting 40 projects implemented by 18 organizations in Madagascar alone. At the end of this phase, and following a positive evaluation, the CEPF Donor Council

[1] To be classified as a biodiversity hotspot, a region must be home to at least 1,500 endemic vascular plant species AND have lost at least 70% of its original primary vegetation.

approved a $1.4 million consolidation phase, which was implemented between 2009 and 2012; this was also in Madagascar alone.

In 2012, the MADIO Hotspot was recognized by the CEPF Donor Council as an eligible region for the development of an ecosystem profile to facilitate the programming of investment in biodiversity conservation. This document was prepared in 2013-2014, under the leadership of Conservation International in Madagascar.

In general, preparation of an ecosystem profile involves desk studies, as well as consultation with relevant stakeholders. An assessment of biological priorities and underlying causes of biodiversity loss is then conducted. These two elements (biological priorities and underlying causes of loss) are combined with an inventory of existing conservation investments and other key elements to highlight the most relevant priorities for CEPF investment.

An important step in developing a profile is to assess the results of previous conservation efforts and define the conservation outcomes that must be met to avoid loss of biodiversity. CEPF's investment niche and strategy target a subset of these outcomes, to ensure that investments are well targeted, as well as to be able to evaluate the success of these investments, as conservation outcomes also provide the basis for monitoring.

Each ecosystem profile recommends strategic funding directions that civil society can implement to protect ecosystems in a hotspot. In doing so, CEPF provides a flexible and adaptable mechanism. In addition, efforts are also designed to complement strategies and frameworks established by national governments and regional bodies. CEPF fosters alliances among government, community groups, NGOs, academic institutions and the private sector, combining the unique capacities of each entity and avoiding duplication of effort, so that the conservation approach is as comprehensive as possible. CEPF encourages transboundary cooperation where ecosystems are shared by several countries, where a regional approach promises to be more effective than a national one, and/or to encourage exchange of experience and good practice among neighboring countries.

The 2013-2014 ecosystem profile helped guide CEPF investment from 2015 to 2022. With US$12.3 million, CEPF supported 129 projects implemented by 93 organizations, in the Comoros, Madagascar, Mauritius and the Seychelles.

For the MADIO Hotspot, although the different islands share biogeographic specificities, they nevertheless compose a whole with a great variability. This heterogeneity is evident in the relative weight of the different entities: the three island groups (the Comoros, the Republic of Mauritius and the Seychelles) and other islands scattered in the western Indian Ocean are dwarfed by the mass of Madagascar, an island-continent that accounts for 95 percent of the land area and 98 percent of the population of the Hotspot. Disparities are also great at the economic level, in the development of public services and in land-use planning. The Seychelles and Mauritius can be considered emerging economies, while Madagascar and the Comoros are among the least developed countries (LDCs).

Compared with the period covered by the previous ecosystem profile, the socio-environmental context in general has evolved significantly. Pressures on natural ecosystems and threats to biodiversity have experienced great leaps, due to interrelated factors, including: (i) climate change; (ii) stagnant, if not declining, economies; (iii) failing governance and politics; and (iv) an unfavorable social environment. Furthermore, CSOs have found themselves with more or less diminishing means and capacities. In addition, as a region heavily dependent upon tourism, the MADIO Hotspot has had to contend with the impacts of the COVID-19 pandemic, which emerged in early 2020.

It is appropriate, therefore, to update the ecosystem profile so that the next phase of CEPF investment can refocus priorities, identify new opportunities, and align with other donors' investments, while taking into account the evolving context.

This update is an activity of the *Ecosystem-based Adaptation (EbA) in the Indian Ocean* program financed by the GCF, through AFD is the accredited entity. This program aims to reduce the vulnerability of island populations by securing the critical ecosystem services they need to be resilient to climate change.

It should be recalled that the GCF plays an important role in the implementation of the Paris Agreement, being the largest global climate fund. Its mandate is to support developing countries to implement their ambitions in terms of their Nationally Determined Contributions (NDCs) for greenhouse gas (GHG) mitigation and adaptation actions that strengthen resilience to climate change.

The involvement of the GCF is all the more crucial, following the alarming findings of the Intergovernmental Panel on Climate Change (IPCC) in its latest report (IPCC 2022). Climate change is happening faster than expected, and impacts include: reduced availability of water and food resources (in Africa, in Asia and on small islands in particular); health impacts in all regions of the world; and loss of animal and plant species.

2. BACKGROUND

Following the decision of the CEPF Donor Council in 2012, the ecosystem profile for the MADIO Hotspot was prepared between June 2013 and January 2014, by a team led by CI-Madagascar, with inputs from the Moore Center for Science and Oceans at CI for the analysis of ecosystem services, and the consulting firm Biotope for the island states.

During 2021-2022, the ecosystem profile was updated to reflect the changing realities on the ground. A consideration of climate change, particularly adaptation to climate change, was central to this update, given the importance of this issue in the face of ecosystem loss and species extinctions. The investment strategy in the ecosystem profile was updated to provide the information needed to prioritize investments under the GCF program. Improving climate resilience of local communities will be achieved by EbA actions at priority sites, where civil society can add value to conservation efforts. To this end, the capacity of CSOs will be engaged and strengthened in the implementation of EbA actions in the Union of the Comoros, the Republic of Madagascar, the Republic of Mauritius, and the Republic of Seychelles.

The updating process was structured around three work packages (WP):

- WP 1: Identification and prioritization of ecosystem services important to human populations in target countries and priority areas for EbA activities.
- W2 2: Conducting consultations with stakeholders (academic institutions, NGOs, government agencies, donors, community groups, private sector actors) to set priorities for CEPF investment in EbA. Particular attention was given to involving the National Designated Authorities (NDAs) for the GCF in the consultation process, to ensure their ownership of the CEPF investment strategy.
- WP 3: Drafting the updated ecosystem profile. Emerging trends were reflected in the updated ecosystem profile, including the impacts of the COVID-19 pandemic.

The overall goal of the updated ecosystem profile was to serve as a strategic reference for CEPF, guiding investments in the MADIO Hotspot during the period 2022-2027.

2.1. Process and approach for updating the Ecosystem Profile

The update was led by a consortium among CI-Madagascar (with technical support from the Moore Center for Science and Oceans at CI), Missouri Botanical Garden, ASITY Madagascar and Biotope, with support from consultants recruited in Madagascar and other Indian Ocean islands throughout the process.

The methodology for identifying Key Biodiversity Areas (KBAs) important for the delivery of ecosystem services described by Neugarten *et al.* (2014) was adopted. However, the analysis required an update of the ecosystem profile in terms of the datasets to used and the weighting given to different ecosystem services. The revised methodology was validated by CEPF through orientation meetings held in September and October 2021.

For the definition of biological priorities, data from the IUCN Red List of Threatened Species (IUCN 2022) were mainly used. However, additional data were obtained from experts and specialized organizations when necessary, such as MBG, and the Moore Centre for Science and Oceans, in close collaboration with CI-Madagascar.

Reviews of literature on biodiversity and ecosystem services were used to complement available data sets. The final list of KBAs was updated by including KBAs that had been identified since the previous ecosystem profile was prepared. A list of 7 to 14 critical ecosystem services was prepared in each country, in consultation with experts. Geographic Information System (GIS) analysis was then undertaken, using existing global and national datasets, to map ecosystem services and evaluate the relative importance of each KBA for each service. KBAs were then ranked, based on their importance for the delivery of ecosystem services contributing to human resilience to climate change, using a multi-criteria analysis. The results of this analysis are presented in Chapter 6 in the form of maps.

Information and analysis in the chapters on socioeconomic context, political context, and civil society context were updated, drawing primarily on literature reviews conducted by the profiling team, complemented by targeted interviews.

Consultations with stakeholders as subnational, national and regional levels were the main source of information to identify and analyze the competencies and needs of CSOs, to update the chapter on threats to biodiversity, their root causes and barriers to conservation. The chapter on conservation investments was updated with new data, collected mainly through literature reviews These chapters were crucial for defining the CEPF niche and investment strategy.

2.2. Consultation process

The development of the ecosystem profile was a participatory process, and stakeholder consultations were organized with the participation of various ministries, national and international NGOs, associations, universities and research centers (Table 1).

Table 1 Main steps in the development of the updated Ecosystem Profile for Madagascar and the Indian Ocean Islands

September 2021 - March 2022	Literature review and preparation of work plans
September 2021	First information workshop with stakeholders
October 2021 – March 2022	Launch workshop and national consultations
March-June 2022	Preparation of draft ecosystem profile
July 2022	Regional validation workshop, Madagascar
July-September 2022	Finalization of ecosystem profile

In Madagascar, a total of 187 stakeholders and 112 institutions were consulted. The process began with an inception workshop on 15 December 2021 in Antananarivo, followed by a virtual kick-off meeting on 6 January 2022 and an online consultation during February 2022.

In Comoros, subnational consultation workshops were held on 3 March 2022 in Grand Comore and 5 March 2022 in Anjouan, followed by a national workshop on 10 March 2022 in Grand Comore, with the participation of 40 people from the public sector, academia, NGOs and associations.

In Mauritius, the stakeholder consultation workshop was held on 15 October 2021. In total, 10 people participated, representing the government (mainly the Ministry of Agro-Industry and Food Security), parastatals, the private sector and the main active NGOs.

In the Seychelles, a consultation workshop was held in Victoria on 9 March 2022. In total, around 30 people participated in the consultation.

Finally, the draft investment strategy, including the proposed geographic and thematic priorities for investment, was presented to stakeholders from all four countries at a regional consultation workshop held in Antananarivo, Madagascar on 1 July 2022.

3. PAST CEPF INVESTMENTS AND LESSONS LEARNED

3.1. Previous investment

This ecosystem profile has been prepared to guide the next phase of CEPF investment in the MADIO Hotspot over a five-year period from 2022 to 2027. The investment strategy is based on the results of recent research and consultations conducted during the updating process, as well as on previous investment phases, taking into consideration achievements and lessons learned since 2000, when CEPF first intervened in the region.

The first phase of CEPF investment, which took place between December 2000 and December 2005, followed by a consolidation phase between 2009 and 2012, focused exclusively on the island of Madagascar. Across the initial investment plus the consolidation phase, CEPF supported 45 grants to 18 organizations, amounting to US$4.25 million for the initial investment and US$1.4 million for the consolidation phase. The projects covered a wide range of topics, from promoting conservation corridors and implementing natural resource management plans to integrating environmental protection and community economic development activities.

At the beginning of CEPF's involvement in 2000, Madagascar's biodiversity was facing immense threats. Nearly 80 percent of the island's primary forest cover had been lost, and erosion had exacerbated the effects of deforestation. The population, estimated at 15 million, was already growing at a rate of 3 percent per year, adding to the pressures, and the poverty rate was very high. At the time, major threats included agricultural expansion (particularly for swidden rainfed rice cultivation, resulting in an annual loss of about 2,000 km^2 of forest), overgrazing, unsustainable charcoal production, mining, hunting, logging, and unregulated international trade in wild plants and animals.

Due to a lack of capacity, civil society was still insufficiently prepared to respond to these threats, which have grown over the years. Information and knowledge on biodiversity remained limited, alongside a government presence that had neither sufficient capacity to protect natural resources and manage them in a reasoned manner, nor the political will for firm governance to deal with them, despite the ongoing implementation of environmental programs within the framework of the National Environmental Action Plan (NEAP) at the time. These threats were compounded by poverty, the impacts of recurrent climatic hazards and insufficient access to education and information in general. On the other hand, while the depletion of natural resources was proceeding at an exponential rate, measures to address it were far from being concrete. These factors presented a complex set of challenges that needed to be addressed if Madagascar's natural capital was to be preserved for the benefit of its people.

CEPF's 2000-2005 investment strategy for Madagascar focused on six points[2]: (i) integration of local groups and individuals in the management of protected areas and reserves; (ii) private sector conservation initiatives; (iii) training programs in biodiversity conservation and management; (iv) public awareness and advocacy; (v) small grants program (Biodiversity Action Fund); and (vi) creation of a participatory monitoring and coordination network.

The consolidation phase during the 2009-2012 period, with an allocation of US$1.4 million, was intended to consolidate gains made under the initial investment. The consolidation phase built on the achievements and lessons learned in the first five years and focused on three investment priorities: (i) developing the NODES mechanism, linking biodiversity conservation and improved livelihoods for local populations; (ii) improving community-

[2] https://www.cepf.net/sites/default/files/madio-five-year-assessment-2006-english.pdf.

based natural resource management mechanisms and local governance structures; and (iii) launching local and national awareness campaigns highlighting the importance of sustainable natural resource management and its socio-economic impacts. The consolidation phase was designed to take advantage of the opportunities generated following the adoption of the "Durban Vision"[3] and to complement the activities of the NEAP Phase 3 and other ongoing initiatives, such as the GEF Small Grants Program (GEF/SGP).

Between 2012 and 2014, there was a growing recognition by both civil society partners and donors that there were strengthening needs on the one hand, and opportunities on the other (capacity, competence, commitment, willingness), in the face of changing ecosystems and stakeholder circumstances. A new phase of investment was therefore warranted. However, the first Ecosystem Profile prepared in 2000 could no longer serve as a reference to guide CEPF investments, both because of changes in the region and because of the evolution of CEPF over the previous 13 years. The Council also took the opportunity to ask the CEPF Secretariat to prepare a regional profile, covering the entire MADIO.

Thus, the Ecosystem Profile was developed for the current second phase (2015 to June 2022), which is being completed, with four strategic directions, implemented at three levels (local, national, regional): *i) Empowering local communities to protect and manage biodiversity in Key Biodiversity Priority Areas; ii) Supporting civil society to strengthen the integration of biodiversity protection into political and economic decision-making processes; iii) Strengthening civil society capacity at the regional and local levels through training, exchanges, and regional cooperation actions; and iv) Providing strategic leadership and effective coordination of CEPF investment through a regional implementation team.*

3.2. Results

CEPF support has played an important role in supporting local civil society and NGOs to participate effectively in conservation activities and in building the technical capacity of Malagasy resource persons. CEPF also helped support the initiation of the Durban Vision and its implementation. CEPF's support enabled the participation of a wide range of local actors, many of whom had never had the opportunity to stand on their own two feet, and also allowed better-known organizations to take risks to engage in conservation actions with uncertain outcomes.

During the initial five-year investment period, CEPF played a strategic role in supporting civil society-led activities that would add value in addressing threats at the national level. At least US$5.6 million in additional resources were mobilized to achieve conservation goals. Specifically, the evaluation of the first phase[4] revealed that CEPF's investment in Madagascar had:

- Contributed to laying the groundwork for the Durban Vision, spearheading the Malagasy government's policy for biodiversity conservation and for the integration of local communities in the conservation and management of new protected areas through the development of the Madagascar Protected Area System (SAPM).
- Over 1 million hectares of KBAs were identified, leading to a formal commitment by the government to protect these areas. Some of these areas also had management plans put in place (during the consolidation phase, CEPF strengthened the management of 1,574,435 ha of KBAs).
- Significantly enhanced the role of local NGOs and community groups in biodiversity conservation.

[3] The Durban Vision refers to a commitment made by Madagascar at the 2003 World Parks Congress to triple the surface area of its protected area system, which at the time was just over 2 million hectares.
[4] CEPF 2006 "Assessing Five Years of CEPF Investment in the Madagascar and Indian Ocean Islands Biodiversity Hotspot - Madagascar. A Special Report"

- Supported several grantees to address the financial sustainability of the current and future SAPM. In particular, CEPF supported CI-Madagascar's advocacy efforts to finance the Foundation for Protected Areas and Biodiversity of Madagascar (FAPBM), with a capitalization target of US$50 million.
- Supported many local communities to manage and benefit from their natural resources through community-based management contracts (during the consolidation phase, six NODES programs awarded 339 micro-grants to 236 community associations).
- Improved the livelihoods of local communities around several protected areas (during the consolidation phase, a total of 790 communities received socio-economic benefits from CEPF-funded actions).
- Supported scientific studies leading to the discovery of 120 species new to science;
- Improved the scientific and technical capacity of over 60 people.
- Developed conservation actions on several emblematic species, such as Madagascar fish eagle (*Haliaeetus vociferoides*), Bernier's teal (*Anas bernieri*) and Sakalava rail (*Zapornia olivieri*).

As for the second phase covering both Madagascar and the other Indian Ocean Islands, the investments contributed to the following cumulative results [5,6,7]:

- Creation and/or extension of 1.6 million ha of protected areas.
- Improved management of 3.2 million ha of KBAs.
- Improvement of the management of landscapes totaling 1.6 million ha, for production, and by extension, to the improvement of the living conditions of local communities.
- Creation of the first atlas of reptiles and amphibians in the Comoros.
- 67 percent of local grantees with strengthened institutional capacity.
- Release of 11 legal texts aimed at improving governance of natural resources.
- Adoption of environmentally friendly practices by 20 private sector actors.
- Inclusion of dry forest tree species into the "Red List of the Trees of Madagascar".

These data and information may not be final and may be revised upwards, as the investment portfolio was not yet closed at the time of finalizing this profile.

3.3. Experience and lessons learned

As mentioned above, there have been CEPF investments prior to this profile: an investment phase in Madagascar from 2000 to 2005, followed by a consolidation phase from 2009 to 2012; and an investment phase in the four countries of the MADIO Hotspot from 2015 to 2022. The proposed new phase of investment, which is the subject of this updated profile, builds on lessons learned from these earlier investments, in terms of approaches, impacts, and stakeholder considerations.

At the end of the 2000-2005 investment phase in Madagascar, a final assessment was conducted (2006). For the 2015-2022 investment phase, a mid-term assessment (May 2020) and an independent evaluation of lessons learned (January 2022) were conducted. A final assessment was also conducted (September 2022) but the results were not available in time to incorporate into the ecosystem profile.

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[5] https://www.cepf.net/resources/investment-analysis/madagascar-and-indian-ocean-islands-mid-term-assessment-2020

[6] Emerald Network Ltd, report for CEPF (January 2022) "Evaluation of Lessons Learned to Inform Reinvestment in the Madagascar and Indian Ocean Islands Biodiversity Hotspot".

[7] https://www.conservation.org/about/global-conservation-fund

In addition to assessing the progress achieved against targets for CEPF investment set out in the ecosystem profile and determining priorities for the remainder of the investment period (January 2020 - June 2022), the mid-term evaluation report drew on the experience, lessons learned and project reports generated by CEPF grantees. It also incorporated the findings of evaluation workshops held in October and December 2020, which were attended by more than 100 representatives of CEPF grantees, local authorities and donor partners.

The independent evaluation focused on the challenges, opportunities, and lessons learned associated with the role of the RIT. It aimed to make future RIT applicants better informed about the experiences and results achieved and, thereby, to create a more competitive environment. This evaluation is separate from the final assessment of the results of CEPF investment in the hotspot, which will be available later in 2022.

3.3.1. Lessons learned and experience from the period 2000-2012[8,9]

The main experiences and lessons learned were:

- Local conservation groups need capacity building and can indeed have a significant impact when their capacity is improved.
- In terms of strengthening communities within the framework of the transfer of natural resource management to local communities, grassroots communities can call upon the technical support of the decentralized services of the state.
- Supporting partner organizations that can provide micro-grants to community groups, while assisting them with day-to-day implementation, proved to be a successful approach on the ground.
- It is essential that a relationship be established between conservation activities and the improvement of living conditions, in order to obtain the commitment of local communities.
- It is difficulty for civil society to engage with private sector actors due to its lack of expertise and experience in working with the private sector.
- The lack of a solid base of conservation actors armed with sufficient skills and expertise has implications for the long-term sustainability of conservation efforts in Madagascar.

The last two points highlight the need for capacity building and awareness raising.

During the period of initial CEPF investment, it was recognized that there was a lack of national and local NGOs in Madagascar and that civil society in general had limited capacity to directly implement projects under CEPF funding. As a result, the majority of funds were channeled to international NGOs. However, funds did reach community-based organizations through CI's pilot small grants program, through the pioneering efforts of the NGO Fanamby in Daraina, and through the actions of ASITY Madagascar in the Mahavavy-Kinkony wetlands.

In addition, the Durban Vision, which paved the way for the integration of local communities in the management of protected areas and for the sustainable use of natural resources in these areas, created an opportunity for increased local community engagement in conservation. Thus, the NODES approach, where locally based organizations provided funding for integrated conservation and development activities in new protected areas, was seen as an effective method that could be scaled up with additional funding.

CEPF's experiences during the initial phase provided the basis for the development of the consolidation phase, and the experiences gained from the subsequent 10 years of funding

[8] https://www.cepf.net/resources/investment-analysis/madagascar-and-indian-ocean-islands-five-year-assessment-2006-0
[9] https://www.cepf.net/resources/documents/madagascar-and-indian-ocean-islands-ecosystem-profile-2014-0

helped define and refine the investment strategy presented in the 2014 ecosystem profile, with improved framing and new strategic directions and investment priorities.

3.3.2. Lessons learned and experiences from the 2015-2022 period[10,11]

From 2015 to 2022, CEPF investments not only reinforced the previous experiences summarized above but also strengthened local organization's knowledge and experience in research, including in biodiversity, spatial analyses, information systems, database management and community-based approaches, while improving interdisciplinary collaborations.

Overall, Madagascar experienced many notable, positive conservation impacts from CEPF investment. CEPF-funded projects contributed to building confidence in local NGOs and strengthening partnerships, as well as contributing to increased collaboration among organizations operating in the country. However, the emergence and development of local NGOs and local talent remains the main legacy of CEPF, which led to the most significant impacts over time.

In the other countries of the MADIO Hotspot, the 2016-2022 investment phase allowed for the identification and refinement of knowledge about KBAs. The mid-term assessment found that this investment phase had progressed very well: balanced development of the grant portfolio with over 90 percent of the spending authority already granted; and good progress in achieving 25 of the 29 indicators in the portfolio's logical framework. However, out of 867 letters of intent received since the beginning of the phase, 81 projects had been awarded through December 2019, resulting in an award rate of 9.3 percent, which was too low.

For the 2016-2022 phase, responsibility for the RIT was assumed by the Tany Meva Foundation, which, during the first half of the phase, experienced significant staff turnover due to governance issues. At the CEPF level, there were also changes in personnel. All of these changes at different levels had impacts on the RIT, as new staff members had to familiarize themselves with their roles, as well as re-establish working relationships with stakeholders several times. Despite these limitations and changes, the portfolio was found to be on track to meet most of its goals, and overall performance was strong.

From these findings, lessons learned were identified during the independent evaluation, to help improve the next phase of CEPF investment in the hotspot. These included a need to strengthen the RIT's presence beyond Madagascar to the Indian Ocean islands, and to improve communication throughout the hotspot to foster regional networking and collaboration. It was recommended that a stronger and more established presence in all countries be put in place early in the next investment phase to avoid delays.

In addition, while staff changes are largely beyond the control of the RIT, it was recommended that delays in processes need to be identified and reported more quickly to minimize the effect on portfolio development, and that the mid-term evaluation should be conducted before the majority of grant allocation has occurred, so that any necessary adjustments can be made at the portfolio level.

Furthermore, the independent evaluation recommended that the low award rate in relation to letters of inquiry received should be addressed in the next phase. To this end, more direct support should be provided to potential applicants after submission of their letters of inquiry, in order to increase the success rate, for example through in-country proposal design workshops.

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[10] https://www.cepf.net/resources/investment-analysis/madagascar-and-indian-ocean-islands-mid-term-assessment-2020

[11] Emerald Network Ltd, report for CEPF (January 2022) "Evaluation of Lessons Learned to Inform Reinvestment in the Madagascar and Indian Ocean Islands Biodiversity Hotspot".

Given the size of the portfolio, another recommendation was that the potential benefits of geographic investment priorities be considered in the next ecosystem profile, such as maximizing efficiency through more concentrated project locations.

The evaluation also recommended that the mid-term assessment should be conducted in a timely manner, to maximize opportunities for adaptive management of the portfolio and/or approach. For example, if the portfolio had not been so far along, it might have been possible to consider concentrating additional efforts on strengthening civil society capacity at the national and regional levels through training, exchange and cooperation.

Having a local partner organization in Madagascar brought many benefits, including strengthening the relationship between CEPF and local civil society, deepening the understanding of the local context particularly in Madagascar, and improving the capacity of this local organization, which is a CEPF goal.

A final lesson from the 2016-2022 investment phase was the need to be adaptive, as regards timelines and budgets. The COVID-19 pandemic was unexpected and created implementation delays for almost every grantee. This necessitated flexibility. Over the course of the pandemic, CEPF amended 28 grants to allow activities to be implemented in a COVID-safe way, and postponed, redesigned or cancelled activities that were prevented by restrictions on travel and public meetings. While, the public health impacts of the pandemic were not as severe in Madagascar and the Indian Ocean Islands as initially feared, with a relatively modest number of cases, the economic impacts were enormous, with a collapse in export revenues, visitor arrivals and foreign direct investment. Looking forward, it will be important to set clear expectations among grantees and maintain clear, consistent communication. CEPF must ensure that they are comfortable requesting amendments if needed, and that they give priority to the health and safety of their project teams, local communities and other stakeholders.

4. BIOLOGICAL IMPORTANCE OF THE HOTSPOT

The MADIO Hotspot is a true natural sanctuary, including Madagascar, the Comoros, the Republic of Mauritius and the Seychelles. The terrestrial surface of the MADIO is about 600,000 km^2, of which 592,040 km^2 are represented by the island of Madagascar alone, which has seen the evolution of an original and distinct fauna and flora, with a very high rate of endemism at the level of species, genera and even families. The terrestrial biological diversity of the archipelagos is closely linked to that of Madagascar. African influences are especially marked in the Comoros, and Asian influences especially in the Seychelles. Although the other island groups of the western Indian Ocean represent a small land area, they contribute a lot to the biological diversity of the Hotspot, with high rates of endemism. Even though the hotspot is defined in terms of terrestrial (vascular plant) biodiversity, marine biodiversity is also exceptional, both in terms of the levels of endemism (in corals, coastal and lagoon species) and in terms of the international importance of populations of certain widely distributed species, such as cetaceans and marine turtles.

In terms of original extent of natural vegetation, MADIO ranks tenth among the biodiversity hotspots globally (Mittermeier *et al.* 1997, Myers *et al.* 2000, Brooks *et al.* 2006). It also ranks eighth among the hotspots in terms of remaining intact habitat (about 10 percent of the original area), according to the most recent estimates of tropical forest cover.

4.1. Geography, Geology and Climate

The MADIO Hotspot comprises a vast group of islands in the southwestern Indian Ocean, included in a quadrilateral of about 1,700 km along each side, whose vertices would be formed by the coral islands of Denis and Bird in the Seychelles to the north, the Comoros to the west, the island of Rodrigues to the east and the southern tip of Madagascar to the south (Figure 1). The Comoros are the closest part of the hotspot to the African continent, being less than 300 km from the coast of Mozambique, while the Mozambique Channel separates Madagascar from the continent by about 400 km at its narrowest point. The distance to other land masses is greater on the other side of the MADIO. For example, the Seychelles are about 2,000 km from the Maldives.

The island of **Madagascar** extends over more than 1,500 km from north to south and 500 km from east to west at its greatest width. Its coastline extends over 5,000 km. The geology of the island is dominated by a Precambrian crystalline formation, which constitutes the whole ridge of the central highlands, covering two thirds of the territory and culminating at 2,643 m above sea level. Five main bioclimatic zones have been identified, namely humid, subhumid, montane, dry and subarid (Ramananjanahary *et al.* 2010). Each of these bioclimatic zones corresponds to a vegetation formation with a particular faunistic and floristic biodiversity (Ministry of Environment 2002).

The Comoros archipelago is located at the northern entrance to the Mozambique Channel, between east Africa and northwestern Madagascar. The three islands that make up the Union of the Comoros cover a total area of 1,862 km^2: Grande Comore (1,148 km^2); Anjouan (424 km^2); and Mohéli (290 km^2). They are isolated from each other by deep sea trenches. The fourth main island in the archipelago, Mayotte, is a French department.

The Republic of Mauritius includes the following islands: Mauritius; Rodrigues; Agaléga and Saint Brandon (or the Carajos Shoals). Mauritius and Rodrigues form part of the Mascarene Archipelago, together with Réunion Island (a French department). The Republic of Mauritius has a large Exclusive Economic Zone (EEZ), which covers approximately 2.3 million km^2 (NBSAP 2017). The land area of Mauritius, Rodrigues, Agaléga, Saint Brandon and the islets covers about 2,000 km^2. At present, coastal protected areas represent 11.9 percent of the land area and 0.006 percent of the EEZ[12]. Mauritius is a volcanic island, although, like Rodrigues, there is no longer any volcanic activity. These two islands are located in the cyclone belt of the western Indian Ocean basin, receiving on average one cyclone per year.

The Seychelles archipelago consists of 115 main granitic and coral islands and atolls (155 individual islands being listed in the Constitution). The total land area is approximately 455 km², spread over the vast EEZ of 1,374,000 km². The four main inhabited granitic islands are, in order of size: Mahé (152.5 km²); Praslin (27.6 km²); Silhouette (20.0km²); and La Digue (10.1 km²). The "plateau" of Mahé, the center of the central archipelago, is about 244 km², where 99.5 percent of the Seychellois population (about 99,000 inhabitants) lives. The outer coral islands (about 211 km²) are either atolls or sandy cays.

Figure 1 Overview of the MADIO Hotspot

[12] https://www.nairobiconvention.org/mauritius-country-profile/marine-and-coastal-resources-governance-mauritius-country-profile

4.2. Biomes, habitats and ecosystems

The MADIO Hotspot covers a range of extremely varied habitats, resulting from climatic variability related to latitude, altitude, and steep relief which, associated with foehn effects related to the trade winds, concentrates precipitation on the eastern slopes of the massifs. The geological and pedological differences (granitic base, ancient or recent volcanism, atolls and sandy formations, sedimentary formations, etc.) add to the diversity of habitats. In a simplified way, most of the islands support a continuum of habitats, with grassy formations and deciduous forests at low altitudes, deciduous and evergreen forests at medium altitudes, and mountain forests at higher altitudes, with high-altitude ericaceous formations on the highest points, above 1,800 m (Réunion, Madagascar and Grande Comore).

On granitic or volcanic islands, the relief has often isolated natural areas within these ecosystems, creating the conditions for speciation and leading to the presence of species with a very restricted distribution and a very localized endemism.

The coral islands of the hotspot (the Scattered Islands and the outer islands of the Seychelles in particular), with their low altitudes and marine influences, support mainly littoral vegetation formations, such as mangroves, halophyte herbaceous formations, brackish steppes, mediolittoral herbaceous and shrubby formations, and supralittoral herbaceous to shrubby formations. These are accompanied, for the largest of the islands, by inland plant formations, such as mangrove and littoral tree formations on karst, littoral herbaceous and shrubby formations on karst, coconut tree formations, and brackish herbaceous formations (CBNM, 2013). These islands are home to colonies of seabirds and some spectacular species, such as Aldabra giant tortoise (*Aldabrachelys gigantea*). In general, however, their fauna is weakly diversified.

Wetlands (including lakes, lagoons, marshes, mangroves, rivers, bays, estuaries and deltaic zones) are particularly important in terms of endemic biodiversity (especially plants, fish, amphibians, water birds, crustaceans, and odonates) and for the environmental services they provide.

Finally, three large marine ecosystems border the hotspot. The marine ecosystem of the Agulhas Current is characterized by warm waters (20-30ºC), low primary productivity, except for a few points of high productivity linked to small upwelling areas and oceanic turbulence. This marine ecosystem is spectacular for its marine biodiversity, since it includes the majority of the coral reefs of the western Indian Ocean. To the north is the large marine ecosystem of the Somali Current, which is dominated by an intense seasonal upwelling system of cold water along the Somali coastline, driven by the northeast monsoon. This system is extremely productive, although less rich in species. To the east of these two ecosystems is the Mascarene Plateau, a distinctive granitic ridge of continental origin, extending between latitudes 2ºS and 22ºS, with an average sea depth of only 100 m. The Mascarene Plateau links the Seychelles, Mauritius and Réunion Islands, and is suggested as a large marine ecosystem in its own right. This Mascarene ecosystem is characterized by a low level of productivity, although its biodiversity seems high.

4.2.1. Madagascar

Madagascar has the greatest diversity of ecosystems by size and is divided into three major biomes with fifteen terrestrial ecosystem types (Table 2; Moat and Smith, 2007). The habitats of Madagascar's coastal areas include estuarine and lagoon systems, mudflats, beach, pebbled or dune cordon vegetation, as well as mangroves that covered 236,402 ha in 2018 (Shapiro *et al.*, 2019) distributed mainly among the regions of Diana, Sofia, Boeny, Melaky, Menabe and Atsimo Andrefana.

Table 2 Terrestrial ecosystem types in Madagascar and their area in 2013

Ecosystem type	Total area (km²)	% of land coverage
1. Mosaic grassland formation/wooded grassland formation of the plateau	246.687	41.67
2. Grassy wooded formation/bushy formation	135,739	22.93
3. Degraded wet forest	58,058	9.81
4. Wet forest	47,737	8.06
5. Western dry forest	31,970	5.40
6. Cultures	23,522	3.97
7. Southwestern dry thorny forest	18,355	3.10
8. Wetlands	5,539	0.94
9. Degraded thorny forest of the southwest	5,427	0.92
10. Western subhumid forest	4,010	0.68
11. Mangroves	2,433	0.41
12. Coastal bush formation of the southwest	1,761	0.30
13. Tapia forest	1,319	0.22
14. Coastal forest	274	0.05
15. Western wet forest	72	0.01

Source: MBG (2013).

The marine realm is characterized by the importance of reef formations: about 3,450 km of Madagascar's 5,600 km of coastline have reef formations, including 1,130 km of fringing reefs, 557 km of coral banks and 1,711 km of submerged reefs (Cooke 2012). The waters around Madagascar support a high diversity of corals, with 380 species recorded (Veron and Turak 2002). Reef formations are distributed in the western and northeastern parts of Madagascar, with more accentuated formations in the western part. In addition to reefs, Madagascar is also characterized by the presence of large seagrass beds (Table 3). The island shelters some of the most extensive seagrass beds of the Indian Ocean, with twelve recorded species: *Cymodocea rotundata, Cymodocea serrulata, Cymodocea serrulata*, *Enhalus acoroides*, *Halodule uninervis, Halodule wrightii*, *Halophila ovalis*, *Halophila stipulacea*, *Ruppia maritima*, *Syringodium isoetifolium*, *Thalassodendron ciliatum*, *Thalassia hemprichii*, and *Zostera capensis* (Gullstrom *et al.* 2002, Green and Short 2003). These seagrass beds are more represented in the northwestern and southwestern coastal areas compared to the eastern area (Hantanirina and Benbow 2013). These marine and coastal areas serve as habitat and spawning area for a wide diversity of fish, invertebrates, marine turtles (five species occur in the marine area of Madagascar), sharks and rays.

Table 3 Marine and coastal habitats in Madagascar, with estimates of their extent

Marine and coastal habitats	Extent (km²)
Beaches and dunes	No data
Seagrass beds	3,000
Mudflats	No data
Mangroves*	2,364
Coral reefs	5,076

*Source: Red List of Ecosystems (2020), except for * Shapiro* et al. *(2019).*

4.2.2. Comoros

Three types of ecosystems are present in the Comoros: terrestrial, lacustrine, marine and coastal. The terrestrial ecosystems of the Comoros are mostly made up of dense evergreen rainforests that have long been subject to various forms of anthropic and natural pressure (Table 4). They are located on the volcanic massifs of the three islands.

On a global scale, the Comoros are one of the 20 islands or archipelagos characterized by a remarkable endemism at the species level (Caledecott *et al.* 1996) and are also a high priority center of biodiversity and plant endemism in the framework of global biodiversity (WWF and IUCN, 1995). The Comoros are also classified as one of 221 Endemic Bird Areas, considered essential for the conservation of global bird diversity and endemism (ICBP, 1992). The Comoros represent an extreme case of islands with very high biodiversity, due to an altitudinal range from 3,000 m below to 2,361 m above sea level. However, the islands' biodiversity is still poorly known, and thus poorly managed and protected. The only published list of flora for the Comoros dates from the beginning of the 20th century (Voeltzkow 1917) with 935 vascular plants cited, of which 416 are considered indigenous and 136 endemic to the archipelago. Exotic plants represent one third of the vascular plant flora, with 383 species (Vos 2004).

Table 4 Terrestrial ecosystems in the Comoros

<table>
<tr><th>Ecosystem type</th><th>Sub-ecosystem type</th></tr>
<tr><td rowspan="4">Dense evergreen rainforest</td><td>Dense and humid high altitude or ridge forest</td></tr>
<tr><td>Dense evergreen mid-altitude rainforest associated with banana plantations or other crops</td></tr>
<tr><td>Dense evergreen valley forest (gallery forest)</td></tr>
<tr><td>Mid-altitude open and humid forest associated with crops</td></tr>
<tr><td colspan="2">High altitude wooded steppe</td></tr>
<tr><td colspan="2">Dry forest of medium to high altitude</td></tr>
<tr><td colspan="2">Pioneer vegetation on sand and remnants of calcified formation</td></tr>
<tr><td colspan="2">Mosaic of degraded lowland forest with cultivation and Psidium cattleyanum coppice</td></tr>
<tr><td colspan="2">Cultivation</td></tr>
<tr><td colspan="2">Reforested areas, usually with Eucalyptus</td></tr>
</table>

The lake ecosystems found in the Comoros are Lake Dziani-Boundouni (Mohéli, 30 ha), Lake Salé in Niamaoui (northeast of Grande Comore, 5 ha), Lake Dzialandzé (in the center of the island of Anjouan between the relict forest of Mount Ntingui and that of Mount Trindrini, 2 ha), and Lake Hantsogoma on the northern slope of the Karthala forest (0.15 ha). In general, lake ecosystems are not well known. The marine and coastal ecosystems in the Comoros include the following types: mangroves, coral reefs, islets, sandy beaches and dunes (Table 5).

Interest in conserving the biodiversity of the Comoros also stems from the need to ensure the stability of the ecosystems for the services they provide, and from the fact that many as-yet-unknown species have potential for science, agronomy or the pharmaceutical industry.

Table 5 Marine and coastal ecosystems of the Comoros

Ecosystem type	Extent
Mangroves	117 ha
Coral reefs	10,000 ha, along 80 percent of the coastline of the three islands
Islets	8 off Mohéli, 1 off Grande Comore and 1 off Anjouan
Beaches and dunes	40 nesting beaches for green turtle and leatherback turtle
Underwater caves	Along 97 km of the coastline of Grande Comore
Seagrass beds	No data
Seabed	No data

4.2.3. Mauritius

The island of Mauritius was almost entirely forested prior to human colonization, which began in 1638 AD. After human colonization, the natural ecosystems rapidly degraded and destroyed. Today, only remnants of the original vegetation, covering about 2 percent of the island's surface, can be found; all of which has been invaded by exotic species (Lorence and Sussman 1986, Florens *et al*. 2012, Hammond *et al.* 2015, Norder *et al.* 2017). The native vegetation of Rodrigues had been almost completely cleared or destroyed by forest clearance for agriculture and livestock, forest fires, and consequent soil erosion.

A particularity of the Mauritian rainforest is the extremely high density of trees (reputed to be the highest in the world), which was reported long before invasive plants spread in these forests. This density is explained by adaptation to cyclones, many species with buttress roots, and the low representation of lianas in the ecosystem. Also notable are a rapid recolonization of scree slopes and forest gaps by native species, and mass flowering/fruiting of many endemic trees following cyclones.

Upland marshes are dominated by sedges and hydrophytic grasses, mixed with drier rocky soil clumps occupied by ericaceous heath forest transitioning into *Sideroxylon* thickets (Vaughan and Wiehe 1937), having significant biological value due to the restricted area, and the number of endemic plants, particularly in the genus *Pandanus*. Due to the cooler conditions in the upper part of the island, many native plants found in this habitat type are found in only a few places in the world and, as a result, are now extremely rare components of upland swamp areas.

Natural and artificial lakes constitute another type of inland freshwater ecosystem. These are found on Mauritius while no significant lake or reservoir is located on Rodrigues. Only two of these lakes have been formed entirely by natural processes in Mauritius. These are Bassin Blanc and Grand Bassin, which were formed in volcanic craters after the collapse of the underlying magma chambers. Since they are located at the top of the watershed, little water arrives by surface runoff or exposure to the water table.

The coastal habitats of Mauritius, Rodrigues and Agaléga have been heavily impacted due to the long history of land use (Table 6). For example, the sand dunes in the west of the country (e.g., Albion, Flic en Flac) have been completely exploited. Coastal wetlands are also in steep decline, due to development pressure.

Dunes and beaches cover almost the entire coastline of the island of Mauritius. In Rodrigues, apart from Ile aux Sables and Ile aux Cocos, which are entirely composed of sandy deposits, sandy beaches are found in limited areas on other islets (e.g. on Gombrani Island and Ile aux Crabes).

Table 6 Estimated area of coastal and marine habitats on Mauritius and Rodrigues

Marine and coastal habitats	Mauritius (ha)	Rodrigues (ha)
Beaches and sand dunes	2,885	8
Seagrass beds	3,279	17,765
Mudflats	919	656
Mangroves	145	24
Coral reefs	6,303	7,005

Source: NWFS and STEM (2008).

Total mangrove cover along the Mauritian coastline is limited to about 145 ha. Mangrove formations are mainly monodominant stands of *Rhizophora mucronata*, with occasional specimens of *Bruguiera gyymnorhiza* found in the brackish water areas upstream of Pointe Lafayette, Trou D'Eau Douce, Ferney and Mahébourg. The presence of a third species reported in some studies has yet to be confirmed. The fern *Acrostichum aureum* is found in the upstream regions strongly influenced by fresh water. Today, most of the mangroves in Mauritius are planted or enriched, while all the mangroves around Rodrigues are plantations designed to control the siltation of the lagoon, and belong to the species *Rhizophora mucronata*.

Intertidal mudflats around Mauritius occur mainly at the mouths of major rivers or along the coastline, as at Case Noyale. The largest and best-known mudflat is located at the Rivulet Terre Rouge Estuary Bird Sanctuary, about three kilometers north of Port Louis. This 26 ha Ramsar site supports about 14 species of migratory birds and up to 35 bird species in total, including occasional and rare visitors.

Small patches of seagrass beds formed by species such as *Halophila ovata*, *Halodule uninervis* and *Syringodium isoetifolium* are common towards the northeast and on the east coast. Larger areas of seagrass beds are found near Les Salines, between the estuaries of the Grande Rivière Noire and Petite Rivière Noire, which continues to the lagoon of Ile aux Bénitiers (ICZM 2009). In Rodrigues, seagrass beds are represented by only two species, *Halophila ovalis* and *H. stipulacaea*, which coexist and also form assemblages with other macroalgae.

Throughout the lagoons of the Republic of Mauritius, coral reefs exist in different abundances, structures and species. These are among the 11 marine hotspots of the world proposed by Roberts (2002). This hotspot encompasses about 1,000 km^2 of reefs surrounding the Mascarene Islands (mainly Mauritius and Rodrigues). Fringing reefs protect vast shallow lagoons around almost all the islands.

4.2.4. Seychelles

The Seychelles are endowed with a rich diversity of terrestrial and marine flora and fauna, recognized as being of international importance. The relative and long-term isolation (1,300 km from Africa) of the central archipelago (which separated more than 65 million years ago from other land masses) and the emergence of new islands during geological episodes of volcanism have resulted in a unique biodiversity characterized by a high degree of endemism. Natural processes, including evolutionary changes, have resulted in a rich variety of unique terrestrial and marine plants and animals, some of which are found nowhere else in the world and are, therefore, endemic to the Seychelles.

Endemism is highest among the terrestrial species of the granitic islands. The flora of the Seychelles is characterized by about 1,760 plant species, of which about 777 are native, with about 24 percent of the native vascular plants considered endemic to the Seychelles (133 species out of 545, mainly located in the national parks), and over 980 are introduced plant species. The terrestrial fauna (300 species) is characterized by many flagship endemics: 15 species and 15 subspecies of birds; five species of bats; a giant tortoise and one to two subspecies of tortoises; more than 15 endemic lizards and chameleons; three snakes; seven caecilians; five frogs; and two freshwater fishes. With a minimum of 3,500 native species, of which 60 percent are endemic, the terrestrial invertebrates show the great diversity of insects (by far the most diverse group), scorpions, spiders, crustaceans, myriapods and mollusks.

Similarly, the marine environment is diverse, with more than 1,000 species of fish (400 of which are confined to the reef), more than 30 species of marine mammals and reptiles, 300 corals, 55 species of sea anemones, 150 species of echinoderms, 350 species of sponges, 165 species of shrimps, 450 species of bivalves and 350 species of macro algae, totaling a minimum of 3,000 marine species (Bijoux *et al*. 2003).

Due to its geological history, African and Indo-Malaysian elements can be found in the terrestrial ecosystems of the Seychelles. The terrestrial habitats are very much related to the geological origin of its two types of islands (granitic and coral). In the main islands, two main characteristics can be noticed:

- The terrestrial landmass is mainly covered by secondary forest of new growth with 40,600 ha of forest, representing 90 percent of the total land area.
- More than 45 percent of forest areas are located in terrestrial protected areas.

The forest can be divided into six categories: (i) coastal and lowland forests (up to 200 m altitude); (ii) intermediate forests (200 to 500 m altitude); (iii) mountain forests (more than 500 m altitude); (iv) palm forests; (v) inselbergs; and (vi) riparian forests (Fourth CBD report).

Inland waters are divided into three categories, including upland wetlands, lowland wetlands and rivers and streams.

Marine ecosystems are extremely important for the socio-economic development of the Seychelles (tourism and fisheries are the two main economic sectors), although they are not as well known as terrestrial ecosystems. They can be divided into nine different habitats: (i) beach ridge and beach (and open interiors or seagrass beds of coral islands); (ii) rocky shores; (iii) mudflats and mangroves; (iv) seagrass beds; (v) reef flat; (vi) coral reefs (including reef ridge, slope, and patch reefs); (vii) Mahé plateau; (viii) pelagic; and (ix) seabed.

4.3. Species Diversity and Endemism: Terrestrial Biodiversity

4.3.1. Madagascar

Birds

Four families of birds are endemic to Madagascar: mesites (*Mesitornithidae*); ground-rollers (*Brachypteraciidae*); asities (*Philepittidae*); and Malagasy warblers or tetrakas (*Bernieridae*).

Mammals

An incredible 221 of the 231 known native mammal species are endemic to Madagascar (Table 7). Madagascar is home to 20 percent of all primate genera in the world, represented by five families unique to the island, with 109 species and subspecies. The lemurs of Madagascar comprise five families and 15 genera: Cheirogaleidae (five genera; 42 species), Lepilemuridae (one genus; 26 species), Lemuridae (five genera; 21 species), Indriidae (two genera; 19 species) and Daubentoniideae (one genus; one species) (Tattersall and Cuozzo 2018).

Table 7 Number of native mammals and rate of endemism in Madagascar

Order	Number of species	% Endemism
Rodentia	28	100
Afrosoricida (tenrecs)	39	100
Primates	109	100
Carnivora	9	100
Chiroptera	46	80
Total	**231**	**96**

Sources: Goodman (2018); IUCN (2022).

Madagascar also has: 28 species of endemic rodents, such as giant jumping rat (*Hypogeomys antimena*, endangered (EN)); nine species of carnivores, such as fossa (*Cryptoprocta ferox*, vulnerable (VU)), which is the main natural predator of lemurs; and 46 species of bats, such as Isalo serotine (*Neoromicia malagasyensis*, VU). Endemic tenrecs, the only insectivorous mammal family, occupy the same ecological niche as shrews and moles.

Reptiles

As of 2018, approximately 420 species of reptiles had been identified in Madagascar, with 98 percent endemism, including extinct species such as *Voay robustus, Aldabrachelys abrupta* and *A. grandidieri* (Glaw and Raselimanana, 2018). Madagascar is an important center of diversity for chameleons, with several dozen species, and is also home to nine species of turtles, including five endemics that are all classified as critically endangered (CR): *Astrochelys radiata; A. yniphora; Erymnochelys madagascariesnis; Pyxis arachnoides;* and *P. planicauda* (Glaw and Raselimanana 2018).

Amphibians

Madagascar is home to a high diversity of amphibian species. To date, 341 species have been described (Vences and Raselimanana 2018) and approximately 200 additional candidate species have been identified (Perl *et al*. 2014). With the exception of three introduced species (*Hoplobatrachus tigerinus, Duttaphrynus melanostictus* and *Ptychadena mascareniensis*), all Malagasy amphibians are endemic. Some belong to an endemic family: the Mantellidae. Among the emblematic and most impressive species are tomato frog (*Dyscophus antongili*), which has a bright red color and is found in a very restricted area in the northeastern part of Madagascar, harlequin frog (*Mantella cowani*) and golden mantella (*M. aurantiaca*).

Freshwater fish

Madagascar's freshwater ichthyofauna has a high level of endemism. Currently, Madagascar has 183 native freshwater fish species (Froese and Pauly 2017), of which 50 percent are endemic to the island, 37 percent are native and 13 percent are introduced/exotic species.

Invertebrates

In Madagascar, the total known species richness of macroinvertebrates, according to a recent review, is about 5,800 species (with 2,500 pending description), 86 percent of which are endemic to the island (Goodman 2008).

Table 8 Number of species and endemism rate for selected invertebrate groups in Madagascar

Groups	Number of species	Endemism rate (%)
Land snails	651	100
Scorpions	40	100
Dragonflies and damselflies	181	73
Lacewings	163	73
Beetles	148	100
Butterflies and moths	300	70
Ants	1,317	98
Crayfish in the Parastacidae family	7	100
Shrimps in the Atyidae family	26	77
Spiders	459	85

Sources: Goodman (2008); Fisher (2019); Djikstra (2021).

Table 8 provides an overview of the diversity and recognized endemism rates for some of the best-studied invertebrate groups in Madagascar. High invertebrate diversity is found on other islands in the hotspot, such as the Seychelles, where 3,795 species have been recorded, with an estimated total of more than 5,100 species and an estimated 60 percent endemism rate (Senterre *et al.* 2010).

When taxa have been well studied, the results in terms of diversity and endemism are remarkable. For example, when Brian Fisher began studying the ants of Madagascar in 1993, 319 species and subspecies of ants in 35 genera were known; there are now more than 1,300 species known (Fisher 2019).

In Madagascar and the surrounding Indian Ocean islands, freshwater mollusks are represented by 10 families of gastropods and four families of bivalves. Freshwater gastropods represent about 85 percent of all freshwater mollusks in the hotspot, of which about 50 percent are endemic. Freshwater bivalves represent about 15 percent of the freshwater mollusk fauna of the hotspot with 35 percent endemism.

The freshwater decapod fauna of the hotspot includes 72 species of freshwater crabs, crayfish and shrimps divided into four families: 20 species of freshwater crabs in the Potamonautidae family, 45 species of freshwater shrimps in the Atyidae and Palaemonidae families and seven species of crayfish in the Parastacidae family. Levels of endemism are high (100 percent at the genus and species level for freshwater crayfish and crabs, and 62 percent of species and 33 percent of genera for freshwater shrimps).

Plants

The island of Madagascar is known for its rich indigenous flora, characterized by high diversity and endemism, both at the species level, with about 90 percent of vascular plant species endemic to the island, and at the family level (five endemic families). More than 11,399 species of vascular plants are currently known (MBG Madagascar Catalogue 2022, Table 10) and it is estimated that at least 3,000 species remain to be discovered or described (GSPM 2021).

According to current knowledge, Madagascar has about 350 plant families, including 249 vascular plant families, five of which are strictly endemic: Asteropeiaceae; Barbeuiaceae; Physenaceae; Sarcolaenaceae; and Sphaerosepalaceae (Table 9).

Despite numerous multidisciplinary explorations of the island, bryophytes remain poorly known compared to other plant groups. The checklist of Marline *et al.* (2012) and the MBG Madagascar Catalogue (2021) reports 1,144 species of bryophytes for Madagascar, including 751 mosses, 390 liverworts, and three anthoceroses, distributed in about 275 genera and 101 families. In relation to endemism, 34 percent of mosses and 19 percent of liverworts are unique to the island (Marline *et al.* 2012).

Table 9 Number of families and genera of vascular plants in Madagascar

Group	Families present	Endemic families	Genera present	Endemic genera
Bryophytes	101	0	275	0
Pteridophytes	34	0	113	0
Gymnosperms	2	0	2	0
Angiosperms	213	5	1,632	309
TOTAL	**350**	**5**	**2,022**	**309**

Source: MBG Madagascar Catalogue http://legacy.tropicos.org/Project/Madagascar. *Accessed: 2022.*

For pteridophytes, 34 families are known, distributed in 113 genera and about 720 species, 53 percent of which are endemic (Flora of Pteridophytes *in press*, F. Rakotondrainibe pers. comm.).

For trees and large shrubs, 103 families, including four endemics, are known, with a total of 490 genera (including 161 endemics) and 4,220 species (including 4,032 endemics). In terms of tree diversity, Madagascar is the 12th most species-rich country in the world with 3,118 tree species, 93 percent of which are endemic (Beech *et al.* 2021).

For palms (Arecaceae family), Madagascar is considered one of the richest territories in the world (eight percent of the global flora of the family in the world) with its 208 species, of which 204 are endemic, distributed in 17 genera, of which eight are endemic (Govaerts *et al.* 2020, Rakotoarinivo *et al*. 2020). The Poaceae family includes 140 genera, with 10 percent endemism (MBG Madagascar Catalogue 2022).

Table 10 Diversity and endemism of vascular plants in Madagascar

Number of native species (estimated)	Number of endemic species	Endemism rate (%)
11,399	9,329	82

Source: MBG Madagascar Catalogue 2022.

More than 900 species of vascular plants, comprising 400 genera and 120 families, are known among the diversity of vascular plants of inselbergs in Madagascar. According to estimates, the actual number of species on inselbergs can reach well over 10 percent of the total number of the flora of Madagascar. Regarding endemism, 70 percent of the species and 10 percent of the genera are endemic. Two endemic families are also known from this habitat: Sarcolaenaceae; and Sphaerosepalaceae (Rabarimanarivo *et al*. 2019). Madagascar's inselbergs form centers of diversity for succulents (including *Aloe*, *Euphorbia, Kalanchoe,* and *Senecio* species), carnivorous plants (*Drosera* and *Utricularia* species), and resurrection plants (including *Xerophyta* species). The latter represent 16 percent (50 species) of the total estimated resurrection species on rock outcrops worldwide. These resurrection plants are important elements for climate change, as resources for future agriculture still unexplored in Madagascar.

Of the 249 vascular plant families currently known in Madagascar (MBG Madagascar Catalogue 2021), 89 plant families include at least one aquatic or semi-aquatic freshwater species, and there are 25 exclusively aquatic families, four of which are pteridophytes, including the Isoetaceae (three species) and Marsileaceae (seven species), and the remaining 21 families are seed plants, including the Aponogetonaceae (15 species), Hydrostachyaceae (14 species), Podostemaceae (six species), Potamogetonaceae (10 species) and Nymphaeaceae (two species). Compared to terrestrial plants which have a high rate of endemism, only 49 percent of the plant species recorded in wetlands are endemic.

4.3.2. Comoros

Like most tropical islands, the Comoros archipelago is well known for harboring remarkable biodiversity, characterized by numerous endemic species. For example, 20 out of 96 of the archipelago's bird species are endemic (BirdLife International 2022), as are 14 percent of its mammal species (Louette *et al.* 2004), and 15 percent of its plant species (Pascal *et al.* 2001, Pascal 2002).

Except for vertebrates, for which the inventory can be considered completed, biodiversity remains very poorly known. For almost all invertebrates, which constitute more than 90 percent of the animal species, no complete list exists, and most groups have not been the subject of any detailed study; it is therefore impossible to evaluate the rate of endemism (Louette *et al.* 2004). The disparity of knowledge between groups is well illustrated by the number of publications concerning each taxon, taken from the bibliography of the main book on the fauna of the Comoros published in 2004. The least rich groups (vertebrates) are those that have been studied the most, and knowledge remains very fragmentary for most of the other taxa (Table 11).

Table 11 Number of species for some groups of animals in the Comoros

Group	Number of species (native and introduced)
Mammals	21
Birds	116
Reptiles and amphibians	28
Mollusks	>166
Arachnids	undefined
Insects	undefined

Source: Louette et al. *(2004).*

The fauna of the Comoros is diverse and balanced; although poor in large mammals, all major zoological groups are represented.

Table 12 Summary of endemic fauna species of Comoros

Taxon	Number of native species	Endemic species
Birds	98	20
Mammals	17	6
Reptiles	25	11
Insects	1,200	360 - 720
Freshwater fishes	20	Undetermined

Sources: Thys and Tengels 1980; Adjanohoun et al. 1982; Louette et al. *1988; Harcourt and Thornback 1990; Cole 1992; Clarke* et al. *1992; BirdLife International 2022.*

Birds

There are currently 96 species of birds, 20 of which are endemic. The Comoros are located on the path of Palearctic migrants. Some birds have a very small range. The most remarkable case seems to be that of Comoro white-eye (*Zosterops mouroniensis*), whose global range is reduced to the *Philippia* sp. zone, which extends from 1,300 to 1,600 m on Mount Karthala.

Mammals

The Comoros are notable for bat species. Six of the nine species of bats on the islands are endemic, including two species of megachiropterans: Livingstone's fruit bat (*Pteropus livingstonii*); and Comoro rousette (*Roussettus obliviosus*).

Mongoose lemur (*Eulemur mongoz*), a species of lemur native to Madagascar, has been introduced to the Comoros. It occurs in the relict forests of Anjouan island and in the forests of the central ridge, as well as in the dry lowland forests of Mohéli.

Reptiles

According to experts, there are at least 11 endemic species of reptiles (five geckos, two chameleons, a skink and three snakes) among the 25 indigenous species identified. The rate of endemism is 44 percent. There are no venomous snakes in the Comoros. Some reptiles species are threatened, such as *Ebena viainunguis, Geckolopis maculate* and *Gehyra mutilata*. Day geckos *Phelsuma* are sought after for export as pets. Geckos live mainly in forests and coconut plantations while some species have adapted to live near houses and in fields.

Insects

Specialists have estimated a total of 1,200 species of insects for the Comoros with relatively high levels of endemism, between 30 and 60 percent. Currently, CNDRS and Oxford University are jointly conducting studies on lepidopterans, many species of which are threatened, in particular, the endangered large-tailed butterfly, as well as *Pseudacrealucretia comorana*, *Temnona pseudopylas latimargo*, *T. marginatacomoriana*, *Nepheleoenopion stictica*, *N. accentifera comorana*, *Tagiades samborana*, *T. insularis grandis*, and *Coleiades ramanatek comoriana*.

Terrestrial mollusks

Fontaine *et al*. (2012) mention 184 species of mollusks, of which more than 50 are new to science. Among this fauna, only 13 species are introduced, and at least 130 (70 percent) are endemic to the archipelago. The mollusks of the Comoros are composed of 24 families, among which those of the Streptaxidae, a family of carnivorous, richly colored snails, is particularly divers.

Crustaceans and freshwater fishes

The list of freshwater fish and macro-crustacean species of the Comoros includes 32 species, including 20 fishes and 12 decapod crustaceans. Of these, seven species are specific to the western Indian Ocean region, with one endemic to the Comoros and one endemic to Madagascar and the Comoros (Keith *et al*. 2006).

Only one introduced species was found. Overall, the number of indigenous species varies greatly from one island to another: 24 in Anjouan, including 15 species of fish and nine species of crustaceans; 30 in Mohéli, including 18 species of fish and 12 of crustaceans; and two species in Grande Comore, which does not have a perennial river.

Vascular plants

Floristic data remain very incomplete and deserve exhaustive studies. Currently, 1,300 species are known from the Comoros, compared to the 935 species reported by Voeltskow in 1917. However, these numbers are far from being definitive, given than inventory work is still in progress and currently limited to one of the islands of the archipelago.

The list of species is based on the collections kept in the herbarium of the National Museum of Natural History (P), including those during the mission carried out within the framework of the project *Faunistic inventory of the rivers of the Comoros and botanical inventory* (Keith *et al.* 2006).

With regard to vascular plants, the most speciose family is the Fabaceae, with 105 species. The Poaceae is well represented, with 92 species, but these are mainly species with a wide distribution, often introduced and invasive.

According to a dataset of specimens available in the Paris Herbarium, the Orchidaceae family in the Comoros is represented by 81 species, of which 18 are endemic and some are globally threatened. The orchids *Cynorkis lilacina* var. *boiviniana* and *Malaxis cardiophylla* have not been observed for over 100 years.

A study conducted in 2006 shows that there are 208 pteridophytes in the Comoros flora. Ferns have a widespread distribution on Mount Karthala, the Grille massif, the forests of Mohéli (Miringoni, Mladjele and MzéKekoule), the relict forest of Moya and Ntringui in Anjouan. The western slopes of Mount Karthala are particularly noteworthy for ferns (both terrestrial and epiphytic), with a maximum diversity of ferns that seems to coincide with their greatest abundance around 1,650 m in altitude.

4.3.3. Mauritius

Due to their volcanic origin, antiquity and isolation, the islands of Mauritius and Rodrigues support a high diversity of flora and fauna, and a high degree of endemism (about 39.5 percent of the higher flora and 72 percent of vertebrates on Mauritius and 31 percent and 87.5 percent respectively on Rodrigues; Table 13). Agaléga and Saint Brandon have no endemic terrestrial species.

In approximately 370 years of human presence, Mauritius and Rodrigues, previously pristine islands teeming with endemic and often evolutionarily remarkable species, have been transformed into two of the most ecologically impacted places on Earth (Cheke and Hume 2008). Both islands are rather unique in that their biota were relatively well known from the beginning of human presence, due to their late discovery. Thus, aided by good (sub)fossil records, new extinct species are still being catalogued (e.g. Rijsdjik *et al*. 2009, de Boer *et al*. 2013a,b, de Boer *et al*. 2014, Hume 2011, 2015).

Mauritius is best known among conservation biologists for providing the world with the very symbol of human-induced species extinction, the remarkable dodo (*Raphus cucullatus*) (Turvey and Cheke 2008). Some other examples of extinct species from Mauritius are broad-billed parrot (*Lophopsittacus mauritianus*) and two species of giant tortoise (*Cylindrapsis triserrata* and *C. inepta*). Rodrigues had Rodrigues solitaire (*Pezophaps solitarius*), a relative of the dodo, and two endemic species of giant tortoise (*Cylindrapsis vosmaeri* and *C. peltastes*).

Thus, 23 of the 50 native vertebrate species known in Mauritius (46 percent) and adjacent islets are now extinct. For Rodrigues, the percentage of extinct vertebrates is higher (56 percent, or 20 species out of 36). Before the first settlers in the 17th century, only flying mammals lived in Mauritius and Rodrigues, but, since then, many invasive exotic species have been introduced, resulting in the loss of much of the endemic and native flora and fauna. Agaléga and Saint Brandon did not originally have mammals.

Table 13 Native and endemic species in selected biological groups

Taxonomic group	Total native species		Endemic species		Extinct species		Extinct endemics	
	Mauritius	Rodrigues	Mauritius	Rodrigues	Mauritius	Rodrigues	Mauritius	Rodrigues
Angiosperms	691	150	273 (39.5%)	47 (31.3%)	61 (11.3%)	17 (11.3%)	30 (11%)	10 (21.3%)
Mammals	5	2	1 (20%)	0	2 (40%)	1 (50%)	0	0
Land birds	28	14	19 (67.9%)	13 (92.9%)	16 (57.1%)	11 (78.6%)	12 (63.2%)	11 (84.6%)
Reptiles	18	8	18 (94.1%)	8 (100%)	5 (29.4%)	8 (100%)	5 (31.3%)	8 (100%)

Butterflies	30	10	5 (16.7%)	0	4 (13.3%)	1 (10%)	1 (20%)	0
Snails	125	30	81 (64.8%)	16 (53.3%)	43 (34.4%)	7 (23.3%)	36 (44.4%)	5 (31.3%)

Source: Florens (2013a).

Mammals

The only native mammals of the Republic of Mauritius are bats. Of the three species of fruit bats known to occur in the country (*Pteropus niger*, *P. subniger*, and *P. rodricensis*), *P. subniger* is extinct, *P. niger* is listed as Vulnerable on the IUCN Red List (Kingston *et al.* 2018) and *P. rodricensis* is still present in Rodrigues and listed as Endangered on the IUCN Red List (Tatayah *et al.* 2017).

There are two species of insectivorous bats in Mauritius, the endemic *Mormopterus acetabulosus* (Goodman *et al*. 2008), and the native *Taphozous mauritianus*, which is also found in Réunion and mainland Africa (Hutson *et al*. 2008). Further study may revise the status of *Taphozous mauritianus.* Agaléga and Saint Brandon have no native terrestrial mammals.

Birds

Although Mauritius is relatively poor in species numbers, it has a large proportion of endemic taxa. Mauritius has one of the densest concentrations of threatened bird species in the world (Safford 2001).

Of the 28 land bird species that existed in Mauritius, 12 have thus far avoided extinction, nine of which are considered globally threatened (Cheke and Hume 2008; Table 14). On Rodrigues, the only two existing endemic land birds, Rodrigues fody (*Foudia flavicans*) and Rodrigues warbler (*Acrocephalus rodericanus*), are found in almost all wooded areas, with their largest populations in the highlands.

The islets around the main island of Mauritius, especially the northern islets, have a great abundance of seabirds. Eleven species nest there, including red-tailed tropicbird (*Phaethon rubricauda*). The highest populations of some of these species in the Indian Ocean is found on the northern islets of Mauritius.

Agaléga was an important seabird station in the 19th century (Cheke and Lawley 1983) but the last colonies were deliberately destroyed by fire in 1943. It is difficult to know what species were present, because of rats, cats, fires and poor scientific recording, but at least 10 species of birds existed at Agaléga. In addition to migratory birds, only two species of native land birds have been recorded. Major ongoing construction (airstrip, aircraft hangar, dormitories, houses, and jetty, etc.) could affect breeding seabirds. Saint Brandon supports large seabird colonies, ranging from five to nine species (Staub and Guého 1968, Williams and Rowlands 1980, BirdLife International 2013, Evans *et al* 2016).

Table 14 Extant endemic species of land birds of Mauritius and Rodrigues islands

Sites	Species	IUCN status
Mauritius	*Falco punctatus*	EN
	Nesoenas mayeri	VU
	Alexandrinus eques	VU
	Collocalia francica	NT
	Coracina typica	VU
	Hypsipetes olivaceus	VU

	Terpsiphone bourbonnensis ssp. *desolata*	LC
	Zosterops mauritianus	LC
	Zosterops chloronothos	CR
	Foudia rubra	EN
Rodrigues	*Acrocephalus rodericanus*	NT
	Foudia flavicans	NT

Reptiles

There are 18 species of endemic reptiles known to have once inhabited mainland Mauritius, of which 13 species remain extant. Seven of these have their remaining populations restricted to offshore islets. Burrowing boa (*Bolyeria multicarinata*) was last seen in 1975 and is now considered extinct. This is the last recorded extinction of a vertebrate in Mauritius (Cheke and Hume 2008), although local extirpations are still ongoing.

All endemic reptile species of Rodrigues have disappeared (Cheke and Hume 2008). Common smooth-scaled gecko (*Lepidodactylus lugubris*) is native to Asia and is still found in several parts of Rodrigues, although it has declined since the arrival of Asian house shrew (*Suncus murinus*). The island of Agaléga has an endemic variety of a day gecko evolved from the Réunion species (*Phelsuma borbonica agalegae*). Its current status has not been assessed, although it is still present on the island.

Fishes

The most recent comprehensive publication on freshwater fishes was carried out by l'Agence Réunionnaise pour le Développement de l'Aquaculture ("Hydro-Réunion"), which carried out electrofishing sampling in 2002. In this sampling mission, 18 species of fish were identified, 13 native species of freshwater fish were found, including two endemic to the Mascarene islands and two others endemic to the Mascarene-Madagascar region. The other species have a much wider distribution, five are Indo-African species and four are Indo-Pacific species. Compared to Réunion, the density of fish was much lower but the eels (*Anguilla marmorata* and *A. mossambica*) were larger in size. According to Froese and Pauly (2015), there are 57 species of freshwater fish in Mauritius, of which 22 are introduced, 34 are native and one is endemic.

Invertebrates

Mauritius has 39 native butterfly species, five of which are endemic, but only one of these is still extant (Williams 2007). From Rodrigues, 12 butterfly species have been recorded, including one subspecies considered extinct and one species probably introduced from Madagascar. On Agaléga, surveys revealed only five species. According to Keith *et al* (2006), there are 11 species of crustaceans, of which one is extinct.

There are 125 native land snail species described for Mauritius, most of which are endemic (64 percent). However, 43 are already extinct (34 percent) (Griffiths and Florens 2006). Several new species have been described recently (Griffiths and Florens 2004) but they are mostly extinct. Rodrigues has a much smaller land snail fauna (30 species) and a lower extinction rate (23 percent). Agaléga has four species of land snails, while Saint Brandon has two species, all with a wider geographic distribution (Griffiths and Florens 2006).

The ant fauna is relatively well known on Mauritius (Fisher *et al*. 2005), with about 24 native species, mostly endemic (59 percent). Some samples are still being studied to determine their identity and whether or not they are native to Mauritius. Most of the species collected on Rodrigues are exotic.

Recently, a spider *Mascarenus remotus* (Gallon 2005) was described from Serpent Island and is known to occur only on this islet off Mauritius. A new species of grass, *Brachiaria nodosa*, has also been described from this same islet.

There are over 1,000 species of arthropods on Mauritius (including 38 endemic families), with an estimated 75 percent endemism at the species level (Motala *et al*. 2007). Some groups have been somewhat better studied, such as the genera *Syzygops* (Williams 2000), *Cratopus* (Williams and Cox 2003), *Phasmatodea* (Hugel 2014, Hugel and Desutter-Grandcolas 2021), and Ichneumonidae (Ganeshan and Madl 2016) but other groups lack in-depth knowledge.

There are 10 species of freshwater macrocrustaceans in Mauritius belonging to two families: the Atyidae (with six *Caridina* and one *Atyoida* species); and the Palaemonidae (with two *Macrobrachium* and one *Palaemon* species) (ARDA 2003). Three of these species are endemic to Mauritius and one to the Mascarene Islands, while the others are of Indo-Pacific distribution. Most of these species are present at higher densities on Mauritius than in corresponding habitats on Réunion. However, the edible prawn species *Macrobrachium lar* is now rather rare because of its exploitation.

Plants

Mauritius has six genera of endemic plants. The flora of Mauritius has a high degree of endemism, with 39.5 percent of flowering plant species endemic to Mauritius (273 species), the remaining species are endemic to the Mascarene Islands (143 species) (Baider *et al.* 2010). About 9 percent of the native species are currently considered extinct. Concerning pteridophytes, there are about 200 taxa in Mauritius, of which 12 are endemic (Grangaud 2010). About 46 taxa are considered extinct, although for some (14 of them), their presence on the island has never been confirmed (Grangaud 2010). Some ferns have been relocated, such as *Pellaea dura* (Pynée *et al.,* 2013), and new records have been made (Pynée *et al*. 2012). There are at least 238 bryophyte taxa in Mauritius (Tixier and Guého 1997, Frahm *et al.* 2009) but studies on these groups are lacking and actual diversity is probably higher.

Rodrigues has three endemic plant genera and approximately 150 native angiosperm species, 31 percent of which are strictly endemic. The extinction rate of endemic species in Rodrigues is the highest among all the islands of the western Indian Ocean (Baider *et al*., 2010). Concerning pteridophytes, there are 27 taxa in Rodrigues, five of which are extinct on the island (Grangaud 2010). A total of 44 species of mosses are listed, of which only one species seems to be endemic (Mitten 1879, Een and Thingsgaard 1999). In the absence of comprehensive surveys, it is difficult to know the status of these groups in Rodrigues.

The flora of Agaléga is documented to have 46 native species, three of which have not been seen recently (Guého and Staub 1983), while Saint Brandon has 17 species (Staub and Guého 1968). Both have no endemic species and are primarily composed of widely distributed species (MWF 2019 and unpublished reports).

4.3.4. Seychelles

The Seychelles, due to their isolation, are characterized by a high degree of endemism, especially in the terrestrial sphere. Table 15 presents the main figures on terrestrial biodiversity (from Senterre *et al.* 2010, 2013, and the IUCN Red List 2021). Approximately 4,500 native species have been identified to date.

Table 15 Terrestrial biodiversity: endemic and threatened species in the Seychelles

Taxonomic group	No. of native species () = introduced	No. of endemic species in Seychelles	Examples of threatened species (IUCN Status)
Plants	545 vascular plants [777 all plants] (>980) all	133 vascular plants [147 all plants]	*Medusagyne oppositifolia* CR, *Vateriopsis seychellarum* CR *Rothmannia annae* CR *Impatiens gordonii* CR *Drypetes riseleyi* CR *Colea seychellarum* EN *Glionnettia sericea* EN *Lodoicea maldivica* EN *Deckenia nobilis* VU *Psychotria pervillei* VU *Tarenna sechellensis* VU *Allophylus sechellensis* VU *Pandanus balfouri* VU
Mammals (native = chiropterans)	6 (0)	5	*Coleura seychellensis* CR *Pteropus aldabrensis* VU *Mops pusillus* VU
Birds	272 (6)	13	*Terpsiphone corvina* VU *Copsychus sechellarum* EN *Zosterops modestus* VU *Otus insularis* CR *Falco araea* VU *Aerodramus elaphrus* VU *Coracopsis (nigra) barclyi* VU *Foudia aldabrana* EN
Snakes	2 (1)	2	*Lycognathophis seychellensis* EN *Lamprophis geometricus* EN
Lizards, geckos & chameleons	6 (1) 7 (3) 2	4 7 2	*Archaius tigris* EN *Archaius scychellensis* EN *Janetaescincus veseyfitzgeraldi* EN *Janetaescincus braueri* EN *Trachylepis wrightii* VU *Ailuronyx trachygaster* CR
Turtles	3	1	*Aldabrachelys gigantea* VU
Frogs	6	5	*Sooglossus thomasseti* CR *Sooglossus pipilodryas* CR *Sechellophryne gardineri* EN *Sechellophryne sechellensis* EN
Caecilians	7	7	*Grandisonia brevis* EN *Praslinia cooperi* EN
Freshwater fishes	20 (5)	2	
Freshwater invertebrates	>3,500	>2,000	
Insects	>2,900 (>135)	>1,670	*Delosia ornata* CR *Carausius scotti* CR *Pulposipes herculeanus* VU *Euploea mitra* EN *Allolestes maclachlani* EN *Nocticola gerlachi* EN *Graffaea seychellensis* EN

			Amphinotus pupulus EN *A. nymphula* EN *Teinobsis alluaudi* VU *Phalangacris phaloricephala* VU
Arachnids	>350 (15-30)	>200	*Phrynicus scaber* VU
Crustaceans	c.70 (5)	c.24	
Myriapods	c.60 (3-13)	c.34	*Sechelleptus seychellarum* EN
Mollusks	c.67 (8)	c.50	*Pachnodus oxoniensis* CR *Conturbatia crenata* CR *Dupontia levensonia* CR *Glabrennea silhouettensis* CR *G. thomassetti* CR *Stylodonta studeriana* EN *Pachnodus fregatensis* EN

Mammals

The only indigenous terrestrial mammals in Seychelles are bats. All other mammals are introduced, such as domestic animals (cattle, pigs, goats, rabbits, hares, cats, dogs, guinea pigs), some of which have become wild, commensal rodents (*Rattus norvegicus*, *Mus musculus*) or introduced species (*Tenrec ecaudatus*).

There are six species of bats, five of which are endemic. Only Mauritian tomb bat (*Taphozous mauritianus*) is not endemic. Seychelles sheath-tailed bat (*Coleura seychellensis*), which is one of the rarest mammals in the world (about 60 individuals) is endemic to the granitic islands of the Seychelles. Seychelles fruit bat (*Pteropus seychellensis*) is a large fruit bat endemic to and typical of the granitic islands, where it is abundant. Aldabra flying-fox (*Pteropus aldabrensis*) is much rarer and with a more reduced distribution, hence its EN status. Seychelles free-tailed bat (*Mops pusillus*, VU) and *Triaenops* sp. have only recently been proposed as endemic to Aldabra (Goodman and Ratrimomanarivo 2007; Goodman and Ranivo 2008, Bielsa *et al*. 2020).

Birds

In 2022, a total of 272 extant bird species were recorded in the Seychelles, including 62 breeding species, 30 annual migrants and 180 vagrants. There are also 10 extinct species, four of which were introduced and established until being eradicated or becoming extirpated naturally (Skerrett *et al*., SBRC website and pers. comm.).

Several species are known to have become globally extinct since humans colonized the islands, including Seychelles yellow white-eye (*Zosterops semiflavus*) and Seychelles parakeet (*Psittacula wardi*) on the granitic islands, and Aldabra brush warbler (*Nesillas aldabranus*), which is considered extinct as it has not been seen since the 1980s. The Seychelles are home to a large number of seabirds, on both the granitic and the outer islands. Some colonies are home to more than a million birds and are among the largest in the Indian Ocean (e.g., frigatebirds and gannets on Aldabra and Cosmoledo atolls), and the largest in the world for some particular species (noddies and tropical shearwaters on Aride).

There are currently 30 endemic taxa, including 15 species of birds endemic to the Seychelles, most of which are globally threatened, and 15 endemic subspecies currently present in the Seychelles.

Reptiles and amphibians

Approximately 25 species of terrestrial reptiles are present in the Seychelles; 21 of these are native and 16 endemic to the Seychelles.

Aldabra has the largest surviving wild population of giant tortoises in the world (over 100,000) and several (re)introduced populations exist on most of the granitic and coralline islands (the main ones being on Frégate and Curieuse). Two turtles described as endemic subspecies also occur in the Seychelles, yellow-bellied pelusios turtle (*Pelusios castanoides intergularis*) and Seychelles black mud turtle (*P. subniger parietalis*), although the latter is now considered an invalid subspecies (Fritz *et al*., 2013). With the habitats of pond turtles declining on the larger developed islands of the Seychelles, two populations of *P. subniger parietalis* have been re-created on North Island and Aride island, and populations of both species have been enhanced on Silhouette (Gerlach *et al*., 2013).

The Seychelles also has the highest rate of endemism among amphibians of any island group in the world; 12 out of 13 species are endemic (92 percent). These include seven endemic species of caecilians (blind, limbless burrowing amphibians), two of which are considered globally threatened. They also include five endemic species of frogs: four members of the Sooglossidae (an endemic family with close relatives in India), all of which are globally threatened; and Seychelles tree frog (*Tachycnemis seychellensis*).

Freshwater fishes

Approximately 25 species of freshwater fishes (Keith *et al*. 2006) exist in the Seychelles, although some species may live in both fresh, brackish or salt water at different stages of their lifecycle (such as eels). Only two species are considered endemic to the Seychelles: *Pachypanchax playfairii*; and *Parioglossus multiradiatus.* Neither is considered threatened.

Invertebrates

It is estimated that over 3,500 species of native terrestrial invertebrates are present in the Seychelles, of which about 60 percent are endemic, the most diverse group by far being insects. These endemic species are mainly found on the granitic islands and in the Aldabra group, and some can also be found in the coral islands. Desroches island (Amirantes) is the only known site for two endemic cockroach species: *Delosia ornate*; and *Margatteoidea amoena*.

Endemic invertebrate flagship species include giant Seychelles millipede (*Sechelleptus sechellarum*; EN; Gerlach 2014a), Seychelles whip spider (*Phrynichus scaber*; EN; Gerlach 2014b), and the leaf insect *Phyllium bioculatum*, assessed as non-threatened although extremely rare (G. Rocamora, pers. comm.). Giant tenebrionid beetle (*Polposipus herculeanus*; VU) is restricted to Frégate island (Gerlach 2014c).

After insects, spiders are the group with the greatest biodiversity (about 350 native species, 60 percent endemic), followed by crustaceans (72 native species, 24 endemic) and mollusks (67 native species, 75 percent endemic). Insects and mollusks are the only terrestrial invertebrate groups for which globally threatened species have been identified in the Seychelles; there are a total of 36 globally threatened insects (6 CR, 18 EN and 12 VU) and 53 globally threatened snails (21 CR, 30 EN and 2 VU).

4.4. Species Diversity and Endemism: Marine Biodiversity

More than 10,000 species of shallow-water marine animals have been identified in the western Indian Ocean, including more than 2,000 species of fish.

The western Indian Ocean is home to 211 species of chondrichthyans, including 128 species of sharks and 79 batoids (rays, skates, etc.) and four species of chimaera (Kiszka and van der Elst 2015). This is equivalent to about 23 percent of these species globally. Eleven shark species are endemic to the western Indian Ocean (Kiszka *et al.* 2009b; Table 16).

Table 16 Endemic shark species in the western Indian Ocean

Species	Marine area
Squalus lalannei, Centrophorus secheyllorum	Seychelles
Chiloscyllium caeruleopunctatum, Halaelurus clevai, Narcine insolita, Dipturus crosnieri, Fenestraja maceachrani, Rhinobatos petiti	Madagascar
Scyliorhinus comoroensis	Comoros

Sources: Compagno (1984); Bauchot and Bianchi (1984); BIODEV (2008).

The southwestern Indian Ocean is home to five of the world's seven species of marine turtles, comprising green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata)*, olive ridley turtle (*Lepidochelys olivacea*), loggerhead turtle (*Caretta caretta*), and leatherback turtle (*Dermochelys coriacea*). It represents a major region at the global level, for the reproduction and feeding of these species (IFREMER 2013). Particularly important nesting sites for marine turtles exist in the Comoros, the Seychelles and the Scattered Islands.

The western Indian Ocean is an important area for marine mammals, with eight Important Marine Mammal Areas (IMMAs) identified[13]:

- (1) Southwest Madagascar and the Mozambique Channel, (2) the Seychelles Plateau and Adjacent Oceanic Waters, and (3) the Mascarenes and Associated Oceanic Features are important for false killer whale (*Pseudorca crassidens*), short-finned pilot whale (*Globicephala macrorhynchus*) and Risso's dolphin (*Grampus griseus*) (Tetley *et al.* 2012), as well as for other flagship species.
- (4) The Madagascar Central East Coast (including Antongil Bay and Ile Sainte Marie), (5) the Shelf Waters of Southern Madagascar, and (6) the Comoros Island Chain and Adjacent Reef Banks are important for humpback whale (*Megaptera novaeangliae*).
- (7) Northwest Madagascar and the Northeast Mozambique Channel is important for Antarctic blue whale (*Balaenoptera musculus intermedia*)*,* pygmy blue whale (*B. m. brevicauda*), fin whale (*B. physalus*), sperm whale (*Physeter macrocephalus*) and other large whale species.
- (8) Aldabra Atoll supports the only known remaining population of dugong (*Dugong dugon*) in the Seychelles, as well as providing a mating, calving and nusery area for humpback whale.

Large cetacean populations are a tourist attraction in several coastal regions of the hotspot, such as Antongil Bay and Ile Sainte Marie in Madagascar, which are important breeding areas for humpback whale*.* The distribution of cetaceans in the western Indian Ocean is shown in Table 17.

Table 17 Distribution of cetaceans in the western Indian Ocean

Country	Island	Dolphins	Beaked whales	Sperm whales	Whales	Right whales	Total Species
Comoros	Great Comoros	8	1	1	1	0	11
	Mohéli	8	2	1	1	0	12
Republic of Mauritius		6	1	1	3	1	12
Seychelles	Mahé	6	2	2	3	0	13
	Aldabra	8	2	1	3	0	14
	South Islands	7	2	1	4	0	14

[13] Marine Mammals Protected Areas Task Force: https://www.marinemammalhabitat.org/imma-eatlas/

	North Islands	7	2	1	4	0	14
	Seychelles Bank	7	2	1	3	0	13
	West	6	2	1	3	0	12
Madagascar	Toliara	7	0	2	1	1	11
	East Coast	7	0	2	1	0	10
	Northeast Coast	8	0	2	1	0	11
	West Coast	7	0	2	1	0	10
	South Coast	8	0	2	2	0	12
	Southwest Coast	6	0	2	2	0	10

Sources: AIDE (2008); Biodev (2008); TAAF (pers. comm. 2014).

Marine invertebrates represent an important economic resource (fishing for sea cucumbers, lobsters, crabs, octopuses, etc.) in the MADIO Hotspot. The most recent assessment of the western Indian Ocean indicates that the region supports at least 8,627 species of shallow-water invertebrate macrofauna (Cooke 2012). As with terrestrial invertebrates, data gaps remain, both in taxonomy and in distributions and population trends.

Studies by Richmond (2001) report 419 species of echinoderms in the western Indian Ocean, 373 of which are distributed around East Africa and Madagascar; of which 81 species are endemic to the region. For the marine areas around Madagascar, 1,400 species of marine gastropods, 306 species of sponges and 650 species of cnidarians have been recorded (Vasseur 1981). On the reefs of Madagascar's Toliara region, 779 species of crustaceans were recorded in 1978 (Thomassin 1978). In the Seychelles, it is estimated that there are 450 species of bivalves, 350 species of sponges, 155 of echinoderms and 165 species of marine crustaceans (J. Nevill pers. comm.).

4.4.1. Madagascar

Madagascar is an island with a high potential for coastal and marine biodiversity. The main marine and coastal ecosystems include mangroves, coral reefs, lagoons, sandy beaches, pebble beaches and rocky outcrops.

The flora of mangrove ecosystems is composed of mangrove species, forming large stands. The flora of the reef areas includes seaweeds and marine phanerogams.

The state of knowledge on the exploitation of marine and coastal resources is limited to censuses, distribution and stock assessments. The main targets of the fisheries are crustaceans, including shrimps, lobsters and crabs. The potential of mollusk resources has not yet been studied, while sea cucumbers are being overexploited in Madagascar without any precise evaluation. In comparison, the exploitation of fish is relatively well known.

The threats to Madagascar's marine biodiversity are related to the coastal and marine environments even though they are considered relatively preserved to date. The main threats are fishing, pollution, deforestation of mangroves, coastal erosion and tourism.

Madagascar's marine and coastal ecosystems contain the largest community of living marine organisms and are among the most biologically productive in the world. Their richness in species makes them one of the most important places for biodiversity on the planet.

Madagascar is home to several endemic marine species, including *Chiloscyllium caeruleopunctatum*, *Halaelurus clevai*, *Narcine insolita*, *Dipturus crosnieri*, *Fenestraja maceachrani,* and *Rhinobatos petiti* (Compagno 1984, Bauchot and Bianchi 1984, BIODEV 2008).

For marine invertebrates, the marine areas around Madagascar are home to 1,400 species of marine gastropods, 306 species of sponges and 650 species of cnidarians (Vasseur 1981). Marine invertebrates (including sea cucumbers, lobsters, crabs, and octopuses) represent an important economic resource from the point of view of economic and food security.

The 2017 list by Fricke *et al*. (2018) includes 137 new marine fish records for Madagascar, bringing the number to 1,540 species of actinopterygian marine fishes, including 30 endemics (Table 18). These 1,540 recorded species belong to 191 families and 29 orders. The Perciformes group account for 57 percent of the species, the next order in terms of number of species being the Anguilliformes (7 percent of species). The family with the next most species is the Gobiidae, followed by the Labridae and the Serranidae.

Table 18 Marine ray-finned fish species endemic to Madagascar

Order	Number of endemic marine fish species
Anguilliformes	4
Siluriformes	1
Ophidiiformes	2
Lophiiformes	2
Atheriniformes	1
Stephanoberyciformes	1
Bercyiformes	1
Perciformes	16
Pleuronectiformes	2

Source: Fricke et al. *(2018).*

Nine marine mammal species have been recorded, including two classified as vulnerable: sperm whale; and dugong (REBIOMA 2017). Madagascar is home to 72 species of sharks, including two endemic species: *Bythaelurus clevai*; and *Chiloscyllium caeruleopunctatum.* Four species are critically endangered: *Pseudoginglymostoma brevicaudatum*; *Sphyrna mokarran*; *Sphyrna lewini*; and *Carcharhinus longimanus*. Fourteen species are endangered, including whale shark (*Rhincodon typus*), and 21 species are vulnerable. Thirty-six species of batoids (skates, rays and sawfish) have been recorded in Madagascar, including three critically endangered species (*Rhynchobatus australiae*, *Rhina ancylostom* and *Pristis pristis*), seven endangered species and eight vulnerable species (WCS 2021).

4.4.2. Comoros

The coastal and marine fauna of the Comoros is rich and includes elements of global importance. However, there are many gaps in the knowledge of this richness. The species associated with coral reefs are very numerous (fish, crustaceans, and mollusks), but they have not been systematically studied. It is estimated that there are nearly 820 species of marine fish (coastal and pelagic) in the Comoros combined.

Endangered marine species

The 1938 discovery of coelacanth (*Latimeria chalumnae*) was one of the most extraordinary biological finds of the century. This crossopterygian "fossil-living" fish, whose origins date back to about 370 million years ago, is closely related to the common ancestor of all tetrapod vertebrates. By its antiquity, the presence of coelacanth in the territorial waters of the Comoros is certainly one of the major elements of biodiversity of the region. Coelacanth inhabits deep underwater caves (between 170 and 230 m below sea level) in the coastal waters off Grande-Comores, along the coast from Salimani to Sima Mbwani, with Itsundzu as the central area. Catches have also been reported from the coast between Moroni and

Hahaya. The coelacanth population in Grande-Comores is currently estimated at around 400 individuals.

In addition to coelacanth, four species of marine turtles frequent the waters of the Comoros, namely green turtle, hawksbill turtle, loggerhead turtle and leatherback turtle. Green turtle and hawksbill turtle are the only ones to nest on the islands' sandy beaches. The main reproduction period is around May for green turtle, and between November and March for hawksbill turtle. The egg-laying sites are threatened by increasing human activity in coastal areas (particularly the removal of materials such as beach sand for construction and urbanization) and by predation of turtles for their meat, eggs, oil, carapace and scales, despite this being banned.

On Grande Comore, marine turtles can be observed in the coastal waters off the island. The beaches of Malé, Mbashilé, Maludja and Ivwani show relatively rare traces of egg-laying. Of the 89 beaches of Mohéli island, with a total length of 26.5 km, about 40 percent are obvious turtle nesting sites. These are mainly the beaches of Itsamia, Nioumachoua islets, and the northwest. These beaches benefit from protection by village associations and the few members of the Environment Department present on the island, who carry out voluntary actions for the protection of the sites from sand extraction and turtle predators.

In the waters of the archipelago, there are at least 12 species of whales and dolphins, including humpback whale. Southern right whale (*Eubalaena australis*) and Bryde's whale (*Balenoptera brydei*) are also frequently encountered. The following dolphin species are also present in Comoros: Indo-Pacific humpback dolphin (*Soussa chinensis*); spinner dolphin (*Stenella longirostris*); common bottlenose dolphin (*Tursiops truncatus*); and short-beaked common dolphin (*Delphinus delphis*).

Whales and dolphins can be found in the southeastern waters off Grande Comore, between Itsandra and Chandini, in the southwestern part of Anjouan off Pomoni and Moya, and in Mohéli around Mohéli National Marine Park. Whales are mainly observed between August and November, when they come to breed.

Dugong is generally observed between August and October. Its preferred habitat is coastal lagoons, where the coral provides shelter from the rough waters of the open ocean, and where the sandy bottom allows the development of seagrass beds.

With regard to marine mollusks, some marine shellfish are threatened by various fishing techniques used in Comoros. They are *Choriona tritonis, Cipraecassis rufa, Cassis cornuta, Lambis* sp., *Turbo marmorato, Tridacna squamosa, T. maxima, Hippopus hippopus* and *Pinctada* spp. Only one marine mollusk is recognized as endemic to the Comoros: *Chiton comorensis*. *Cyprae* spp. mollusks (cowrie shells) are probably the most popular exotic shellfish for their monetary, ornamental, ritual and magical value. Many species of mollusks are threatened with extinction by illegal and destructive fishing methods, including use of explosives and small-mesh-size nets. The richest areas have not yet been inventoried, but they seem to be abundant in the most preserved areas such as Beit Salam in Itsandra, Grande Comore and Mea islet in Mohéli.

Crustaceans, such as green lobster *Palinurus* spp. and coconut crabs *Birgus latro*, which are consumed by tourists, are also among the threatened species.

Coastal fishes

Coastal fishes live in coastal marine waters to a depth of about 200 m. The richness of coastal fishes in Comoros is low compared to other countries in the region, because of the narrowness of the continental shelf. About 820 species of coastal fish are currently known. The most common are *Chaetodon* spp., *Pomacanthurus imperator*, *Apolemichthys trimaculatus, Abudefduf saxatilis, Acanthurus leucosternon, Dascyllus trimaculatus, Caesio* *xanthonotus, Pterois* spp., *Pteropterus radiata, Variola louti, Myripristis* sp., *Cephalopholis argus*, and *Priacanthus hamrur*. Coelacanth is the only known endemic species. The vast majority of coastal fishes live in coral reefs. Others live offshore and regularly come to the corals to feed on small fish.

Offshore fish

Offshore fishes are found off the Comorian waters. They are often migratory fish that regularly come to hunt a few kilometers from the coast. The most numerous deep-sea or pelagic fish in the Comoros are Indo-Pacific sailfish (*Istiophorus platypterus*), blue marlin (*Makaira mazara*), wahoo (*Acanthocybium solandri*), skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), rainbow runner (*Elagatis bipinnulata*), and bigeye scad (*Selar crumenophthalmus*).

Octopuses

Octopuses can be found in all the coral reefs of the Comoros. However, the sites known for their abundance are Mitsamiouli, Chindini, Malé, Nioumachouoi Islands, Wallah, Itsamia, Pomoni, Moya and Ouani.

Sea cucumbers

Holothurians or sea cucumbers are found on all the seabeds of the Comoros where they are distributed in different zones. The outer slopes and passes are colonized mainly by *Holothuria nobilis*, *H. excellens*, *H. edulis*, *H. fuscogilva*, *Thelenota ananas* and *Bohadschia argus*. *Actinopyga miliaris*, *H. atra*, *H. coluber* and *H. leucospilota are* found on the inner reef flats and *H. cineracens*, *H. impatiens*, *A. mauritiana*, *A. echinites* and *Stichopus variegatus* on the outer reef flats. The outer lagoon is colonized by *B. maculisparsa*, *B. marmorata* and *H. fuscopunctata*. In the bays (mangroves), *H. scabra*, *B. vitiensis*, *B. similis* and *H. flavomaculata* are found.

Lobsters

Lobsters are found on almost all the reefs of the Comoros. Several species of lobster inhabit the reefs of the Comoros, including *Palinurus japonicus, P. ornatus*, *P. versicolor* and *P. longipes*. This last species is the most coveted and exploited in Comoros. It is mostly found on the external slope of the reefs, often taking refuge at the foot of large corals, such as *Porites*. It tends to go up at night towards the flats, where it easily becomes the prey of fishermen.

Marine flora

The marine flora of the Comoros seagrass beds is ecologically important, because it serves as a support for many fixed organisms (algae, hydraires, bryozoans and ascidians) and as a refuge for many marine species, such as gastropods, small crustaceans and fishes such as wrasses, scares, spinefoots and emperor breams.

The seagrass beds in the Comoros are located within lagoons. The most frequent genera of seagrass observed along the Comorian coasts are *Gracilaria*, *Jania*, *Lithotamnium*, *Padina*, *Ulva*, *Codium*, *Halimeda*, *Halodule*, *Halophylla*, *Porolithon*, *Thalassia*, *Zostera*, *Syringodium* and *Cymodoce*. There are also many algae in this area, some of which are filamentous (turf algae), as well as the brown algae *Turbinaria* and *Sargassum*.

4.4.3. Mauritius

The marine biodiversity literature for the Republic of Mauritius is scattered. Knowledge of marine groups in the country is lacking for many groups, or incomplete for others. Most of the known organisms are coastal dwellers. Little is known about pelagic and benthic groups (Bhikajee 2004). Even with these limitations, compilations of the literature show that there are about 1,700 known marine species in the Republic of Mauritius to date. A checklist of all species names (including synonyms and invalid names) for the different groups by island/atoll can be found on the Mauritian Oceanographic Institute (MOI) database (MOI 2007). In many cases, however, some records are old and do not specify the sampling locality, hence the distribution of species is provisional.

Marine mammals

Seventeen species of marine mammals have been recorded in Mauritian waters (Bhikajee 2004). In the territorial waters of the Republic of Mauritius, some whales can be easily observed during their migration to and from Antarctica for calving, such as humpback whale and sperm whale. Some dolphins are resident in Mauritian lagoons, such as spinner dolphin and common bottlenose dolphin.

Dugong, once common in the lagoons of Mauritius and Rodrigues, as evidenced by Dutch drawings from the 17th century, has now disappeared. It is possible that the species occurs in the territorial waters of the Republic of Mauritius, as the species has been sighted in Aldabra in the Seychelles and is also present in Madagascar and the Comoros.

Reptiles

Two species of marine turtle (green turtle and hawksbill turtle) are found in the waters of the Republic of Mauritius. Turtles still use beaches on the islands of Saint Brandon and Agaléga for nesting but this is declining due to hunting, egg collection, and invasive species (Griffiths and Tatayah 2006, Webster and Cadinouche 2013, MWF 2019).

Fishes

In the Republic of Mauritius, there are at least 1,074 species of fish, of which five are endemic and 22 are introduced. Eight-hundred-and-two species are reef-associated, 73 are pelagic, and 44 are deep-sea fishes. Two-hundred-and-three are game fishes, while 22 are commercial fishes.

In Rodrigues, 493 species of fish have been recorded, two of which are endemic: *Pomacentrus rodriguesensis*; and *Chlidichthys foudioides* (Heemstra *et al*. 2004).

Marine flora

In Mauritius, 435 algae and six seagrass species have been described (Ramah *et al*. 2013). Mauritius has a rich algal flora with more than 160 genera identified in the coastal waters. On Rodrigues, 60 red algae (de Clerck *et al*. 2004), 60 green algae and 18 brown algae have been recorded but the algae of Rodrigues are considered as a poor flora compared to those of Mauritius (Coopejans *et al*. 2004).

Coral reefs

There are approximately 750 km^2 of coral reef habitat on the whole of Mauritius, distributed relatively evenly among Mauritius, Rodrigues and Saint Brandon (Turner and Klaus 2005). There are five types of reef: (i) fringing reefs; (ii) patch reefs; (iii) atolls; (iv) reef flats; and (v) barrier reefs.

At least 159 species of stony corals have been recorded (Pillay *et al*. 2002), although this number is an underestimate, as more species have been discovered recently. Around Mauritius island, 163 coral species have been recorded and Rodrigues has a very similar number: 130 species including one endemic, *Acropora rodriguensis* (Ferner *et al*. 2004). The monitoring of corals around Mauritius island shows a strong reduction of the cover during the last years (up to 70 percent), with a much lower decrease for Rodrigues (Hamada *et al*. 2008; Figure 2).

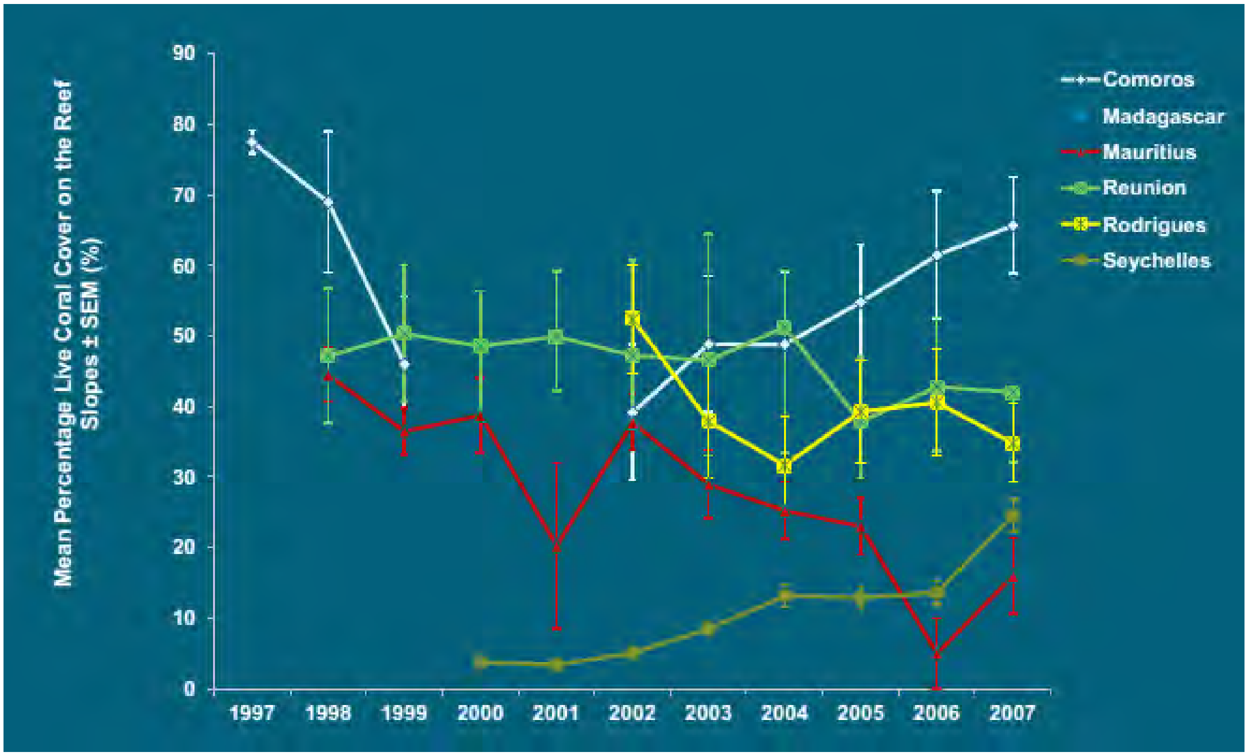

Figure 2 Average coral cover on the reef slopes of the western Indian Ocean islands, with Mauritius in red and Rodrigues in yellow (from Hamada *et al*. 2008)

Crustaceans

Twenty-one species of crustaceans are found in Mauritius (Bhikajee 2004). Five species of penaeid shrimp can be found near the Mauritian coast (Bhikajee 2004, ICZM 2009). In Mauritius, 138 species of gammerid amphipods are known, of which 32 percent are endemic (Appadoo and Steele 1998).

Echinoderms

A high degree of endemism (38 percent) is recorded in the Melitidae and Corophiidae families for Mauritius island. Off Rodrigues, 74 species of echinoderms have been recorded, including three species of Crinoidea, 10 species of Asteroidea, 17 species of Ophiuroidea, 15 species of Echinoidea and 29 species of Holothurioidea (Rowe and Richmond 2004).

Mollusks

109 species of marine bivalves are currently known from waters off Rodrigues, including one endemic species of oyster (*Crassostrea edulis*) (Oliver *et al*. 2004). This level of diversity is similar to that of Mauritius island and the Seychelles (Oliver *et al*. 2004).

4.4.4. Seychelles

The marine biodiversity of Seychellois waters is still poorly studied and researched, especially considering the geographical extent and diversity of the habitats in question. Therefore, the information contained here considerably under-represents the occurrence of species both because of the lack of research and the absence of authoritative compendia on the work undertaken to date. Marine life in the Seychelles is estimated to total at least 3,000 species (Table 19).

Table 19 Marine biodiversity in the Seychelles

Taxonomic group	Number of species	Species endemic to the Seychelles	Globally threatened species
Macroalgae	350		
Scleractinian corals (stony corals)	>300		*Acropora roseni* EN *Acropora rudis* EN *Acanthastrea hemprichii* VU *Acanthastrea ishigakiensis* VU *Acropora aculeus* VU *Acropora anthocercis* VU *Acropora echinata* VU *Acropora hemprichii* VU *Acropora horrida* VU *Acropora microclados* VU *Acropora pharaonis* VU *Acropora polystoma* VU *Acropora spicifera* VU *Acropora verweyi* VU *Anomastraea irregularis* VU *Catalaphyllia jardinei* VU *Fungia seychellensis* VU *Horastrea indica* VU *Leptoseris incrustans* VU *Montastrea serageldini* VU *Montipora australiensis* VU *Montipora friabilis* VU *Montipora lobulata* VU *Montipora orientalis* VU *Pachyseris rugosa* VU *Pavona bipartita* VU *Pavona cactus* VU *Pavona danai* VU *Pavona venosa* VU *Pectinia africanus* VU *Physogyra lichtesteini* VU *Pocillopora indiania* VU *Turbinaria peltata* VU *Turbinaria stellulata* VU
Octocorallian corals (blue corals, soft corals, gorgonians, etc.)	>70		
Cetaceans	26		*Balaenoptera borealis* EN *Balaenoptera musculus* EN *Balaenoptera physalus* VU *Physeter macrocephalus* VU
Sirenians	1		*Dugong dugon* VU
Marine turtles	5		*Dermochelys coriacea* VU *Eretmochelys imbricata* CR *Caretta caretta* VU *Chelonia mydas* EN *Lepidochelys olivacea* VU
Sea snakes	1		

Taxonomic group	Number of species	Species endemic to the Seychelles	Globally threatened species
Reef fishes	>400	*Amphiprion fuscocaudatus* *Lethrinus enigmaticus*	*Albula glossodonta* VU *Thunnus obesus* VU *Bolbometopon muricatum* VU *Cheilinus undulatus* EN *Epinephelus lanceolatus* VU
Sharks	68	*Squalus lalannei* *Centrophorus seychellorum*	*Sphyrna lewini* EN *Sphyrna mokarran* EN *Carcharhinus longimanus* CR *Carcharodon carcharias* VU *Carcharhinus obscurus* VU *Carcharhinus plumbeus* VU *Carcharias taurus* VU *Centrophorus granulosus* VU *Centrophorus squamosus* VU *Isurus oxyrinchus* VU *Nebrius ferrugineus* VU *Negaprion acutidens* VU *Pseudoginglymostoma brevicaudatum* VU *Rhincodon typus* VU *Sphyrna zygaena* VU
Skates, rays and sawfish	9		*Aetomylaeus maculatus* EN *Manta birostris* VU *Himantura uarnak* VU *Rhinoptera javanica* VU *Taeniura meyeni* VU *Urogymnus asperrimus* VU *Rhynchobatus djiddensis* VU *Rhina ancylostoma* VU *Pristis pristis* CR [probably extinct in Seychelles waters]
Seahorses	1		*Hippocampus histrix* VU
Crustaceans	165	*Eupontonia noctalba* *Jocasta platysoma* *Periclimenaeus manihinei* *Periclimenes compressus* *Periclimenes difficilis*	
Bivalves	450		
Sea Urchins	33		
Star fish	32		
Sea cucumber	35		
Crinoides	10		
Ophiuroides	44		
Sponges	c.350	18 species known only from the Seychelles	

Marine mammals

There are 26 known cetacean species frequenting the waters of the Seychelles, including such globally threatened species as sei whale (*Balaenoptera borealis*), blue whale, fin whale and sperm whale, as well as eight species of dolphins. There is a small but growing population of dugong (VU) of 20-25 individuals found around Aldabra atoll (SIF, *in litt.*). Dugong is the most threatened marine mammal in the western Indian Ocean.

Marine reptiles

Five marine turtles can be found in Seychellois waters, all globally threatened. Hawksbill turtle (CR) and green turtle (EN) are the most numerous locally, although much reduced compared to historical numbers. They nest on beaches; the former mainly on the granitic archipelago and the latter on the southern outer islands. Loggerhead turtle (EN), leatherback turtle (CR) and olive ridley turtle (VU) do not breed in the Seychelles but are occasionally encountered at sea. Yellow-bellied sea snake (*Hydrophis platurus*) is also occasionally found in the coastal seas of the Seychelles.

Marine fishes

There is no definitive list of marine fishes for the Seychelles but it is known that there are about 1,000 species identified to date. Endemism is low, assumed to be about 1 percent, and includes Seychelles clownfish (*Amphiprion fuscocaudatus*) and black-eyed emperor (*Lethrinus enigmaticus*). There are, however, various regional endemics present in Seychellois waters, such as Seychelles barbel fish (*Parupeneus seychellensis*), Seychelles squirrel fish (*Sargocentron seychellense*), Seychelles soldierfish (*Myripristis seychellensis*) and Zanzibar butterflyfish (*Chaetodon zanzibarensis*). There are various globally threatened species, especially among species towards the top of the food chain, such as sharks and groupers.

Corals

It is estimated that 300 to 350 species of corals occur in the Seychelles, some of which are listed as globally threatened on the IUCN Red List. Prior to 1998, Seychellois coral reefs had good live coral cover and supported diverse reef communities. However, the whole scenario changed with a severe El Niño and Southern Oscillation (ENSO)-related bleaching event in 1998. Fast-growing *Acroporas* and *Pocilloporas* corals suffered the most, and a phase change from living coral cover to coral-rubble/macroalgal-dominated reefs was initiated. The impact of coral bleaching was most severe on the Mahé Plateau, with reefs there experiencing 80 to 90 percent mortality of living coral cover. The outer islands, particularly the southern islands, were generally less affected, with less than 40 percent coral mortality, perhaps due to upwelling of cold water along the steep volcanic slopes and reduced anthropogenic stress around these islands and the atoll corals, as the lagoons naturally have greater temperature tolerance. It took 17 years for the coral reefs of the inner islands to recover to pre-bleaching live hard coral cover. Another mass coral bleaching event occurred in early 2016, which reduced the average coral cover to less than 10 percent. However, it appears that recovery from the 2016 event was faster than in 1998, possibly a sign that corals are becoming more resilient.

Other marine invertebrates

The Seychelles have a rich diversity of marine invertebrates. Four-hundred-and-fifty species of mollusk, 165 species of shrimp, 55 species of sea anemone, 155 species of echinoderm and 350 species of sponge have been identified according to the limited research undertaken to date.

5. CONSERVATION OUTCOMES FOR THE HOTSPOT

The ecosystem profile for the MADIO Hotspot reflects CEPF's commitment to conservation outcomes, allowing it to measure the success of investments and establishing a scientific basis for determining the geographic and thematic focus of its investment.

Conservation outcomes can be defined at three levels (species, sites and corridors), simplifying a continuous hierarchical spectrum of ecological scales. These three levels are linked geographically, as corridors contain the sites that support species. They are also linked logically: for a species to be conserved, the site that supports it must be protected, while sites must be connected at the scale of landscapes or seascapes if they are to be resilient to climate change and to continue to provide essential ecosystem services. When conservation outcomes are met, they deliver proven results, such as extinctions avoided (at the species level), sites protected (at the site level) and corridors consolidated (at the corridor level).

The definition of conservation outcomes follows a bottom-up process, starting with species-level outcomes and then identifying site outcomes and, finally, corridor outcomes. This requires detailed knowledge of the conservation status of each species. While this information has been collected for nearly 50 years through the global Red List developed by IUCN and its partners, there are still gaps in knowledge about the population status of most threatened species, especially plants and invertebrates.

Table 20 Conservation status of species in the MADIO Hotspot

Taxonomic group	Total species assessed	EX Species	EW Species	Species CR	Species EN	Species VU
Animals	5,715	101	0	259	569	489
Mammals	288	5	0	35	64	47
Birds	515	37	0	7	35	36
Reptiles	476	14	0	28	64	76
Amphibians	329	0	0	23	85	44
Fish	2,081	2	0	29	58	60
Insects	664	2	0	45	82	43
Malacostra	123	0	0	0	2	6
Arachnides	213	9	0	40	82	40
Diplopodes	166	3	0	32	26	9
Maxillopoda	2	1	0	0	0	0
Hexanauplia	2	1	0	0	0	1
Chilopoda	10	0	0	3	5	1
Mollusks	385	26	0	17	54	45
Cnidaires	384	0	0	0	8	76
Echinoderms	76	0	0	0	4	5
Nemertin	1	1	0	0	0	0
Plants	**5,063**	**3**	**2**	**621**	**1,462**	**944**
TOTAL	**10,778**	**104**	**2**	**880**	**2,031**	**1,433**

Source: IUCN (2021-3), downloaded on 27 June 2022.

The IUCN Red List is widely recognized as the most comprehensive and objective global approach to assessing the conservation status of plant, fungus and animal species. It provides information on the taxonomy, conservation status and distribution of plants, fungi and animals that have been assessed globally using the IUCN Red List Categories and Criteria.

5.1. Species Outcomes

The IUCN Red List is based on quantitative criteria to estimate the probability of extinction of each species. On the list, species classified as globally threatened have a high probability of extinction in the medium term. These are species in the categories of CR, EN and VU. There are a total of 4,344 species outcomes in the MADIO Hotspot, comprising 880 CR species, 2,031 EN species and 1,433 VU species (Table 20). Plants comprise 70 percent of the total, underlining the importance of the hotspot for the conservation of plant diversity.

5.1.1. Madagascar

Data on extinction risk comes from scientific publications, species recovery plans, National Biodiversity Strategies and Action Plans (NBSAP), reference documents, field guides, personal communications with researchers, specific work on certain taxa, such as the inventory of Important Plant Areas (IPAs) in Madagascar, and the International Biodiversity Assessment Tool (IBAT).

Species outcomes comprise those species that are globally threatened according to the IUCN Red List. As of December 2021, 3,058 globally threatened species had been identified for Madagascar, including marine as well as terrestrial and freshwater species. Based on the available data, the level of threat at the specific level appears very high, with nearly 18 percent of the threatened species critically endangered. In addition, 14 species have already been declared extinct or extinct in the wild (Table 21).

Birds

The Red List Index for Madagascan birds has shown a significant decrease since 1988, due to a number of species moving into higher threat categories from lower threat categories (ASITY Madagascar and BirdLife International, 2021). Loss of habitat due to deforestation is the most common threat. Two bird species are assessed as extinct: Alaotra grebe (*Tachybaptus rufolavatus*) and snail-eating coua (*Coua delalandei*). Two species are assessed as CR: Madagascar pochard (*Aythya innotata*) and Madagascar fish-eagle (*Haliaetus vociferoides*). A further 16 species are assessed as EN, belonging to various families such as the Vangidae (endemic to Madagascar and the Comoros), Anatidae and Rallidae. In total, 37 species of terrestrial and wetland birds are globally threatened (IBAT, 2022). The rainforests of eastern Madagascar have the highest number of globally threatened birds, including Madagascar snake-eagle (*Eutriorchis astur*, EN) and Madagascar red owl (*Tyto soumagnei*, EN). In the western part, Madagascar fish-eagle (*Haliaeetus vociferoides*, CR) is notable by its presence. The endemic birds of the island's wetlands are among the most threatened, due to the loss of habitat linked to the expansion of rice cultivation. The expansion of the SAPM since 2004 has helped secure some sites for globally threatened species with restricted distributions. However, 91 percent of Malagasy birds show a declining trend (IUCN, 2013).

Mammals

53 percent of the known mammals in Madagascar are threatened, including 36 CR species, 59 EN and 45 VU species. Primates are the most threatened and the need for conservation attention is further reinforced by the uniqueness of this group, as well as its exceptional endemism. Excluding one introduced species in the Comoros, the 99 species of lemurs (divided into 15 genera and five families) are all endemic to Madagascar.

Table 21 Summary table of species outcomes in Madagascar

Taxonomic group	Total species assessed	Total species outcomes (i.e., CR, EN & VU)	EX & EW	CR	EN	VU	NT	LC	DD
Actinopterygii	1,457	80	2	20	33	27	9	1,248	118
Amphibia	314	145	0	22	79	44	18	136	15
Anthozoa	342	66	0	0	3	63	105	151	20
Arachnida	7	2	0	1	0	1	0	5	0
Aves	279	37	2	2	16	19	20	220	0
Bivalvia	19	4	3	1	2	1	0	8	2
Cephalopoda	37	0	0	0	0	0	0	25	12
Chondrichthyes	72	36	0	7	9	20	13	10	13
Cycadopsida	1	0	0	0	0	0	0	1	0
Diplopoda	125	49	0	27	16	6	42	27	7
Gastropoda	159	31	0	4	18	9	3	110	14
Holothuroidea	64	8	0	0	4	4	0	22	34
Hydrozoa	5	0	0	0	0	0	0	5	0
Insecta	262	29	0	9	12	8	19	116	97
Jungermanniopsida	4	3	0	1	2	0	0	1	0
Liliopsida	874	508	1	160	226	122	43	295	27
Lycopodiopsida	5	1	0	0	1	0	0	4	0
Magnoliopsida	2,885	1763	0	242	872	649	132	936	47
Malacostraca	110	6	0	0	1	5	0	73	31
Mammalia	266	140	4	36	59	45	3	99	20
Maxillopoda	4	1	2	0	0	1	0	0	1
Pinopsida	8	5	0	1	4	0	2	0	1
Polypodiopsida	43	4	0	1	0	3	0	39	0
Reptilia	395	140	0	25	54	61	47	164	42
TOTAL	**7,737**	**3,058**	**14**	**559**	**1,411**	**1,088**	**456**	**3,695**	**501**

Source: IUCN Red List, accessed via IBAT on 8 March 2022.
Red List Categories: EX = Extinct; EW = Extinct in the Wild; CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; DD = Data Deficient.

Reptiles

Madagascar has an immense diversity of reptiles, with 395 species, of which 140 species are threatened: 25 CR; 54 EN; and 61 VU. The two terrestrial, endemic turtles are considered among the most threatened vertebrates in the world (Rhodin *et al.* 2011). Two snake species are likely extinct: *Pseudoxyrhopus ankafinaensis,* whose habitat is mid- to high-altitude upland rainforest, of which only a few remnants remain and the fragment where the species was found is no longer in existence (Raxworthy and Nussbaum 1994); and *Compsophis vinckei*, represented by only two individuals found in east-central Madagascar outside the SAPM (Jenkins *et al.* 2014).

Amphibians

Amphibian conservation status assessments were fairly comprehensive. More than 46 percent of the known amphibians in Madagascar are threatened, and therefore priorities for conservation, including 22 CR, 79 EN and 44 VU species. Six Alliance for Zero Extinction (AZE) sites in Madagascar have been identified due to the presence of CR amphibians.

Plants

Currently, 3,820 Malagasy plant species have been assessed for their risk of extinction and almost 60 percent of these species are placed in the threatened categories, including 405 CR, 1,105 EN and 774 VU species (IUCN 2022). The situation is very worrying for some taxa, such as orchids or palms.

To date, Red List assessments have focused on priority plant groups such as trees, which were assessed under Botanic Gardens Conservation International's (BCGI's) Global Tree Assessment program[14]. Approximately 3,118 tree species are found in Madagascar, of which 2,904 are endemic and 1,828 are considered threatened, including 320 CR, 911 EN and 597 VU species. The main threats to trees in Madagascar are illegal logging, with impacts on 83 percent of Madagascar's endemic trees (Beech *et al.* 2021).

Another important plant group is aquatic plants, whose Red List assessment results were used to define freshwater KBAs. Of the 169 species assessed for the IUCN Red List, 133 (79 percent) are globally threatened, including 34 CR, 75 EN and 24 VU species. Wetlands are one of the most fragile and threatened ecosystems in Madagascar. Pressures and threats to aquatic plants can be anthropogenic or natural. Anthropogenic activities, such as agriculture, land reclamation, illegal collection, fires and urbanization, contribute to the degradation of wetlands and their flora (Balmford *et al*. 2017, Maharombaka *et al*. 2017). In addition, natural events, such as cyclones and drought, which are exacerbated by climate change, and invasion by exotic species are also major threats to freshwater plant species.

5.1.2. Comoros

The IUCN has identified 157 species in its Red List of Threatened Species including terrestrial, freshwater and marine species (Table 22). Generally speaking, the most serious threat to the conservation of Comorian fauna and flora, especially those endemic or threatened, is the destruction of their habitats. However, other threats exist, such as exploitation for food, commercial export and souvenir collection. In Comoros, no species has become extinct in recent centuries. However, there are 10 CR species belonging to five taxonomic groups, including coelacanth, which occurs in marine caves off the south of Grande Comore, where about 400 individuals have been counted. Other CR species include *Ravenea moorei*, a large palm of high-altitude rainforests.

Table 22 Summary table of species outcomes in the Comoros

Taxonomic group	CR	EN	VU	Total species outcomes
Plants	2	8	6	16
Mammals	2	2	4	8
Birds	0	13	3	16
Reptiles	1	1	7	9
Amphibians	0	0	0	0
Fishes	4	12	14	30
Invertebrates	1	10	67	78
TOTAL	**10**	**46**	**101**	**157**

Source: IUCN (2021-3).

14 https://www.bgci.org/our-work/projects-and-case-studies/global-tree-assessment/

Only a few species are legally protected in the Comoros, namely coelacanth, marine turtles, lemurs, shells and corals. The existing hunting, fishing and logging laws date from the colonial period and all of them are in need of revision.

5.1.3. Mauritius

The Republic of Mauritius has two of the most ecologically devastated islands in the world, with approximately less than 1.3 percent good forest cover remaining on the island of Mauritius (Hammond *et al.* 2015) and none on Rodrigues. Past deforestation, overexploitation, invasion by exotic species, and fire have resulted in high rates of extinction (Hammond *et al.* 2015, Norder *et al.* 2017). Although many species are not yet on the official IUCN Red List, the percentage of species considered threatened by IUCN is relatively well known for the different groups, based on distribution data and threats. Today, the majority of island endemic species are threatened (Table 23). For example, Mauritius has one of the highest concentrations of threatened bird species in the world (Safford 2001). The Republic of Mauritius also has one of the most threatened island floras in the world (Walter and Gillet 1998), with approximately 80 percent of the endemic flora of Mauritius and Rodrigues considered threatened (Baider *et al*. 2010).

Table 23 Summary table of species outcomes in the Republic of Mauritius

Taxonomic group	Distribution	Extant endemic species	Extinct in the wild (EW)	CR	EN	VU	Total species outcomes
Angiosperms	Endemic to Mauritius	281	18 (including E(W) species)	13	4	1	18
	Endemic to Rodrigues	33	18 (including E(W) species)	11	3	0	14
Mammals	Endemic to Rodrigues & Mauritius	4	1	0	1	2	3
Land birds	Endemic to Mauritius	9	12	1	2	4	7
Reptiles	Endemic to Mauritius	11	5	0	4	2	6
Butterflies	Endemic to Mauritius	4	0	0	0	0	0
Mollusks	Endemic to Mauritius	53	0	0	4	2	6
Mollusks	Endemic to Rodrigues	8	0	0	4	1	5

Mammals

Endemic to Mauritius and Réunion, greater Mascarene flying-fox (*Pteropus niger*) has been legally protected in Mauritius since the early 1980s. The species plays a disproportionately important key ecological role as the largest surviving frugivore on the island (Hansen and Galetti 2009, Florens *et al*. 2017, Albert *et al*. 2021), being the only surviving animal capable of dispersing the seeds of a number of native plant species. The species was downlisted from EN (Florens 2012) to VU (Hutson and Racey 2013), based on population and roost site increases but has reverted to EN following mass culls since 2015 (Kingston *et al.* 2018). This initial downlisting was attributed to population increases due to the absence of a major cyclone in the previous decade. However, the species has remained threatened due to the continued decline in the extent and quality of good native forest cover (Florens 2008, Florens *et al.* 2012) and because the species is highly vulnerable to stochastic events such as cyclones and official culling programs (Kingston *et al.* 2018), which are supported by local fruit growers and the majority of the Mauritian population, who perceive the species as a pest.

Endemic to the islands of Mauritius and Rodrigues, Rodrigues flying-fox (*Pteropus rodricensis*) is the smallest living fruit bat in the Mascarene islands and currently survives only on Rodrigues. The species has been selected one of the seven wonders of the AZE campaign. The main roosting sites are outside of the protected areas.

Birds

Although Mauritius is relatively poor in species numbers, it has a large proportion of endemic taxa, almost all of which are threatened. The island of Mauritius has one of the highest concentrations of threatened bird species in the world (Safford 2001). All endemic threatened species are restricted-range species and belong to the Mauritius Endemic Bird Area, which covers the entire island. Rodrigues warbler and Rodrigues fody are both considered as Near Threatened by IUCN and belong to the Rodrigues Endemic Bird Area.

More recently, increased and successful attention has been given to two of the most threatened endemic passerines: Mauritius fody (*Foudia rubra*) and Mauritius olive white-eye (*Zosterops chloronothos*) (Jones 2008). Other land bird species, such as Mauritius cuckooshrike (*Coracina typica*) and Mauritius bulbul (*Hypsipetes olivaceus*) are threatened by alien invasive species, as well as by habitat degradation.

Reptiles

In the Republic of Mauritius, seven endemic reptile species are restricted to remaining populations on offshore islets, with some surviving on single islets. To rebuild the reptile community on the islets, conservation programs have been initiated since 2006 through the Mauritius Reptile Recovery Programme, a partnership among Durrell Wildlife Conservation Trust, Mauritius Wildlife Foundation and the National Park and Conservation Service.

A total of six endemic reptile species were re-established on the islets where they had been extirpated, increasing their abundance and distribution. These species are Telfair's skink (*Leiolopisma telfairii*), Gunther's gecko (*Phelsuma guentheri*), Round Island boa (*Casarea dusumieri*), Bojer's skink (*Gongylomorphus bojeri*), small nocturnal gecko (*Nactus coindemirensis*), and orange-tailed skink (*Gongylomorphus* cf *fontenayi*).

Telfair's skink and Gunther's gecko, which were only found on Round Island, have been reintroduced on Coin de Mire and Ile aux Aigrettes. The current population of Telfair's skink is estimated at about 56,202 individuals Cole *et al.* (2018), and that of Gunther's gecko at about 2,347 individuals.

Bojer's skink from Vacoas Island has been reintroduced on Ile aux Fouquets and Ile de la Passe, and the small nocturnal gecko (*Nactus coindemirensis*) from Vacoas Island to Marianas Island (Cole *et al.* 2021). Bojer's skink is currently found on Round Island, Pigeon Rock, Gabriel and Gunners Quoin Islands, Serpent Island, Vacoas Islet, Ile aux Fouquets, and Ile de la Passe and its population is estimated at 128,996 individuals.

Round Island burrowing boa (*Bolyeria multocarinata*), restricted to Round Island, was reintroduced to Coin de Mire in 2012, and an increase in abundance and distribution of this species was noted on the island following this intervention. The population on Ile Ronde and Coin de Mire is estimated at 1,818 individuals (Cole *et al.* 2021a).

Gongylomorphus fontenayi is a reptile endemic to Mauritius. There are two forms, the highland Macchabé skink and the lowland orange-tailed skink. Macchabé skink is restricted to the humid highland region of the Black River Gorges National Park in the southwest of the island (Cole 2021). The range of the species in the Black River Gorges National Park is considered to be declining, as it is mainly restricted to native vegetation that is degraded by the invasion of non-native plants, particularly Chinese guava *Psidium cattleyanum*.

Orange-tailed skink was only known naturally from Plate Island (2.5 km^2) after being discovered in 1995. Although orange-tailed skink is treated as a separate management unit, it has not yet been formally identified and is currently considered to be a variant of *G. fontenayi*. Plate Island's orange-tailed skink population (estimated at 25,000 individuals) disappeared in 2011, 15 months after shrews, an invasive predator of small reptiles, were detected on the island (Cole 2021). Skinks were reintroduced on Coin de Mire (where Gabriel island is located) to save the population and prevent extinction. The population has increased considerably on Coin de Mire and the species is now established there but few skinks have been detected on Gabriel island.

Invertebrates

Forty species of butterflies have been recorded in Mauritius, 10 are non-resident, rare or even extinct. The remaining 30 species are common in Mauritius. In total, 25 species are widespread in Africa and elsewhere, and seven are endemic to the Mascarene islands (Williams 2007). Twelve species of butterflies have been recorded on Rodrigues and five on Agaléga.

Several new species of land snails have been described in recent decades (Griffiths and Florens 2004) but they are mostly extinct. There are a few rare cases where land snail species presumed extinct have been relocated (Florens and Baider 2007), although the populations of these species are small and, therefore, highly threatened.

Plants

A preliminary IUCN red list compiled in 2005-2006 for about 50 percent of the higher plant taxa on the island of Mauritius showed that 95.5 percent of the 353 taxa would be considered threatened, but these included species and subspecies and varieties endemic to the Mascarenes (Atkinson and NTPTC 2007). When only island endemics are listed, the percentage of threatened species was less than 82 percent in 2014 (Baider and Florens, unpublished data). Nevertheless, nearly 20 percent of critically endangered species had fewer than 10 known individuals in the wild (17-18 taxa), some of which had only one plant left. In 2016-2017, as part of the IUCN Mascarene Islands Plant Specialist Group, the endemic plants of Mauritius were reassessed in collaboration between Mauritian Wildlife Foundation (MWF), National Parks and Conservation Services (NPCS), and the Mauritius Forestry and Herbarium Service. An unpublished assessment of the work is available, which shows a decline in the status of plants in Mauritius, despite some conservation actions.

Fortunately, on average, one native taxon that had not been seen for over a century and was thought to be extinct was rediscovered per year in the last decade. These taxa include critically endangered species, such as the endemic *Trochetia parviflora* (Florens *et al.* 2001), the endemic *Pandanus iceryi* and *P.* cf. *macrostigma* (NWFS 2005), the endemic *Dicliptera falcata* (Florens and Baider unpublished data), the endemic *Ficus densifolia* (Florens and Baider 2006), the endemic *Badula ovalifolia* (Florens *et al.* 2008), the endemic *Ixora vaughanii* (Baider and Florens 2011), the endemic *Pandanus pyramidalis* and the native *Nervilia bicarinata* (Baider and Florens 2011), among others. In addition, new records of native species are being made (Roberts *et al.* 2004, Baider *et al.* 2012) and new species are being discovered and described (Bosser and Guého 2002, Le Péchon *et al.* 2011, Pailler and Baider 2012, Baider and Florens 2013). Many of these are considered critically endangered and are not propagated *ex situ*.

Recent quantitative surveys indicate that the remaining number of individuals of some endemic species is higher than previously thought, although they remain critically endangered, for example *Chasalia grandiflora* and *C. lanceolata* (Baider and Florens 2011), *Pandanus pseudomontanus*, *Elaeocarpus bojeri* and *Tetrataxis salicifolia* (Florens and Baider, unpublished data), and *Roussea simplex*. In very few cases, improved knowledge has improved the overall conservation status of species, such as *Sideroxylon grandiflorum* (Florens and Baider 2006), including the relocation of species thought to be extinct in the wild, such as *Dombeya mauritiana*.

The percentage of threatened species for Rodrigues is similar to that for Mauritius, as was the case in the previous ecosystem profile (CEPF 2014). However, proportionally more species are known to be extinct. Unlike Mauritius, no presumed extinct species have been rediscovered, mainly because there are almost no remnants of native vegetation that have not been studied. On the other hand, many rocky valleys (cascades) are dangerous to survey and a number of plants are very small (*Hypoestes inconspicua*, *H. rodriguesiana* and *Ramphogyne rhynchocarpa*) and would be difficult to detect. In addition, relatively fewer new species have been described, with *Cynanchum guehoi* (Bosser and Marais 2005) a rare example. The percentage of endemic species with fewer than 10 individuals in the wild is higher on Rodrigues (about 37 percent) than on Mauritius, which has two such species: *Ramosmania rodriguesii* (Strahm 1989) although there has been great progress in cultivation and reintroduction to reserves; and *Dombeya rodriguesiana* (Tatayah *et al.* 2021) known from a single individual in the wild and not reproducing naturally.

Some of the wild-extinct Mauritian endemics, such as *Cylindrocline lorencei,* have been successfully propagated abroad in France (Conservatoire Botanique de Brest), the United Kingdom (Royal Botanic Gardens, Kew) and in France (Conservatoire Botanique de Brest). Some individuals have been repatriated, although effective reintroduction into the wild is still being attempted. The same is true for *Dombeya rodriguesiana* (Tatayah *et al.* 2021), which is functionally extinct in the wild. In contrast, *Ramosmania heterophylla*, an endemic relative of Rodrigues coffee is on a better trajectory. Once considered extinct, the species is now cultivated in Rodrigues and Mauritius, as well as in a few other botanical gardens, including Royal Botanic Gardens, Kew. The National Tropical Botanical Garden of Hawaii also has a number of endangered species from both islands in its collection.

5.1.4. Seychelles

Approximately 476 terrestrial species are considered globally threatened in the Seychelles. The list includes 61 plants and 415 animals (Table 24).

Table 24 Summary table of species outcomes in the Seychelles

Taxonomic group	Extinct in the wild	CR	EN	VU	Total species outcomes
Plants	2	17	13	31	61
Invertebrates	16	76	133	114	323
Fish	0	7	14	27	48
Amphibians	0	2	4	0	6
Reptiles	1	2	6	4	12
Birds	3	2	6	11	19
Mammals	0	1	2	4	7
TOTAL	**22**	**107**	**178**	**191**	**476**

Source: IUCN Red List 2022-1.

At least 22 endemic species have become extinct since 1900, including two vascular plants, 16 terrestrial/freshwater invertebrates (snails), one reptile (*Pelusios seychellensis*) and three bird species (Aldabra brush warbler, Seychelles yellow white-eye and Seychelles parakeet). Between one and three additional reptile species (Seychelles giant tortoises and granitic island crocodiles) are known to have disappeared in the early 19^{th} century, as well as several other bird or reptile species before they could be described, after humans and rats (probably brought by early navigators) had colonized most of the islands in the 18^{th} century. In addition, six other native plant species, some with subspecies endemic to Seychelles, appear to have become extinct in Seychelles (Senterre *et al.* 2013) but, because they continue to exist in other places, they cannot be considered globally extinct.

Fourteen vertebrates are critically endangered, including Seychelles sheath-tailed bat, locally known as the banana bat, considered the rarest bat in the world, with around 60 individuals surviving in 5 to 6 caves on Mahé and Silhouette islands. Other CR species include Thomasset's frog (*Sooglossus thomasseti*) and Seychelles palm frog (*S. pipilodryas*), whose distributions are restricted to the peaks of Mahé and/or Silhouette island. Two rare turtles described as endemic forms (now questioned by genetic studies), *Pelusios castanoides intergularis* and *P. subniger parietalis,* have sometimes been designated as CR but only at the subspecies level.

There are about 76 CR species of terrestrial and freshwater invertebrates known to date (a minimum, knowing that many invertebrate species are yet to be described), among which are several endemic snails: *Pachnodus oxoniensis*; *Conturbatia crenata*; *Dupontia levensonia*; *Glabrennea silhouettensis*; and *G. thomassetti*. On Aldabra, the endemic snail *Rachistia aldabrae*, declared extinct in 2007 because it had not been found for about a century, was rediscovered in 2015 (SIF, pers. comm.).

There are also 17 CR plant species, including: *Medusagyne oppositifolia* and *Vateriopsis sechellarum,* each of which is only known from a handful of mature trees; *Rothmania annae* found in the wild only on Aride island; *Gastonia sechellarum* var. *contracta* and *G. s.* var. *curiosae*; *Impatiens gordonii*; and *Drypetes reseleyi*.

Endangered species include two endemic bird species: Seychelles magpie-robin (*Copsychus sechellarum*) of which there are about 350 individuals on five islands with an increasing population; and Aldabra fody (*Foudia aldabrana*). They also include two birds endemic to the western Indian Ocean, namely Malagasy pond heron (*Ardeola idae*) and Malagasy sacred ibis (*Threskiornis bernieri*).

Endangered species also include five endemic reptiles: Seychelles chameleon (*Archaius tigris*), found on Mahé and Praslin; a new species of *Archaius* chameleon, recently identified from Praslin (Raxworthy *et al.* in prep.); Seychelles wolf snake (*Lycognathophis seychellensis*); Seychelles house snake (*Lamprophis geometricus*); and Vesey-Fitzgerald's and Brauer's burrowing skinks (*Janetaescincus veseyfitzgeraldi* and *J. braueri*). There are also four endemic amphibians assessed as EN: Gardiner's frog (*Sechellophryne gardinieri*); Seychelles frog (*S. sechellensis*); Mahé caecilian (*Grandisonia brevis*); and Cooper's black caecilian (*Praslinia cooperi*).

A total of 133 threatened terrestrial and freshwater invertebrates include species such as the endemic snails *Stylodonta studeriana* and *Pachnodus fregatensis*, the butterfly *Euploea mitra* and the damselfly *Allolestes maclachlani*. Threatened vascular plants (13) include the emblematic *Colea seychellarum, Glionetia sericea* and coco-de-mer (*Lodoicea maldivica*).

Vulnerable species include:

- A bat (*Mops pusillus)*.
- Eleven bird species, including: Seychelles paradise-flycatcher (*Terpsiphone corvina*), which has populations of 350-506 individuals on La Digue island (2020), 84 birds on Denis island as of 2019 (introduced in 2008) and 26 birds on Curieuse island

(reintroduced in 2018); Seychelles kestrel (*Falco araea*), numbering c.430 pairs; Seychelles swiftlet (*Aerodramus elaphrus*), with only three known breeding caves; Seychelles white-eye (*Zosterops modestus*), with c.500-600 individuals on four islands; and Seychelles black parrot (*Coracopsis barklyi*), with 500-900 individuals on a single island (Reuleux *et al*. 2013).

- Four reptiles: Aldabra giant tortoise, with c.100,000 individuals on Aldabra plus numerous small translocated populations, all threatened by climate change; Wright's skink (*Trachylepis wrightii*); leatherback turtle and Aldabra snake-eyed skink (*Cryptoblepharus aldabrae*).
- Thirty-one vascular plants, including three endemic palms, as well as rare endemic species such as *Gastonia crassa*, *Brexia madagascariensis*, *Canthium carinatum*, *Psychotria pervillei*, *Tarenna sechellensis*, *Allophyllus sechellensis* and *Pandanus balfouri*.
- One-hundred-and-fourteen invertebrates, including snail species such as *Stylodonta unidentata*, *Pachnodus praslinus* and *Silhouettia silhouettae*. It should be noted that the lack of data on abundance and population trends severely limits the ability to conduct Red List assessments for invertebrates, and it is likely that the list of threatened invertebrates would be much longer if more surveys and taxonomic work could be conducted.

Seychelles warbler (*Acrocephalus sechellensis*), once considered CR with only 29 surviving birds on Cousin island, has been progressively downlisted to NT and now has a population of over 3,000 individuals on five islands. Similarly, Seychelles fody (*Foudia sechellarum*), with a population of over 2,300 individuals on five islands, has been downlisted from VU to NT[15] .

Finally, a minimum of 131 marine species are considered globally threatened in the Seychelles, according to the IUCN Red List for 2022. They include 97 VU species, 26 EN species and eight CR species. The majority of these threatened species are corals (60 species, all VU, except for two EN species) or fishes (48 species, including 17 sharks). Other globally threatened marine species include nine sea urchins (four EN and five VU), four marine mammals (one EN and three VU), and three marine turtles (one CR, one EN and one VU). However, these statistics need to be updated. Indeed, additional research is needed to compile a complete list of the threatened marine biodiversity of the Seychelles, as there is currently no authoritative compendium. Existing search engine formats do not facilitate this type of geographically focused search and research documents/reports are held in various agencies, often overseas.

5.2. Site Outcomes

Many species are best conserved through the protection of a network of sites at which they occur. For CEPF, site outcomes are defined as Key Biodiversity Areas (KBAs): sites that contribute significantly to the global persistence of biodiversity. KBAs are identified for individual elements of biodiversity, such as globally threatened species or ecosystems. Multiple approaches have been used by conservation organizations to identify such sites, and these were consolidated into a single methodology by IUCN, resulting in the *Global Standard for the Identification of Key Biodiversity Areas* (IUCN 2016). Most of the KBAs in the MADIO Hotspot were identified prior to the adoption of this global standard, however.

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[15] Note: An additional number of species were considered for identifying KBAs and these species are named "species, of conservation concern" by Senterre *et al*. (2013). Of a total of 1,045 species of concern classified in various rarity categories, most are endemic to Seychelles (73 percent). Species considered "rare" (618 species) represent 59 percent of all recorded species of concern and 18 percent of the total estimated number of native species among the groups included in the KBA study. Of these rare species, 488 (80 percent) are endemic and 60 (10 percent) are highly threatened (IUCN categories EX, CR, EN).

A total of 329 KBAs have been identified in Madagascar and the Indian Ocean islands, covering a combined area of 9.6 million hectares (Table 25). This area comprises 7.1 million hectares of terrestrial and freshwater ecosystems plus 2.5 million hectares of marine ecosystems. The country with the most KBAs is Madagascar, which accounts for 71 percent of the total number and 95 percent of the total area.

Table 25 Site outcomes in the MADIO Hotspot by country

	Madagascar	**Comoros**	**Mauritius**	**Seychelles**	**TOTAL**
Updated number of KBAs	235	20	17	57	**329**
Land area (ha)	6,872,323	36,500	37,853.4	192,838.2	**7,139,514.6**
Marine area (ha)	2,285,924	149,452.9	43,793.7	11,779.8	**2,490,950.4**
Total area (ha)	9,158,307	185,952.9	81,647.1	204,617.9	**9,630,524.9**

5.2.1. Madagascar

Key Biodiversity Areas in Madagascar

The 2014 ecosystem profile identified 212 KBAs in Madagascar. However, the criteria for identifying KBAs varied from institution to institution and from initiative to initiative. The lack of harmony between the different approaches sometimes made it difficult to assess the objectivity, transparency and rigor of their identification. It was for this reason that a global KBA standard was developed and published by IUCN in 2016, to consolidate the criteria and methodology for identifying key areas for KBA as sites that contribute significantly to the global persistence of biodiversity.

In 2018, the new global standard was applied in Madagascar for the first time, for the identification of KBAs in freshwater ecosystems, under the leadership of the IUCN Freshwater Biodiversity Unit, in partnership with local and international experts. The exercise resulted in the identification of 23 new freshwater KBAs in river, lake and marsh systems. Most of these are located in the northwestern freshwater ecoregion or the eastern highlands of Madagascar (Figure 3). With the addition of these 23 new freshwater KBAs, the number of KBAs in Madagascar has increased to 235 (Figure 4 and Table 27).

Alliance for Zero Extinction sites in Madagascar

Started in 2005, the AZE is a global initiative that aims to identify and protect sites that are the last remaining refuges of one or more CR or EN species (https://zeroextinction.org/). Madagascar currently has 55 confirmed AZE sites and 13 candidate sites, where AZE status has been proposed for taxa not comprehensively assessed (Figure 5). Of the confirmed AZE sites, all but seven are the focus of conservation actions (Table 26). AZE sites are threatened by logging, mining, petroleum development, and other development projects.

Table 26 Conservation actions in AZE sites in Madagascar

Status of AZE site	**Number of sites**	**With conservation actions**	**Without conservation actions**
Confirmed	55	48	7
Candidates	13	6	7
TOTAL	**68**	**54**	**14**

Of the candidate sites, six have protected area status and conservation actions are underway. For example, in 2018, conservation actions were initiated at the candidate sites in Tsitongambarika forest. During this update of the ecosystem profile, AZE sites were overlaid with the KBAs. Based on available data, 57 KBAs overlap with AZEs, of which 10 are freshwater KBAs identified in 2018.

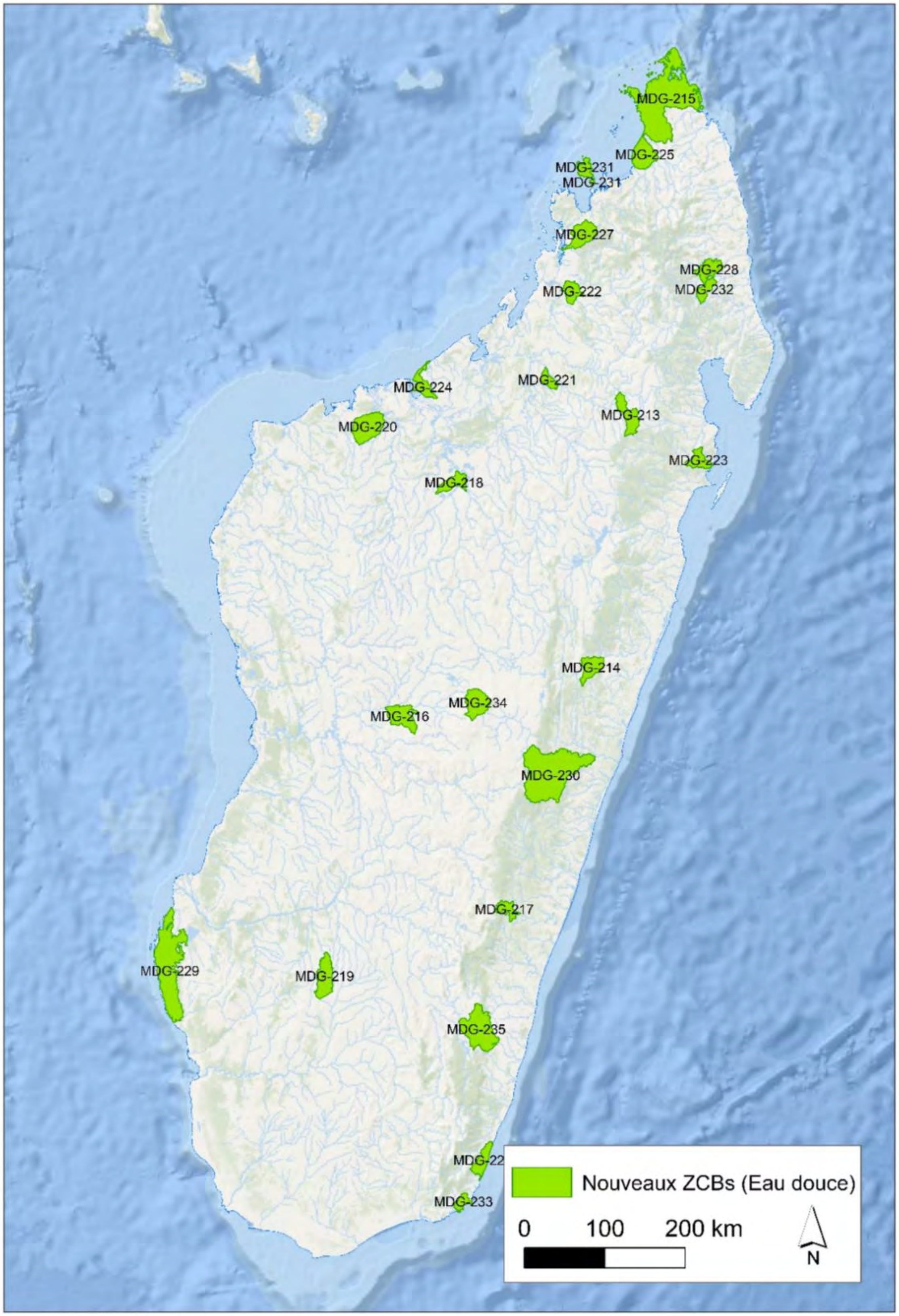

Figure 3 New freshwater KBAs in Madagascar identified in 2018

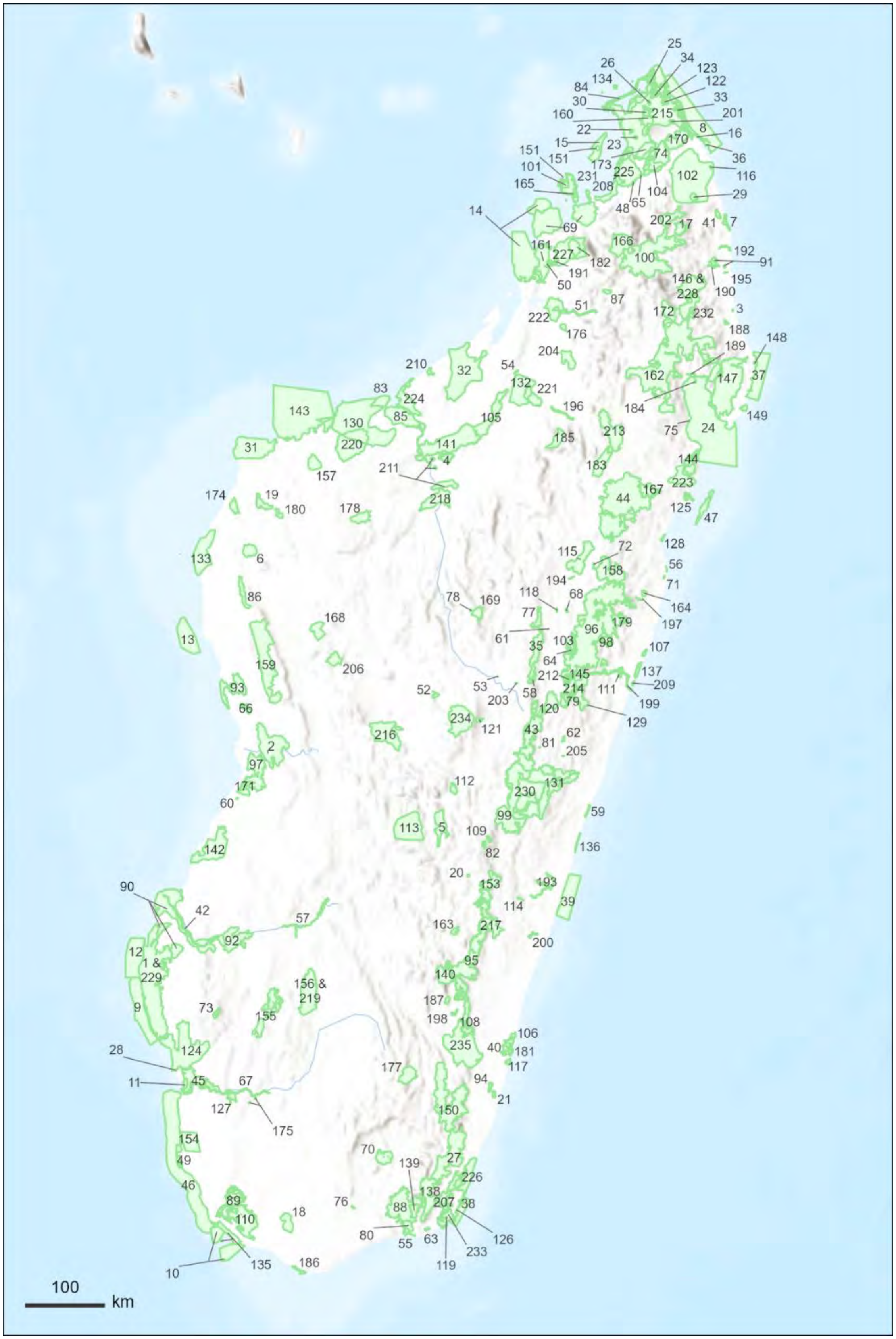

Figure 4 KBAs in Madagascar updated in 2022

Table 27 List of KBAs in Madagascar

KBA code	KBA name (French)	KBA name (English)
MDG-1	Parc National de Mikea	Mikea National Park
MDG-2	Ambalibe Menabe	Ambalibe Menabe
MDG-3	Ambanitazana (Antsiranana)	Ambanitazana (Antsiranana)
MDG-4	Ambato-Boeny	Ambato-Boeny
MDG-5	Ambatofinandrahana	Ambatofinandrahana
MDG-6	Ambereny	Ambereny
MDG-7	Ambondrobe (Vohémar)	Ambondrobe (Vohemar)
MDG-8	Baie d'Ambodivahibe	Ambodivahibe Bay
MDG-9	Baie de Salary	Salary Bay
MDG-10	Nosy Ve Androka	Nosy Ve Androka
MDG-11	Tsinjoriake-Andatabo	Tsinjoriake-Andatabo
MDG-12	Velondriake	Velondriake
MDG-13	Iles Barren	Barren Islands
MDG-14	Iranja-Ankazoberavina-Baie des Russes	Iranja-Ankazoberavina-Russian Bay
MDG-15	Archipel Mitsio	Mitsio Archipelago
MDG-16	Ambompofofo	Ambompofofo
MDG-17	Andravory (Andrafainkona)	Andravory (Andrafainkona)
MDG-18	Anena (Beloha)	Anena (Beloha)
MDG-19	Angodoka-Ambakoa (Besalampy)	Angodoka-Ambakoa (Besalampy)
MDG-20	Ankafina (Ambohimahasoa)	Ankafina (Ambohimasoa)
MDG-21	Ankaraobolava-Agnakatriky	Ankarabolava-Agnakatriky
MDG-22	Antanifotsy Nord (Diana)	Antanifotsy North (Diana)
MDG-23	Antanifotsy Sud (Diana)	Antanifotsy South (Diana)
MDG-24	Baie d'Antongil	Antongil Bay
MDG-25	Baie de Diego	Diego Bay
MDG-26	Parc National de Montagne d’Ambre - Parcelle II	Montagne d’Ambre National Park - Section II
MDG-27	Beampingaratsy (Corridor Midongy du Sud-Andohahela)	Beampingaratsy (South Midongy-Andohahela Corridor)
MDG-28	Belalanda	Belalanda
MDG-29	Bobakindro (Salafaina)	Bobakindro (Salafaina)
MDG-30	Cap d'Ambre	Cap d'Ambre
MDG-31	Cap Saint André	Cap Saint André
MDG-32	Complexe de la Baie de Mahajamba - Anjajavy	Mahajamba Bay - Anjavavy Complex
MDG-33	Complexe de la Baie de Rigny (Antsiranana)	Rigny Bay Complex (Antsiranana)
MDG-34	Complexe des Trois baies	Three Bays Complex
MDG-35	Corridor Anjozorobe Angavo-Tsinjoarivo	Anjozorobe-Angavo-Tsinjoarivo Corridor
MDG-36	Zone Côtière Est d'Antsiranana	Coastal Area East of Antsiranana
MDG-37	Zone Côtière Antalaha-Mahavelona	Coastal Area Antalaha-Mahavelona
MDG-38	Zone Côtière de Lokaro	Lokaro Coastal Area
MDG-39	Côte de Mananjary	Mananjary Coast
MDG-40	Efatsy (Farafangana)	Efatsy (Farafangana)
MDG-41	Fanambana (Vohémar)	Fanambana (Vohemar)
MDG-42	Rivière Mangoky	Mangoky River
MDG-43	Forêt Classée Onive	Onive Classified Forest
MDG-44	Forêt Classée Bidia-Bezavona	Bidia-Bezavona Classified Forest
MDG-45	Forêt Saint Augustin	Saint Augustin Forest
MDG-46	Grand Récif de Toliary	Toliary Great Reef
MDG-47	Ile Sainte Marie (Ambohidena)	Sainte-Marie Island (Ambohidena)
MDG-48	Ilevika (Matsaborilava)	Ilevika (Matsaborilava)
MDG-49	Ouest Itampolo - Mahafaly	West Itampolo - Mahafaly
MDG-50	Lac Andranomalaza (Maromandia)	Lake Andranomalaza (Maromandia)
MDG-51	Lac Andrapongy et Rivière Anjingo	Lake Andrapongy and Anjingo River
MDG-52	Lac Itasy	Lake Itasy
MDG-53	Lac Tsarasaotra	Lake Tsarasaotra
MDG-54	Lac Tseny	Lake Tseny
MDG-55	Lacs Anony et Erombo	Lakes Anony and Erombo
MDG-56	Mahatsara (Mahambo Foulpointe)	Mahatsara (Mahambo Foulpointe)
MDG-57	Makay	Makay
MDG-58	Mandraka	Mandraka

KBA code	KBA name (French)	KBA name (English)
MDG-59	Nankinana (Ambodibonara-Masomeloka)	Nankinana (Ambodibonara-Masomeloka)
MDG-60	Allée des Baobabs	Avenue of the Baobabs
MDG-61	Ambakoana/Analabe	Ambakoana/Analabe
MDG-62	Ambatofotsy (Anosibe An'Ala)	Ambatofotsy (Anosibe An'Ala)
MDG-63	Réserve Spéciale d'Ambatotsirongorongo	Special Reserve of Ambatotsirongorongo
MDG-64	Ambohidray	Ambohidray
MDG-65	Ambohipiraka	Ambohipiraka
MDG-66	Ambondrombe (Belo sur Tsiribihina)	Ambondrombe (Belo on Tsiribihina)
MDG-67	Amoron'i Onilahy et Rivière Onilahy	Amoron'i Onilahy and Onilahy River
MDG-68	Ampananganandehibe-Beasina (Andilanatoby)	Ampananganandehibe-Beasina (Andilanatoby)
MDG-69	Ampasindava/Baie de Rigny (Est)	Ampasindava/Rigny Bay (East)
MDG-70	Vohidava-Betsimalaho (Anosy)	Vohidava-Betsimalaho (Anosy)
MDG-71	Réserve Spéciale d'Analalava	Analalava Special Reserve
MDG-72	Analalava-Analabe-Betanantanana (Ambatosoratra)	Analalava-Analabe-Betanantanana (Ambatosoratra)
MDG-73	Analavelona	Analavelona
MDG-74	Paysage Harmonieux Protégé d'Andrafiamena Andavakoera	Protected Harmonious Landscape of Andrafiamena Andavakoera
MDG-75	Andreba	Andreba
MDG-76	Angavo Androy	Angavo Androy
MDG-77	Complexe Anjozorobe - Angavo	Anjozorobe - Angavo Complex
MDG-78	Ankafobe	Ankafobe
MDG-79	Ankeniheny-Lakato	Ankeniheny-Lakato
MDG-80	Paysage Harmonieux Protégé d'Ankodida	Protected Harmonious Landscape of Ankodida
MDG-81	Ankorabe (Antadonkomby)	Ankorabe (Antadonkomby)
MDG-82	Antoetra Ampadirana (Fohisokina)	Antoetra Ampadirana (Fohisokina)
MDG-83	Antrema	Antrema
MDG-84	Archipel Cap Anorontany	Cap Anorontany Archipelago
MDG-85	Aire Protégée de Bombetoka Beloboka et Zones humides Marovoay (Rivières Betsiboka-Tsiribihina)	Bombetoka Beloboka Protected Area and Marovoay Wetlands (Betsiboka-Tsiribihina Rivers)
MDG-86	Paysage Harmonieux Protégé de Beanka	Protected Harmonious Landscape of Beanka
MDG-87	Bemanevika (Zones humides Ankaizina)	Bemanevika (Ankaizina wetlands)
MDG-88	Complexe d'Ifotaky	Ifotaky Complex
MDG-89	Complexe Forestier du Plateau Mahafaly	Mahafaly Plateau Forest Complex
MDG-90	Complexe du Lac Ihotry - Delta Mangoky	Lake Ihotry - Mangoky Delta Complex
MDG-91	Complexe de Makirovana-Ambatobiribiry-Anjombolava-Tsihomanaomby	Makirovana-Ambatobiribiry-Anjombolava-Tsihomanaomby Complex
MDG-92	Complexe Forestier de Mangoky-Ankazoabo	Mangoky-Ankazoabo Complex
MDG-93	Complexe Zone Humide de Manambolomaty - Forêt Classée de Tsimembo - Zone Humide de Bemamba	Manambolomaty Wetland - Tsimembo Classified Forest - Bemamba Wetland Complex
MDG-94	Complexe de Vohipaho	Vohipaho Complex
MDG-95	Corridor Ambositra-Vondrozo	Ambositra-Vondrozo Corridor
MDG-96	Ankeniheny-Zahamena	Ankeniheny-Zahamena Corridor
MDG-97	Corridor Menabe-Antimena/ Kirindy-Ambadira/Haute Tsiribihana et Tsiribihana	Corridor Menabe-Antimena/ Kirindy-Ambadira/Upper Tsiribihana and Tsiribihana
MDG-98	Corridor Forestier Analamay-Mantadia	Analamay-Mantadia Forest Corridor
MDG-99	Corridor Forestier de Fandriana - Parc National de Marolambo	Forest Corridor Fandriana - Marolambo National Park
MDG-100	Corridor Tsaratanàna-Marojejy	Tsaratanana-Marojejy Corridor
MDG-101	Cratère de Nosy Be (Lac Mont Passot)	Nosy Be Crater (Lake Mont Passot)
MDG-102	Daraina-Loky Manambato	Daraina-Loky Manambato
MDG-103	Fierenana	Fierenana

KBA code	KBA name (French)	KBA name (English)
MDG-104	Forêt Classée Andavakoera du Paysage Harmonieux Protégé d'Andrafiamena-Andavakoera	Andavakoera Classified Forest of the Protected Harmonious Landscape of Andrafiamena-Andavakoera
MDG-105	Paysage Harmonieux Protégé du Corridor Forestier Bongolava	Protected Harmonious Landscape of the Bongolava Forest Corridor
MDG-106	Forêt classée Manombo	Manombo Classified Forest
MDG-107	Forêt classée Vohibola	Vohibola Classifed Forest
MDG-108	Forêt classée Vondrozo et extension (Sud du Paysage Harmonieux Protégé du Corridor Forestier Ambositra-Vondrozo)	Vondrozo Classified Forest and Extension (South of the Protected Harmonious Landscape of Ambositra-Vondrozo Forest Corridor)
MDG-109	Forêt classée Zafimaniry	Zafimaniry Classified Forest
MDG-110	Forêt Menarandra/Vohidefo	Menarandra Forest/Vohidefo
MDG-111	Forêt Sahafina (Anivorano-Brickaville)	Sahafina Forest (Anivorano-Brickaville)
MDG-112	Paysage Harmonieux Protégé du Massif d'Ibity	Protected Harmonious Landscape of the Ibity Massif
MDG-113	Paysage Harmonieux Protégé du Massif d'Itremo et corridor	Protected Harmonious Landscape of the Itremo Massif and corridor
MDG-114	Kianjavato	Kianjavato
MDG-115	Paysage Harmonieux Protégé du Lac Alaotra	Protected Harmonious Landscape of the Lake Alaotra
MDG-116	Lac Sahaka/Analabe	Lake Sahaka/Analabe
MDG-117	Agnalazaha	Agnalazaha
MDG-118	Mahialambo	Mahialambo
MDG-119	Mandena	Mandena
MDG-120	Mangabe-Ranomena-Sahasarotra	Mangabe-Ranomena-Sahasarotra
MDG-121	Manjakatompo-Ankaratra	Manjakatompo-Ankaratra
MDG-122	Montagne des Français	Montagne des Français
MDG-123	Forêt Oronjia	Oronjia Forest
MDG-124	Aire Protégée de Ranobe PK32	Ranobe PK32 Protected Area
MDG-125	Pointe à Larrée (incl. Réserve Spéciale)	Pointe à Larrée (incl. Special Reserve)

KBA code	KBA name (French)	KBA name (English)
MDG-126	Sainte Luce/Ambato Atsinanana	Sainte Luce/Ambato Atsinanana
MDG-127	Sept Lacs	Seven Lakes
MDG-128	Tampolo (Incl. Paysage Harmonieux Protégé de la Réserve de Tampolo)	Tampolo (Incl. Protected Harmonious Landscape of the Tampolo Reserve)
MDG-129	Vohibe Ambalabe (Vatomandry)	Vohibe Ambalabe (Vatomandry)
MDG-130	Zones Humides Mahavavy - Kinkony	Mahavavy - Kinkony Wetlands
MDG-131	Zones Humides Nosivolo	Nosivolo Wetlands
MDG-132	Zones humides Port-Bergé	Port-Bergé Wetlands
MDG-133	Zones humides Tambohorano	Tambohorano Wetlands
MDG-134	Nosy Foty	Nosy Foty
MDG-135	Zones Humides Côte Sud-Ouest et Nosy Manitse	Southwestern Coastal Wetlands and Nosy Manitse
MDG-136	Nosy Varika	Nosy Varika
MDG-137	Nord Pangalane	North Pangalane
MDG-138	Parc National Andohahela Parcel I	Andohahela National Park - Section I
MDG-139	Parc National Andohahela Parcel II	Andohahela National Park - Section II
MDG-140	Parc National d'Andringitra	Andringitra National Park
MDG-141	Parc National d'Ankarafantsika	Ankarafantsika National Park
MDG-142	Parc National de Kirindy Mité et Extension	Kirindy Mite National Park and Extension
MDG-143	Parc National de Baie de Baly et Extension	Baly Bay National Park and Extension
MDG-144	Parc National de Mananara-Nord	Mananara-North National Park
MDG-145	Parc National d'Analamazaotra	Analamazaotra National Park
MDG-146	Parc National de Marojejy	Marojejy National Park
MDG-147	Parc National de Masoala	Masoala National Park
MDG-148	Parc National de Masoala - Parcelle II	Masoala National Park - Section II
MDG-149	Parc National de Masoala - Parcelle III	Masoala National Park - Section III
MDG-150	Parc National de Midongy Sud	Midongy South National Park
MDG-151	Nosy Mitsio	Nosy Mitsio

KBA code	KBA name (French)	KBA name (English)
MDG-152	Nosy Be and Satellites (Parc National de Nosy Tanihely)	Nosy Be and Satellites Islands (Nosy Tanihely National Park)
MDG-153	Parc National de Ranomafana	Ranomafana National Park
MDG-154	Parc National de Tsimanampetsotse	Tsimanampetsotsa National Park
MDG-155	Parc National de Zombitse-Vohibasia et Extension	Zombitse-Vohibasia National Park and extension
MDG-156	Parc National d'Isalo	Isalo National Park
MDG-157	Parc National Tsingy de Namoroka	Tsingy de Namoroka National Park
MDG-158	Parc National de Zahamena	Zahamena National Park
MDG-159	Parc National de Tsingy de Bemaraha	Tsingy de Bemaraha National Park
MDG-160	Parc National de Montagne d'Ambre - Parcelle I	Montagne d'Ambre National Park - Section I
MDG-161	Zones humides Baie Sahamalaza	Sahamalaza Bay Wetlands
MDG-162	Parc Naturel de Makira	Makira Natural Park
MDG-163	Anja Reserve communautaire	Anja Community Reserve
MDG-164	Réserve Naturelle Intégrale de Betampona	Betampona Strict Nature Reserve
MDG-165	Parc National de Lokobe	Lokobe National Park
MDG-166	Réserve Naturelle Intégrale de Tsaratanàna (hors extensions)	Integral Natural Reserve of Tsaratanàna (excluding extensions)
MDG-167	Réserve Spéciale d'Ambatovaky	Ambatovaky Special Reserve
MDG-168	Réserve Spéciale d'Ambohijanahary	Ambohijanahary Special Reserve
MDG-169	Réserve Spéciale d'Ambohitantely et extention	Ambohitantely Special Reserve and Extension
MDG-170	Réserve Spéciale d'Analamerana	Analamerana Special Reserve
MDG-171	Réserve Spéciale d'Andranomena	Andranomena Special Reserve
MDG-172	Réserve Spéciale d'Anjanaharibe-Sud	South Anjanaharibe Special Reserve
MDG-173	Réserve Spéciale d'Ankarana	Ankarana Special Reserve
MDG-174	Réserve Spéciale de Bemarivo	Bemarivo Special Reserve

KBA code	KBA name (French)	KBA name (English)
MDG-175	Réserve Spéciale de Beza - Mahafaly	Beza-Mahafaly Special Reserve
MDG-176	Réserve Spéciale de Bora	Bora Special Reserve
MDG-177	Réserve Spéciale de Kalambatritra	Kalambatritra Special Reserve
MDG-178	Réserve Spéciale de Kasijy	Kasijy Special Reserve
MDG-179	Réserve Spéciale de Mangerivola	Mangerivola Special Reserve
MDG-180	Réserve Spéciale de Maningoza	Maningoza Special Reserve
MDG-181	Réserve Spéciale de Manombo	Manombo Special Reserve
MDG-182	Réserve Spéciale de Manongarivo	Manongarivo Special Reserve
MDG-183	Réserve Spéciale de Marotandrano	Marotandrano Special Reserve
MDG-184	Île Principale du Parc National de Nosy Mangabe	Main Island of Nosy Mangabe National Park
MDG-185	Réserve Spéciale de Tampoketsa-Analamaitso	Tampoketsa-Analamaintso Special Reserve
MDG-186	Réserve Spéciale de Cap Sainte Marie et Extension	Cap Sainte Marie Special Reserve and Extension
MDG-187	Réserve Spéciale du Pic d'Ivohibe	Pic d'Ivohibe Special Reserve
MDG-188	Rivière Ankavia-Ankavanana (Antalaha)	Ankavia-Ankavanana River (Antalaha)
MDG-189	Rivière Antainambalana-Andranofotsy (Maroantsetra)	Antainambalana-Andranofotsy River (Maroantsetra)
MDG-190	Rivière Bemarivo	Bemarivo River
MDG-191	Rivière Maevarano	Maevarano River
MDG-192	Rivière Mahanara	Mahanara River
MDG-193	Rivière Mananjary	Mananjary River
MDG-194	Rivière Mangarahara-Amboaboa	Mangarahara-Amboaboa River
MDG-195	Rivière Sambava	Sambava River
MDG-196	Rivière Sofia	Sofia River
MDG-197	Rivière Ivoloina	Ivoloina River
MDG-198	Rivière Mananara Sud	Mananara South River
MDG-199	Rivières Mangoro-Rianila	Mangoro-Rianila Rivers

KBA code	KBA name (French)	KBA name (English)
MDG-200	Rivière Namorona-Faraony	Namorona-Faraony River
MDG-201	Sahafary (Andranomena Antsiranana)	Sahafary (Andranomena Antsiranana)
MDG-202	Sorata	Sorata
MDG-203	Station Forestière Angavokely	Angavokely Forest Station
MDG-204	Station Forestière Anjiamangirana	Anjiamangirana Forest Station
MDG-205	Tarzanville (Moramanga)	Tarzanville (Moramanga)
MDG-206	Tsinjoarivo	Tsinjoarivo
MDG-207	Tsitongambarika	Tsitongambarika
MDG-208	Zones humides Ambavanankarana	Ambavanankarana Wetlands
MDG-209	Zones humides Ambila-Lemaintso	Ambila-Lemaintso Wetlands
MDG-210	Zones humides Ankobohobo	Ankobohobo Wetlands
MDG-211	Zones humides Mahevatanana-Ambato-Boeni	Maevatanana-Ambato-Boeny Wetlands
MDG-212	Zones Humides de Torotorofotsy	Torotorofotsy Wetlands
MDG-213	Bassin versant d'Amboaboa	Amboaboa Catchment
MDG-214	Andasibe	Andasibe
MDG-215	Antsiranana	Antsiranana
MDG-216	Rivière Mahajilo	Mahajilo River
MDG-217	Sources Faraony	Faraony Headwaters
MDG-218	Lacs Ikopa	Ikopa Lakes
MDG-219	Parc National d'Isalo (Eau Douce)	Isalo National Park (Freshwater)
MDG-220	Lac Kinkony	Kinkony Lake
MDG-221	Bassin du Lac Tseny	Lake Tseny Basin
MDG-222	Basse d'Ankofia (Baie de Loza)*	Lower Ankofia (Loza Bay)*
MDG-223	Basse d'Anove	Lower Anove
MDG-224	Zone Côtière de Mahajanga	Mahajanga Coastal Zone
MDG-225	Delta de Mahavavy	Mahavavy Delta
MDG-226	Manambato Sud	Manambato South
MDG-227	Bassin Versant de Manongarivo	Manongarivo Catchment
MDG-228	Parc National de Marojejy (Eau Douce)	Marojejy National Park (Freshwater)
MDG-229	Parc National de Mikea (Eau Douce)	Mikea National Park (Freshwater)
MDG-230	Site Ramsar de la Rivière Nosivolo et affluents	Nosivolo River and Tributaries Ramsar Site
MDG-231	Groupe des Îles de Nosy Be	Nosy Be Islands Group
MDG-232	Sud de la Haute Rivière Lokoho	Southern Upper Lokoho River
MDG-233	Tolagnaro	Tolagnaro
MDG-234	Haute Rivière Kitsamby	Upper Kitsamby River
MDG-235	Haute Rivière Mananara	Upper Mananara River

Note: * = There is a 100 percent overlap between Lower Ankofia freshwater KBA and Loza Bay terrestrial KBA; as such, the two sites were combined into a single KBA.

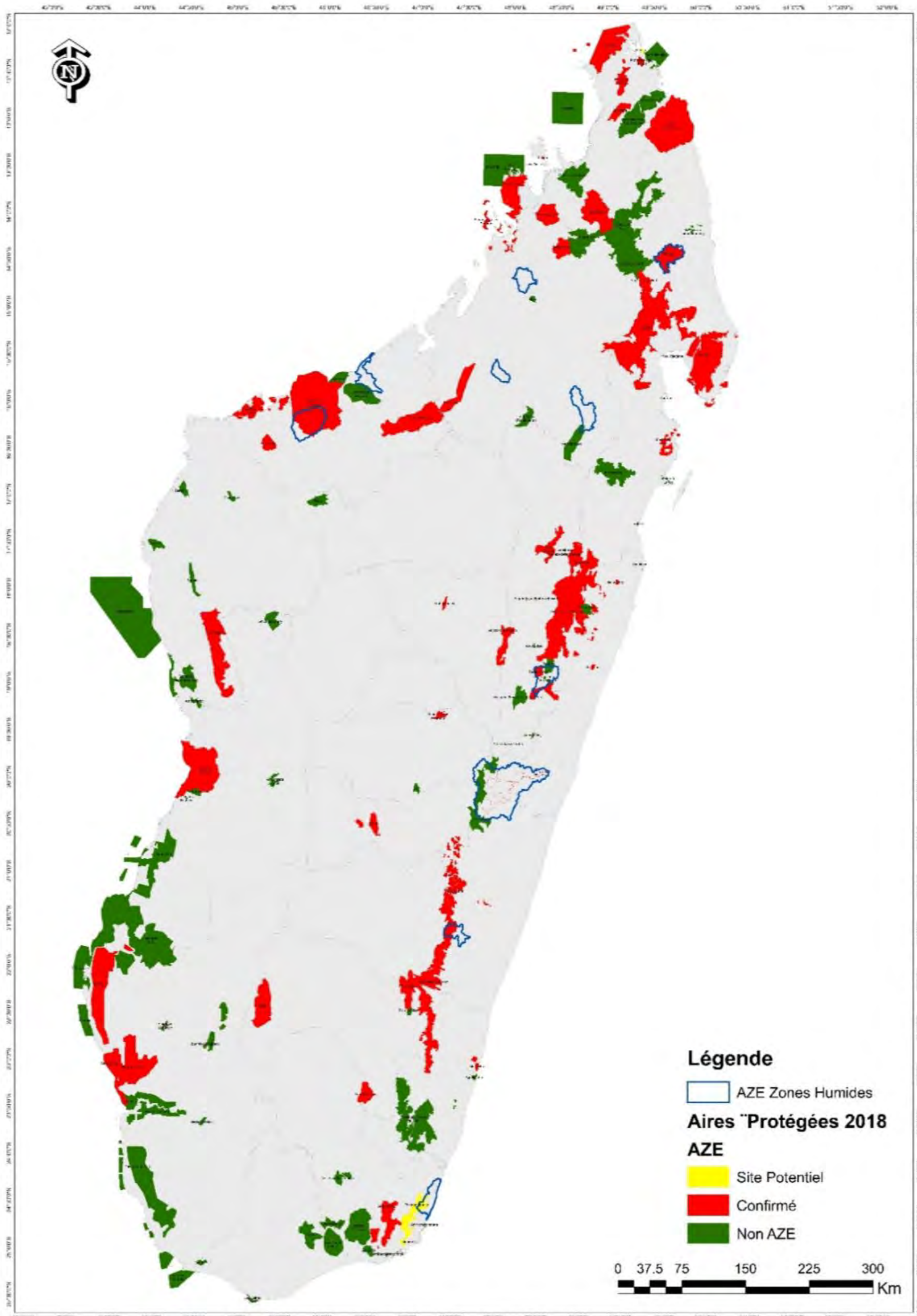

Figure 5 AZE sites in Madagascar

Important Marine Mammal Areas in Madagascar

As described in Section 4.4, Madagascar has four IMMAs: Northwest Madagascar and the Northeast Mozambique Channel; Madagascar Central East Coasts (including Antongil Bay and Ile Sainte Marie); Shelf Waters of Southern Madagascar; and Southwest Madagascar and the Mozambique Channel. Two candidate IMMAs have also been identified: Madagascar Ridge; and Central Mozambique Channel.

Important Plant Areas in Madagascar

Madagascar currently has 80 IPAs, whose identification criteria differ slightly from those used by PlantLife to identify KBAs for plants. These include centers of endemism, irreplaceable areas, AZE sites and areas of concentration of species with restricted distributions (Raharimampionona *et al.* 2005).

As a result of the 2003 Durban Vision, which allowed for the inclusion of KBAs for plants in the SAPM, more than half (45 out of 80) of the IPAs in Madagascar have been designated as protected areas and are currently under the governance of 16 managers, in particular MBG, which promotes and/or manages 13 protected areas, covering a total area of 139,283 ha. The inclusion of this category is to ensure maximum representativeness of the flora of Madagascar in terms of habitats and species.

Freshwater KBAs in Madagascar

In 2018, regional experts identified and validated 23 important rivers, lakes and marshes as freshwater KBAs, 10 of which are also AZE sites. Ninety-two species were confirmed as trigger species for these KBAs. Freshwater KBAs support 80 globally threatened species, 62 geographically restricted species, and 10 species showing population aggregations during one or more key life stages.

The combined area of the 23 freshwater KBAs is 23,920 km², representing four percent of the total area of Madagascar. The area of freshwater KBAs within existing protected areas is 9,159 km², equivalent to 38 percent of the total area of confirmed freshwater KBAs (IUCN 2018).

5.2.2. Comoros

Key Biodiversity Areas in Comoros

During the participatory process implemented in 2014 to prepare the CEPF ecosystem profile for the MADIO Hotspot, a total of 20 KBAs were defined for the Union of the Comoros (Figure 6, Table 28). These KBAs cover a combined area of 185,953 ha, comprising 36,500 ha of terrestrial ecosystems and 149,453 ha of marine ecosystems.

In 2014, the only official protected area in the Union of Comoros was the former Mohéli Marine Park with an area of 404 km², the largest marine area in the Indian Ocean region. Ecological studies conducted in 2011 on priority areas for the conservation of terrestrial biodiversity presented a proposed delineation and zoning for three terrestrial protected areas, covering 19.73 percent of the national territory. As of 2019, six protected areas had been formally established, corresponding to nine of the KBAs identified in the 2014 ecosystem profile.

AZE sites for Comoros

There are two AZE sites in the Comoros. The first is Mohéli island, which has a unique forest bird fauna, including two species endemic to the island: the critically endangered Mohéli scops owl (*Otus moheliensis*) and the endangered Mohéli brush-warbler (*Nesillas mariae*). Six other restricted-range species and one shorebird nest there, including Comoro olive-pigeon (*Columba pollenii*). Twelve subspecies endemic to the island and seven subspecies endemic to the Comoros are also present, as well as the threatened but not endemic Réunion harrier (*Circus maillardi*). One endemic seabird subspecies, Mohéli shearwater (*Puffinus lherminieri temptator*), appears to nest only in the forest on Mohéli. This AZE site contains Mount Mlédjélé (Mwali Highlands) KBA.

The second AZE site in the Comoros, Mont Ntringui National Park on the island of Anjouan, with an area of 11,700 ha, represents 28 percent of the total area of the island. It has also been identified as an AZE site due to the presence of CR and EN species with limited distributions; it overlaps with Mount Ntringui (Ndzuani highlands) KBA. In 2006, the government of the Comoros nominated the site as a Ramsar site.

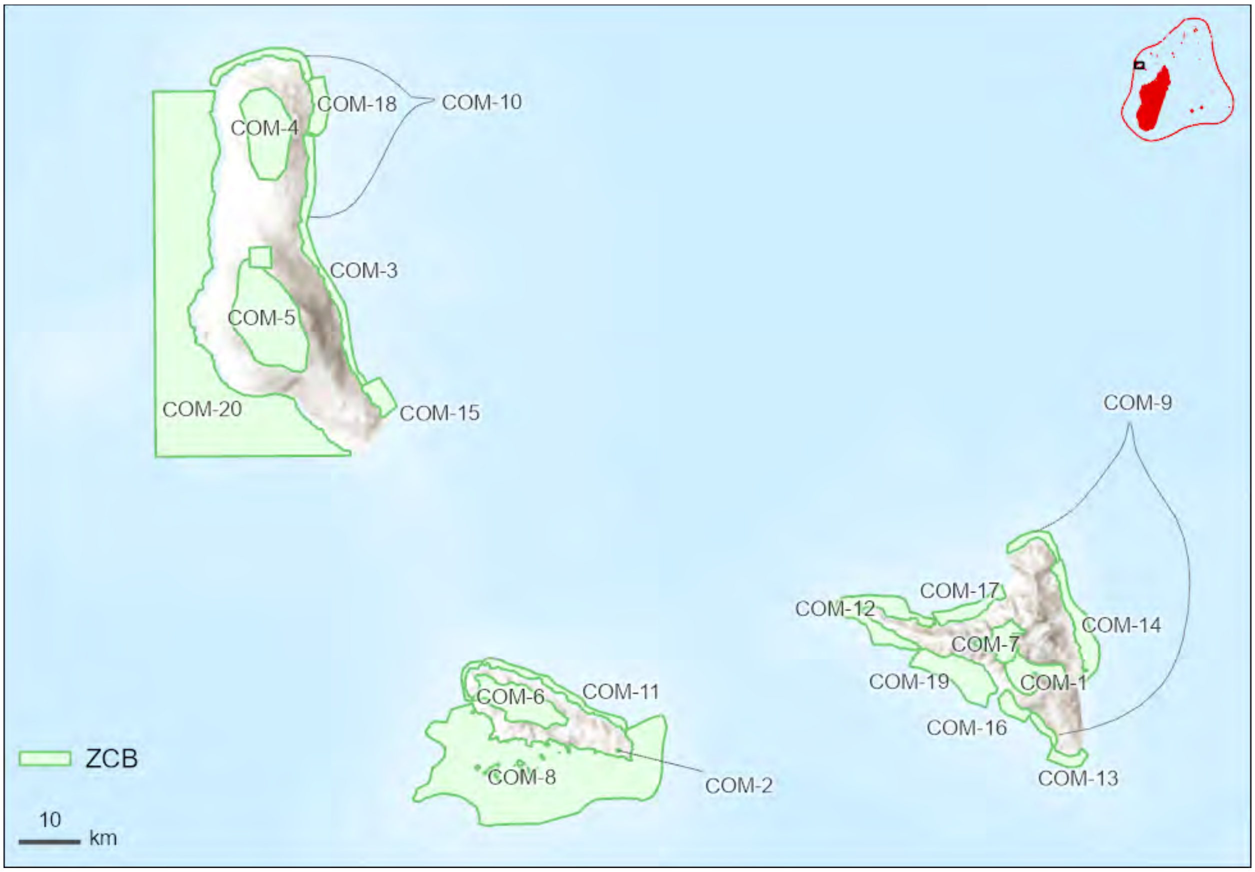

Figure 6 KBAs in the Comoros

Table 28 List of KBAs in the Comoros

KBA code	KBA name (French)	KBA name (English)
COM-1	Forêt de Moya	Moya forest
COM-2	Lac Dziani-Boudouni	Dziani-Boudouni lake
COM-3	Lac Hantsongoma	Hantsongoma lake
COM-4	Massif de la Grille	La Grille mountains
COM-5	Massif du Karthala	Karthala mountains
COM-6	Mont Mlédjélé (Hautes terres de Mwali)	Mount Mlédjélé (Mwali highlands)
COM-7	Mont Ntringui (Hautes terres de Ndzuani)	Mount Ntringui (Ndzuani highlands)
COM-8	Parc Marin de Mohéli	Mohéli Marine Park
COM-9	Récifs coralliens d'Anjouan	Anjouan coral reefs
COM-10	Récifs coralliens de Grande Comore	Grande Comore coral reefs

KBA code	KBA name (French)	KBA name (English)
COM-11	Récifs coralliens de Mohéli - hors Parc Marin	Mohéli coral reefs - outside of marine park
COM-12	Zone de Bimbini et Ilot de la Selle	Bimbini area and La Selle islet
COM-13	Zone de Chiroroni	Chiroroni area
COM-14	Zone de Domoni	Domoni area
COM-15	Zone de Malé	Malé area
COM-16	Zone de Moya	Moya area
COM-17	Zone de Mutsamudu	Mutsamudu area
COM-18	Zone de Ndroudé et Ilot aux Tortues	Ndroudé area and Turtles islet
COM-19	Zone de Pomoni	Pomoni area
COM-20	Zone du Coelacanthe	Coelacanth area

5.2.3. Mauritius

For the Republic of Mauritius, the identification of KBAs was based on IBAs, as well as a study to determine the most important areas to complement the current protected area network, conducted during the preparation of a UNEP/GEF project (Desmet 2009). This study was based on plant inventories by Page and D'Argent (1997), who had also assessed the quality of the native forest. This information was added to previous biodiversity data (especially the presence or absence of native angiosperm taxa) and the knowledge of local experts and stakeholders to create a final biodiversity importance map (Desmet 2009). There are 17 KBAs in Mauritius (Figure 7, Table 29), covering a total area of 81,647 ha, which comprises 37,853 of terrestrial ecosystems and 43,794 ha of marine ecosystems.

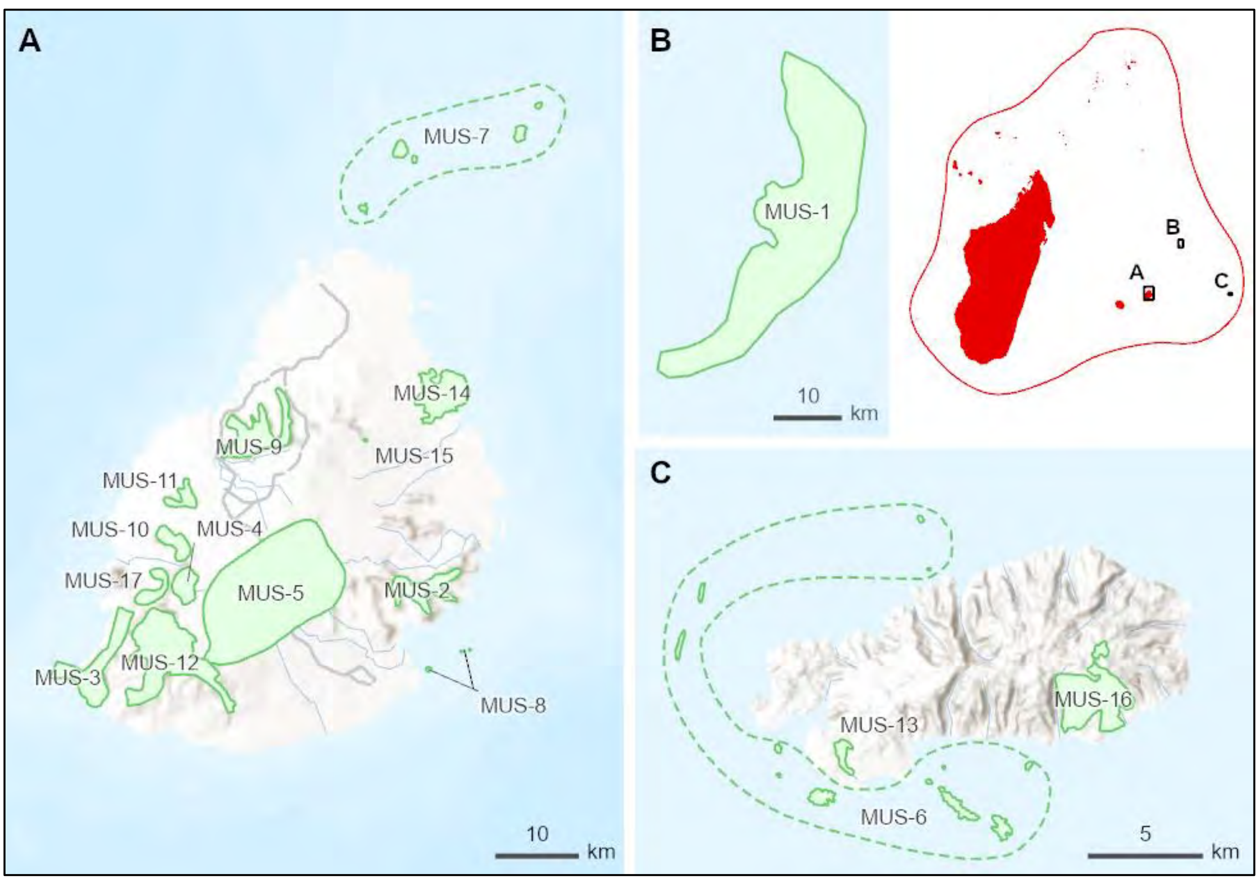

Figure 7 KBAs in Mauritius

Table 29 List of KBAs in Mauritius

KBA code	KBA name (French)	KBA name (English)	Island
MUS-1	Bancs de Cargados Carajos	Cargados Carajos Shoals	Saint Brandon
MUS-2	Chaine des Monts Bambou	Bamboo Mountain Range	Mauritius
MUS-3	Chamarel - Le Morne	Chamarel - Le Morne	Mauritius
MUS-4	Chutes de Tamarind / Mont Simonet / Reserve Naturelle du Cabinet	Tamarind Falls / Mount Simonet / Cabinet Nature Reserve	Mauritius
MUS-5	Forêts Reliques du Plateau Central	Relict Forests of the Central Plateau	Mauritius
MUS-6	Îlots de Rodrigues	Rodrigues' Islets	Rodrigues
MUS-7	Îlots du nord de l'Île Maurice	Mauritius Island's Northern Islets	Mauritius
MUS-8	Îlots du Sud-Est de l'Île Maurice	Mauritius Island's South-Eastern Islets	Mauritius
MUS-9	Le Pouce - Anse Courtois - Pieter Both - Longue Montagne	Le Pouce - Anse Courtois - Pieter Both - Longue Mountain	Mauritius
MUS-10	Mondrain - Magenta - Trois Mamelles - Mont du Rempart	Mondrain - Magenta - Trois Mamelles - Mont du Rempart	Mauritius
MUS-11	Montagne Corps de Garde	Corps de Garde Mountain	Mauritius
MUS-12	Parc National des Gorges de la Rivière Noire et zones adjacentes	Black River Gorges National Park and surrounding areas	Mauritius
MUS-13	Plaine Corail	Plaine Corail	Rodrigues
MUS-14	Plaine des Roches - Bras d'Eau	Plaine des Roches - Bras d'Eau	Mauritius
MUS-15	Pont Bon Dieu	Pont Bon Dieu	Mauritius
MUS-16	Versant Sud de Grande Montagne	South Slopes of Grande Montagne	Rodrigues
MUS-17	Yemen-Takamaka	Yemen-Takamaka	Mauritius

5.2.4. Seychelles

In the 2014 ecosystem profile, in order to harmonize the presentation of results with other countries, all individual KBAs included in national parks (nine for Morne Seychellois National Park, 11 for Silhouette National Park, and three for the Montagne Planneau National Park extension project) and a few small islands and sites (four on Curieuse, three on Felicité, and two neighboring sites on Praslin) were merged into single (and thus larger) KBA units. Approximately 10 sites on Mahé of relatively limited interest identified by Carlström (1996), which had been affected by development or other forms of habitat degradation, and/or for which insufficient data were available, were left out. According to the methodology used, only terrestrial sites with documented KBA criteria (presence of globally threatened species or sites meeting IBA criteria) were retained. Two small sites on Praslin without globally threatened species but meeting other international criteria proposed as important sites for ecological processes (IFC 2012) were temporarily left out pending more information on how these criteria can be considered under the KBA global standard (IUCN 2016). Other sites, including protected areas of current limited biological interest (e.g., five small unmanaged bird sanctuaries and a small national park) were incorporated into larger adjacent marine/coastal areas of high biodiversity value. These marine/coastal areas, almost always bordering terrestrial sites, consisted primarily of existing marine national parks on granitic islands, as well as areas of high biological interest identified as potential marine parks on outer islands. Existing special reserves and IBAs with terrestrial and marine areas were divided into their terrestrial and marine parts for consistency, to simplify the comparative assessment of conservation value, level of threats, etc. among all these sites, and to define priorities for action, which was done separately for terrestrial and marine sites.

Figure 8 (Bertzky *et al*. 2013) visualizes the correspondence among IBAs (i.e. KBAs for birds), KBAs for non-avian taxa and AZE sites. The same reasoning can be applied to spatial inventories where important areas for other taxa (plants, fish, cetaceans, turtles, etc.) have been defined.

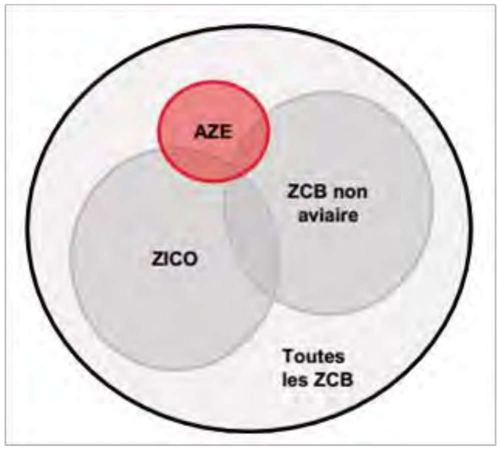

Figure 8 Correspondence among IBAs, KBAs for non-avian taxa and AZE sites

As a result, a total of 43 terrestrial KBA sites, plus an additional 33 marine sites of high biodiversity value, were identified. English and French site names were reviewed and harmonized for all sites. However, to reduce the final number of KBAs, the marine and terrestrial portions of these sites were merged, and a list of 57 KBAs was finalized and considered to represent CEPF site outcomes (Figure 9, Table 30). This list was retained, unchanged, for the updated ecosystem profile in 2022.[16]

The area of KBAs recognized as site outcomes in the ecosystem profile covers a smaller combined area than that given in the Senterre *et al.* (2013) KBA inventory, as some areas were excluded from selection in this study for the reasons given above. The coastal and marine areas considered here as site outcomes correspond to previously existing MPAs. The percentage of KBAs (and total land) protected was already much higher for the outer islands compared to the inner islands, again as noted by Senterre *et al.* (2013). This is thanks to the Aldabra Special Reserve, which accounts for most of the outer islands' area and about one-third of the total area of the Seychelles. Now that four new protected areas (totaling 573 ha) have been declared, this proportion is even higher and reaches 77.3 percent of the outer islands' land area. As a result, the protected land area in Seychelles reaches 47.8 percent of the total.

[16] Notes: Only three Ramsar sites have been nominated under the Ramsar Convention by the government of the Seychelles (Aldabra, the coastal wetlands of Port Launay and part of Morne Seychellois National Park (Mare aux Cochons)). Furthermore, there does not appear to have been an AZE inventory in the Seychelles, although some documents mention two sites on the granitic islands (La Digue plateau and Morne Seychellois National Park on Mahé). If such an inventory had been conducted, other key sites for threatened plant and animal species such as Silhouette and Frégate Islands should also have been identified.

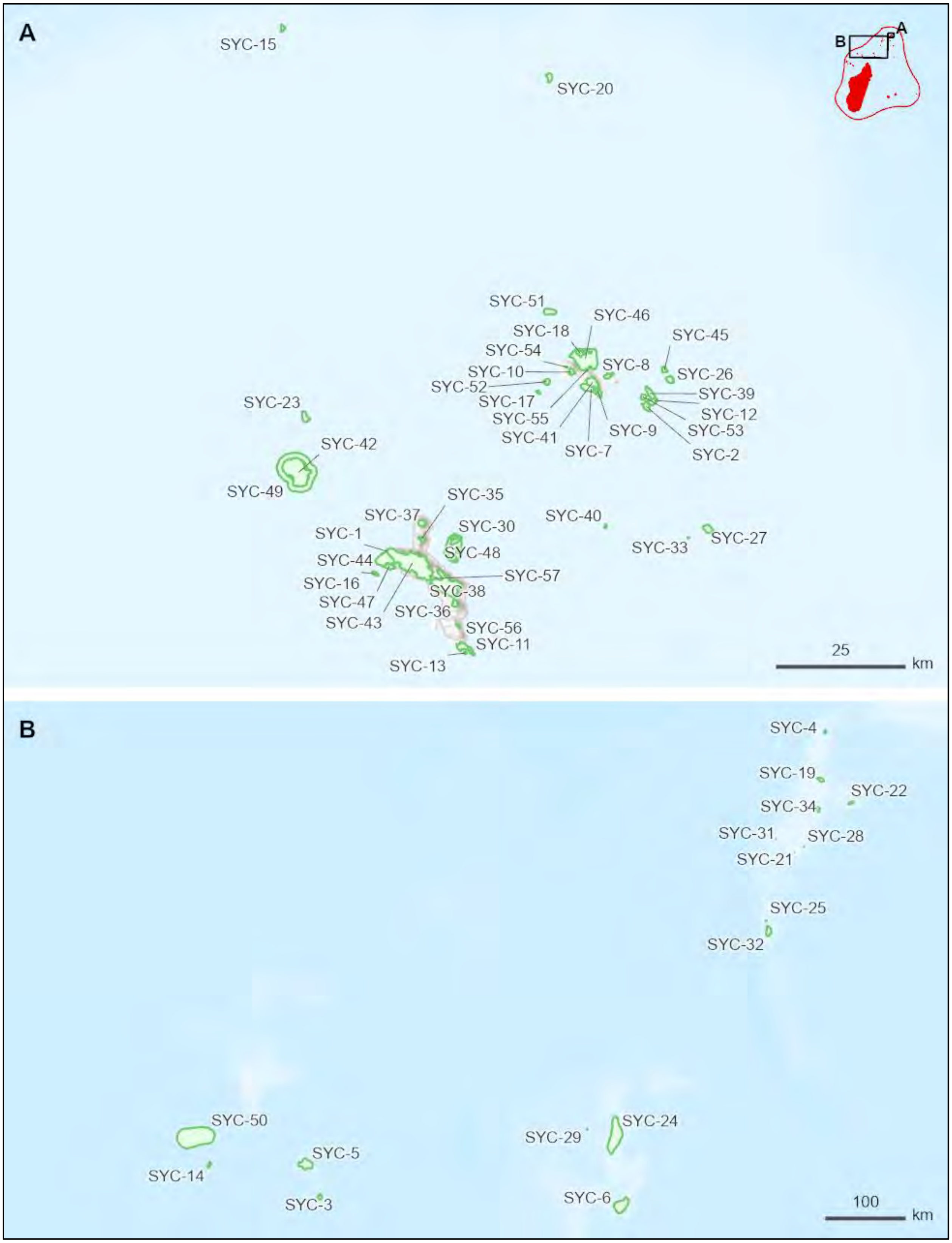

Figure 9 KBAs in the Seychelles

Table 30 List of KBAs in Seychelles

KBA code	KBA name (French)	KBA name (English)
SYC-1	Anse Major / Anse Jasmin (partie marine du MSNP)	Anse Major / Anse Jasmin (marine area of MSNP)
SYC-2	Anse Source d'Argent-Anse Marron	Anse Source d'Argent-Anse Marron
SYC-3	Astove	Astove
SYC-4	Bancs Africains	African Banks
SYC-5	Cosmolédo	Cosmoledo
SYC-6	Farquhar - Île du sud et îlots	Farquhar - South Island and islets
SYC-7	Pentes Sud du Fond Azore jusqu'à l'Anse Bois de Rose	Fond Azore southern slopes to Anse Bois de Rose
SYC-8	Fond Diable et Pointe Joséphine	Fond Diable and Pointe Joséphine
SYC-9	Fond Ferdinand	Fond Ferdinand
SYC-10	Forêt de l'Amitié	L'Amitié Forest
SYC-11	Montagne Corail-Collines du Sud Forêts Sèches	Coral Mountain-Southern Hills Dry Forests
SYC-12	Grand Anse-Petite Anse-Fond Piment	Grand Anse-Petite Anse-Fond Piment
SYC-13	Zones humides de Grand Police	Grand Police wetlands
SYC-14	Île de l’Assomption	Assumption Island
SYC-15	Île aux Vaches (Bird Island)	Bird Island (Ile aux Vaches)
SYC-16	Île de la Conception	Conception Island
SYC-17	Île Cousine	Cousine Island
SYC-18	Île Curieuse	Curieuse Island
SYC-19	Île D'Arros et Atoll Saint-Joseph	D'Arros Island and Saint Joseph Atoll
SYC-20	Île Denis	Denis Island
SYC-21	Île Desnoeufs	Desnoeufs Island
SYC-22	Île Desroches - récifs environnants	Desroches Island - surrounding reefs
SYC-23	Île du Nord (North Island)	North Island (Ile du Nord)
SYC-24	Île et Banc de Providence	Providence Island and Bank
SYC-25	Île Alphonse et lagune	Alphonse Island and Lagoon
SYC-26	Île Félicité	Félicité Island
SYC-27	Île Frégate	Frégate Island
SYC-28	Île Marie-Louise	Marie-Louise Island
SYC-29	Île Saint-Pierre	Saint-Pierre Island
SYC-30	Île Sainte-Anne	Sainte-Anne Island
SYC-31	Îles Etoile et Boudeuse	Etoile and Boudeuse Islands
SYC-32	Îles Saint-François et Bijoutier	Saint-François and Bijoutier Islands
SYC-33	Ilot Frégate	Frégate Islet
SYC-34	Lagon de Poivre et récifs environnants	Poivre Lagoon and surrounding reefs
SYC-35	Mont Signal	Mount Signal
SYC-36	Montagne Brûlée-Piton de l'Eboulis	Burnt Mountain-Piton de l'Eboulis
SYC-37	Montagne Glacis - When she comes	Glacis Mountain - When she comes
SYC-38	Montagne Planneau (Grand Bois-Varigault-Cascade)	Planneau Mountain (Grand Bois-Varigault-Cascade)
SYC-39	Nid d'Aigle (crêtes et versants Est)	Nid d'Aigle (ridge and eastern slopes)
SYC-40	Parc National de l’Île de Récif	Recif Island National Park
SYC-41	Parc National de Praslin	Praslin National Park
SYC-42	Parc National de Silhouette	Silhouette National Park
SYC-43	Parc National du Morne Seychellois	Morne Seychellois National Park
SYC-44	Parc National Marin de Cap Ternay / Baie Ternay	Cap Ternay / Ternay Bay Marine National Park
SYC-45	Parc National Marin de l'Île Cocos	Cocos Island Marine National Park
SYC-46	Parc National Marin de l'Île Curieuse	Curieuse Island Marine National Park

KBA code	KBA name (French)	KBA name (English)
SYC-47	Parc National Marin de Port Launay et zone humides côtières	Port Launay Marine National Park and coastal wetlands
SYC-48	Parc National Marin de Sainte-Anne	Sainte-Anne Marine National Park
SYC-49	Parc National Marin de Silhouette	Silhouette Marine National Park
SYC-50	Réserve Spéciale d'Aldabra	Aldabra Special Reserve
SYC-51	Reserve Spéciale de l'Île Aride	Aride Island Special Reserve
SYC-52	Réserve Spéciale de l'Île Cousin	Cousin Island Special Reserve
SYC-53	Réserve Spéciale de La Veuve	La Veuve Special Reserve
SYC-54	Rivière Kerlan	Kerlan River
SYC-55	Rochers d'Anse Petite Cour	Anse Petite Cour Boulders
SYC-56	Val d'Endor	Val d'Endor
SYC-57	Région de La Misère-Dauban : La Misère	La Misère-Dauban area: La Misère

5.3. Corridor Outcomes

CEPF considers conservation corridors to be larger geographic units than KBAs, through which conservation investment is directed at the landscape level. These planning units include groups of KBAs. While KBAs are intended to be protected or managed with biodiversity protection as a primary goal, isolated KBAs, even those with large areas, will have less resilience to climate change, and other environmental changes. A longer-term vision of conservation can be achieved through the management and protection of conservation corridors at the landscape scale. Conservation corridors represent both a response to species loss, habitat loss and fragmentation, and a proactive response to the need to integrate biodiversity protection into productive areas, particularly agriculture. The scale of the corridors is also relevant to take into account the services provided by ecosystems, beyond biodiversity conservation, for human wellbeing.

In the small islands of the Indian Ocean, the notion of conservation corridors did not seem justified, mainly due to the size of the islands relative to the KBAs. However, the issue of ecological continuity remained of concern and groups of terrestrial sites were thus identified in line with the global approach which would better achieve conservation objectives. Consequently, in both Mauritius and the Seychelles, a number of terrestrial KBAs encompass several small protected areas, along with the unprotected areas that surround them. The principle of preserving ecological continuity has thus been maintained, even if the areas concerned do not justify the creation of specific corridors.

5.3.1. Madagascar

In Madagascar's Eastern Ecoregion, large forest blocks still exist, linking protected areas along the eastern slopes of the central cordillera. Seven important corridors have been identified that are necessary to ensure ecological continuity. These corridors are of great importance in terms of biodiversity, as they include most of the country's remaining rainforests. They also play an important role in terms of ecosystem services, including carbon storage and water supply.

In other ecoregions, natural ecosystems are much more fragmented, and ecological continuity would often be difficult, if not impossible, to restore. Nevertheless, some regions have a number of important sites, sometimes small but of very high biological value, that share certain biological traits, and often share the same species. Even if the natural ecosystems are not contiguous, genetic exchanges between fragmented sites are still possible for some species. These exchanges could even be reinforced in the long term by human intervention. Biodiversity conservation in these regions would benefit from a broader vision, rather than a "site-by-site" approach. River systems in these regions also play an important role as natural connectors between sites and require coordinated management to maintain water quality for freshwater species, as well as for coastal and marine areas near river mouths. This is particularly the case for the important river systems of the Mahajanga River (Northwestern Landscape), the Mangoky (Kirindy-Mangoky Landscape) or the Onilahy (Mikea Landscape). For this part of the country, where sites are more fragmented, the term "landscape" was chosen, following a term commonly used in the Malagasy conservation community, to differentiate these corridors from the contiguous forest blocks of the Eastern Ecoregion.

Figure 10 and Table 31 show the 13 conservation outcomes identified in Madagascar.

Figure 10 Conservation corridors in Madagascar

Table 31 List of conservation corridors in Madagascar

No.	Corridor name	Area (Ha)
1	Northwestern Landscape	925,493
2	Extreme North Landscape	2,194,046
3	Anosy Corridor	508,016
4	Mahafaly-Karimbola Plateau Landscape	725,510
5	Kirindy-Mangoky Landscape	404,942
6	Marojejy Tsaratanana Corridor or COMATSA	317,287
7	Menabe Landscape	201,312
8	Mikea Landscape	744,376
9	MaMaBAIE Corridor	1,800,000
10	Bidia-Bezavona Corridor	280,097
11	Ankeniheny-Zahamena Corridor or CAZ	370,211
12	Fandriana-Marolambo Corridor or COFAM	194,127
13	Ambositra-Vondrozo Forest Corridor or COFAV	314,186
	TOTAL	**8,979,603**

5.3.2. Comoros

The notion of ecological corridors seems to be absent from the Comoros' environmental policies and strategies, whether national or sectoral. This is the case for biodiversity strategies and action plans, national communications on climate change and the agricultural strategy. The small size of the archipelago could justify the lack of interest of policy makers, biodiversity conservationists and territorial planners in maintaining ecological continuity but the absence of academic studies and scientific reports further reinforces this lack of interest. Nevertheless, ecological continuity at the level of each island can be considered at the following three levels: (i) the establishment of a national network of protected areas and its extension strategy; (ii) the existence of a permanent or semi-permanent hydraulic network on the islands of Anjouan and Mohéli; and (iii) biodiversity in urban areas. For the purposes of the ecosystem profile, no corridor outcomes were defined in the Comoros.

5.3.3. Mauritius

On the island of Mauritius, it was proposed to link the remaining areas of good quality native forests, degraded/secondary forests and some plantations as part of a project to link various forests through mainly existing vegetation corridors[17]. Such an exercise was not conducted for Rodrigues, which has experienced a greater degree of forest clearance. Two other "ridge to reef" projects are also being implemented on Mauritius island, one by the National Parks and Conservation Service[18], and a second in Bel Ombre Reserve. On Rodrigues, although the concept of ridge to reef is well understood by the Regional Assembly, NGOs, and civil society, such a project has not yet been implemented. For the purposes of this ecosystem profile, no corridor outcomes were defined in the country.

5.3.4. Seychelles

Few actions have been undertaken on this aspect since the ecosystem profile was originally prepared in 2014. In particular, no specific study on conservation corridors has been done in the Seychelles. Therefore, for the purposes of the current ecosystem profile, no conservation corridors were defined in the Seychelles.

As a continuation of the KBA inventory, a study should be conducted to define conservation corridors, particularly on large islands where most human development has occurred, to

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[17] Mauritius government project entitled "Protected Areas Network Expansion Strategy", supported by UNDP
[18] Forests our lifeline | EEAS Website (europa.eu)

maintain connectivity and interactions between populations of flora and fauna of conservation concern, as well as between ecosystems of special interest within landscapes. This will help reduce the adverse effects of isolation on (small) patches of natural habitat and associated plant and animal species. It will also help ensure continuity of ecosystem functions (water catchment, soil retention, forest carbon sinks, and recreation) at the landscape scale. This includes the need to work on seascapes and marine corridors (or at least geographic units that could be used from a management perspective), the same work having been done on whale sharks and marine mammals by MCSS. At this time, the map showing the geographic distribution of existing KBA sites (Figure 9) provides an idea of where corridors connecting these terrestrial and coastal sites could be identified.

6. ECOSYSTEM SERVICES AND KBA+

6.1. Importance of ecosystem services

Ecosystem services are the contributions that ecosystems make to economic development and other human activities (European Environment Agency 2013). The Common International Classification of Ecosystem Services (IAEA 2013), updated by Haines-Young and Potschin (2018), recognizes three categories of ecosystem service: provisioning services; regulating and maintenance services; and cultural services. For the purposes of the ecosystem profile, these have been broken down into divisions, within which ecosystem services can be grouped (Table 32).

Table 32 Classification of ecosystem services in the MADIO Hotspot

Section	Division	Ecosystem service
Provisioning services	Nutrition	Fish
		Wild animal meat
		Edible plants
		Wild fruit
		Wild spices (example, cinnamon)
		Medicinal plants
		Water for domestic use
		Water for irrigation
	Materials	Building materials (wood, thatch)
		Materials for handicrafts (wood, sedge)
		Forage for livestock
		Water for mining
	Energy	Firewood
		Charcoal
		Water for hydroelectricity
Regulating and maintenance services	Transformation of biochemical or physical inputs to ecosystems	Water quality for domestic use
		Water quality for irrigation
		Water quality for hydroelectricity
	Regulation of environmental flows	Flood control (marshes)
		Water flow regulation for hydroelectricity
		Drought regulation
		Reduction of soil erosion
		Protection against cyclones (mangrove, reef, beach)
	Regulation of physical, chemical and biological conditions	Carbon storage and sequestration
		Protection against cyclones at local and global level (mangroves, forests)
		Genetic material
Cultural services	Physical and intellectual interactions with ecosystems and land/seascapes	Ecotourism
		Existence value (biodiversity)
	Spiritual, symbolic and other interactions with ecosystems and landscapes/seascapes	Cultural and spiritual identity

6.2. Objectives, methodology and limitations

The methodologies for the identification and prioritization of ecosystem services in the hotspot are described in detail in the WP1 reports, which are available on the CEPF website.

In each of the hotspot countries, ecosystem services were identified and then ranked, according to the relative importance of their contribution to the resilience of human populations to climate change. This was done through literature reviews and stakeholder consultations, resulting in the establishment of priority ecosystem service lists. These lists of priority ecosystem services are, thus, the product of "expert opinion". Managers and experts directly involved in ecosystem service issues at KBAs were consulted first. The methodology used was the "KBA+" methodology, originally developed in Madagascar by scientists at CI's Moore Center for Science and Oceans during the preparation of the 2014 ecosystem profile.

Thanks to previous work on KBA+ in Madagascar, spatial datasets on many ecosystem services were available for use in this analysis. For the Indian Ocean islands, however, assessments of ecosystem services are relatively underdeveloped. Although the importance of ecosystem services is affirmed in various strategic documents, they have not been sufficiently assessed to provide quantitative data to evaluate objectively their scientific, ecological and financial contributions to local populations. In this situation, the identification of ecosystem services and the relative weighting given to each were necessarily subjective.

In each country, once a list of 7 to 14 essential ecosystem services had been prepared, datasets were produced that could be overlaid on the layer of KBAs, thereby allowing the relative importance of each KBA for each ecosystem service to be assessed. Different sources of data in different formats were used to compile these datasets. Where spatial data were available, these were converted into GIS shapefiles and overlaid with the KBA boundaries to infer, by addition, the importance of each KBA for ecosystem services. In cases where spatial data were unavailable, expert opinion was used to assign relative importance to KBAs for a particular service.

Before any meaningful comparison could be made, data normalization was necessary. Two normalizations were performed on the data. Some ecosystem services were normalized by relative importance: each parameter value was divided by the maximum value for that parameter, giving a value between 0 and 1 for each KBA. Other ecosystem services were normalized by presence/absence, giving a value of 0 (if the service is absent) or 1 (if it is present) for each KBA. This process resulted in a table containing KBAs in columns and ecosystem services in the rows, with the values in the cells indicating the relative importance of each KBA for each ecosystem service.

Given that all ecosystem services do not make equal contributions to the resilience of human populations to climate change, expert opinion was then used to weight each service. The weightings were then applied to the individual scores for each ecosystem service in the table, and the weighted scores were then summed to give an overall score based on this multi-criteria analysis.

6.3. Results

6.3.1. Madagascar

The results of the multi-criteria analysis for Madagascar are described in detail in the WP1 report for Madagascar, which is available on the CEPF website. The results of this analysis are presented below. The relative importance of KBAs for ecosystem services that contribute to the resilience of human populations to climate change is shown in Figure 11, while the ranking of KBAs following the KBA+ methodology is shown in Table 33. In the interests of space, only the top 50 ranked sites are shown; the full list is presented in the WP1 report.

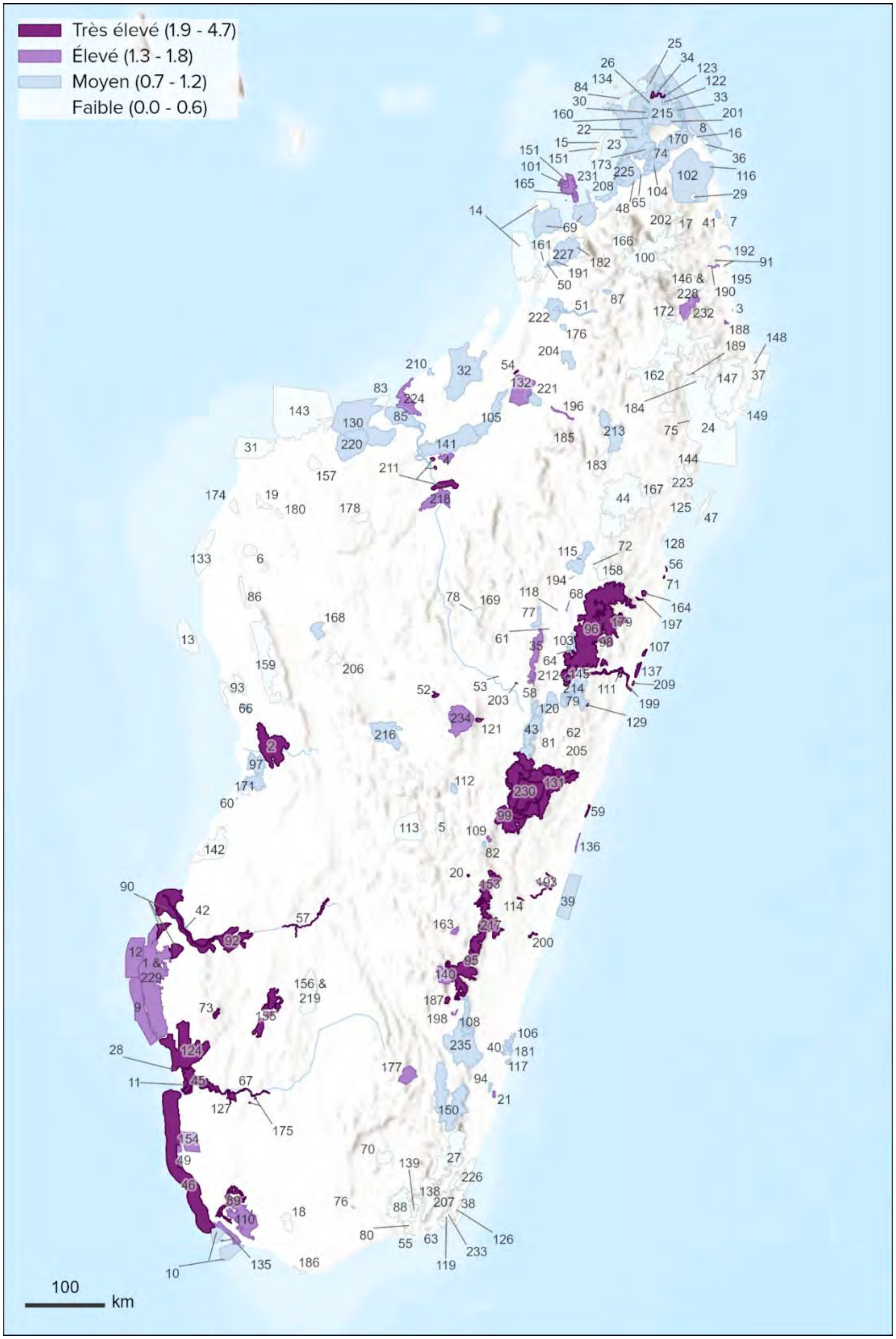

Figure 11 Relative importance of KBAs in Madagascar for ecosystem services: Low *Faible*, Medium *Moyen*, High *Élevé*, Very high *Très élevé*

Table 33 KBA+ ranking in Madagascar based on multi-criteria analysis (top 50 sites only)

KBA code	KBA name	Multi-criteria score
MDG-199	Mangoro-Rianala Rivers	4.75
MDG-111	Sahafina Forest (Anivorano-Brickaville)	4.18
MDG-98	Analamay-Mantadia Forest Corridor	3.43
MDG-131	Nosivolo Wetlands	3.29
MDG-67	Amoron'i Onilahy and Onilahy River	3.17
MDG-42	Mangoky River	3.12
MDG-99	Forest Corridor Fandriana - Marolambo National Park	3.11
MDG-95	Ambositra-Vondrozo Corridor	3.11
MDG-52	Lake Itasy	3.09
MDG-56	Mahatsara (Mahambo Foulpointe)	3.05
MDG-197	Ivoloina River	3.00
MDG-179	Mangerivola Special Reserve	2.88
MDG-164	Betampona Strict Nature Reserve	2.80
MDG-96	Ankeniheny-Zahamena Corridor	2.79
MDG-124	Ranobe PK32 Protected Area	2.78
MDG-137	North Pangalane	2.63
MDG-230	Nosivolo River and Tributaries Ramsar Site	2.61
MDG-28	Belalanda	2.58
MDG-211	Maevatanana-Ambato-Boeny Wetlands	2.55
MDG-20	Ankafina (Ambohimasoa)	2.54
MDG-155	Zombitse-Vohibasia National Park	2.52
MDG-11	Tsinjoriake-Andatabo	2.48
MDG-129	Vohibe Ambalabe (Vatomandry)	2.43
MDG-90	Lake Ihotry-Mangoky Delta Complex	2.42
MDG-73	Analavelona	2.41
MDG-153	Ranomafana National Park	2.37
MDG-217	Faraony Headwaters	2.26
MDG-57	Makay	2.21
MDG-71	Analalava Special Reserve	2.20
MDG-193	Mananjary River	2.18
MDG-107	Vohibola Classified Forest	2.17
MDG-92	Mangoky-Ankazoabo Complex	2.14
MDG-203	Angavokely Forest Station	2.13
MDG-46	Toliary Great Reef	2.06
MDG-200	Namorona-Faraony River	2.02
MDG-209	Ambila-Lemaintso Wetlands	2.01
MDG-89	Mahafaly Plateau Forest Complex	2.01
MDG-34	Three Bays Complex	1.97
MDG-175	Beza-Mahafaly Special Reserve	1.97
MDG-187	Pic d'Ivohibe Special Reserve	1.97
MDG-54	Lake Tseny	1.97
MDG-45	Saint Augustin Forest	1.96
MDG-121	Manjakatompo-Ankaratra	1.95
MDG-127	Seven Lakes	1.91

KBA code	KBA name	Multi-criteria score
MDG-114	Kianjavato	1.90
MDG-2	Ambalibe Menabe	1.89
MDG-59	Nankinana (Ambodibonara-Masomeloka)	1.84
MDG-53	Lake Tsarasaotra	1.82
MDG-49	West Itampolo - Mahafaly	1.79
MDG-231	Nosy Be Islands Group	1.76

6.3.2. Comoros

The results of the multi-criteria analysis for the Comoros are described in detail in the WP1 report for the Indian Ocean islands, which is available on the CEPF website. The results of this analysis are presented below. The relative importance of KBAs for ecosystem services that contribute to the resilience of human populations to climate change is shown in Figure 12, while the ranking of KBAs following the KBA+ methodology is shown in Table 34.

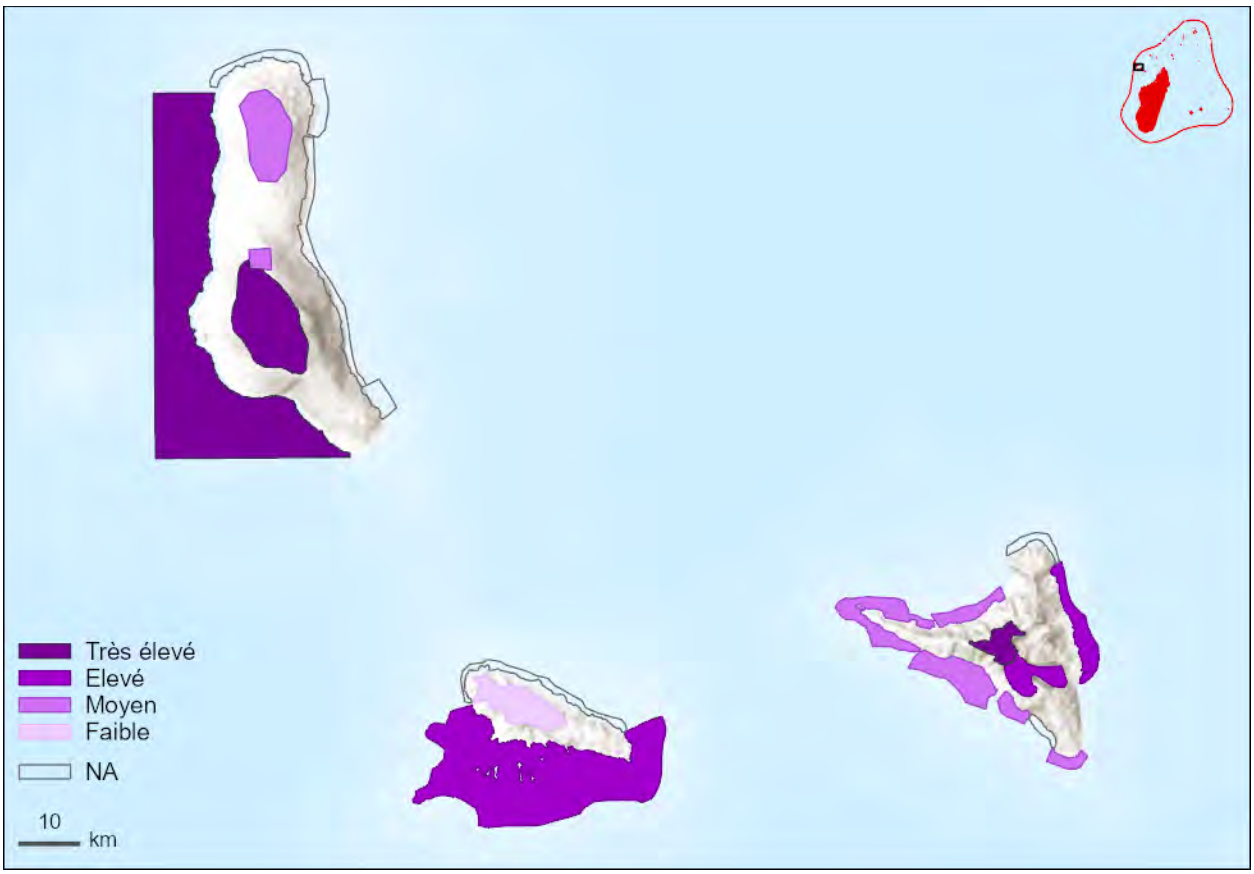

Figure 12 Relative importance of KBAs in the Comoros for ecosystem services

Table 34 KBA+ ranking in the Comoros based on multi-criteria analysis

KBA code	KBA name	Multi-criteria score
COM-7	Mount Ntringui (Ndzuani highlands)	0.54
COM-5	Karthala mountains	0.45
COM-20	Coelacanth area	0.43
COM-1	Moya forest	0.27
COM-14	Domoni area	0.25

KBA code	KBA name	Multi-criteria score
COM-4	La Grille mountains	0.22
COM-8	Mohéli Marine Park	0.21
COM-12	Bimbini area and La Selle islet	0.19
COM-19	Pomoni area	0.18
COM-16	Moya area	0.17
COM-10	Grande Comore coral reefs	0.16
COM-17	Mutsamudu area	0.15
COM-3	Hantsongoma lake	0.14
COM-9	Anjouan coral reefs	0.14
COM-13	Chironi area	0.13
COM-15	Malé area	0.12
COM-6	Mount Mlédjélé (Mwali highlands)	0.11
COM-18	Ndroudé area and Turtles islet	0.10
COM-11	Mohéli coral reefs - outside of marine park	0.09
COM-2	Dziani-Boudouni lake	0.05

6.3.3. Mauritius

The results of the multi-criteria analysis for the Republic of Mauritius are described in detail in the WP1 report for the Indian Ocean islands, which is available on the CEPF website. The results of this analysis are presented below. The relative importance of KBAs for ecosystem services that contribute to the resilience of human populations to climate change is shown in Figure 13, while the ranking of KBAs following the KBA+ methodology is shown in Table 35.

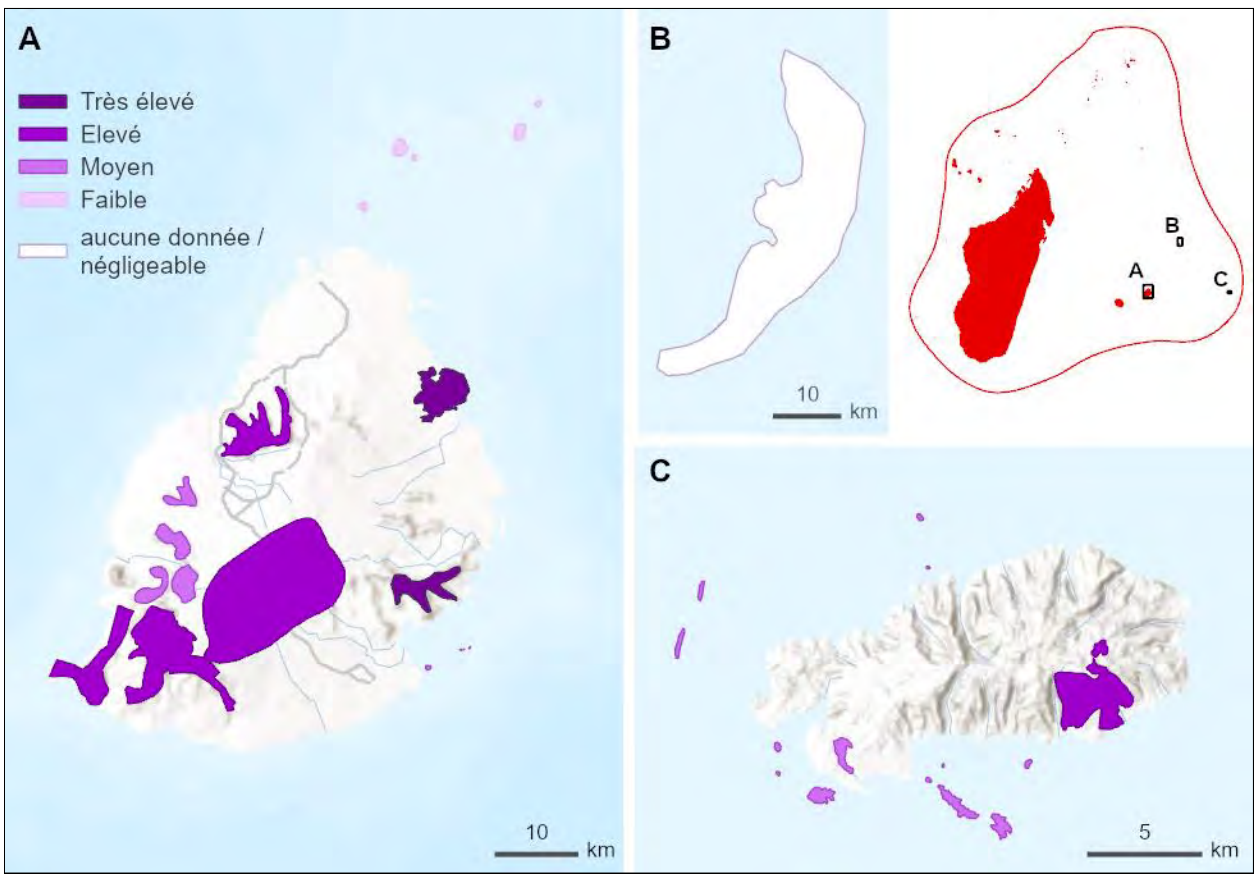

Figure 13 Relative importance of KBAs in Mauritius for ecosystem services

Table 35 KBA+ ranking in Mauritius based on multi-criteria analysis

KBA code	KBA name	Multi-criteria score
MUS-2	Bamboo Mountain Range	0.655
MUS-5	Relict Forests of the Central Plateau	0.550
MUS-14	Plaine des Roches - Bras d'Eau	0.537
MUS-12	Black River Gorges National Park and surrounding areas	0.520
MUS-3	Chamarel - Le Morne	0.503
MUS-8	Mauritius Island's South-Eastern Islets	0.395
MUS-16	South Slopes of Grande Montagne	0.364
MUS-17	Yemen-Takamaka	0.353
MUS-11	Corps de Garde Mountain	0.343
MUS-6	Rodrigues' Islets	0.308
MUS-4	Tamarind Falls / Mount Simonet / Cabinet Nature Reserve	0.290
MUS-9	Le Pouce - Anse Courtois - Pieter Both - Longue Mountain	0.280
MUS-7	Mauritius Island's Northern Islets	0.260
MUS-10	Mondrain - Magenta - Trois Mamelles - Mont du Rempart	0.225
MUS-13	Plaine Corail	0.220
MUS-1	Cargados Carajos Shoals	0.200
MUS-15	Pont Bon Dieu	0.167

6.3.4. Seychelles

The results of the multi-criteria analysis for the Seychelles are described in detail in the WP1 report for the Indian Ocean islands, which is available on the CEPF website. The results of this analysis are presented below. The relative importance of KBAs for ecosystem services that contribute to the resilience of human populations to climate change is shown in Figure 14, while the ranking of KBAs following the KBA+ methodology is shown in Table 36.

Table 36 KBA+ ranking in the Seychelles based on multi-criteria analysis

KBA code	Island group	Terrestrial /Marine	KBA name	Multi-criteria score
SYC-43	Inner	T	Morne Seychellois National Park	0.719
SYC-38	Inner	T	Planneau Mountain (Grand Bois-Varigault-Cascade)	0.633
SYC-41	Inner	T	Praslin National Park	0.586
SYC-42	Inner	T	Silhouette National Park	0.563
SYC-36	Inner	T	Burnt Mountain-Piton de l'Eboulis	0.500
SYC-50	Aldabra	M/T	Aldabra Special Reserve	0.469
SYC-47	Inner	M	Port Launay Marine National Park and coastal wetlands	0.469
SYC-15	North edge	T	Bird Island (Ile aux Vaches)	0.469
SYC-5	Cosmoledo	M/T	Cosmoledo	0.453
SYC-51	Inner	M/T	Aride Island Special Reserve	0.445
SYC-52	Inner	M/T	Cousin Island Special Reserve	0.445
SYC-48	Inner	M	Sainte-Anne Marine National Park	0.438
SYC-20	North edge	T	Denis Island	0.430
SYC-46	Inner	M	Curieuse Island Marine National Park	0.406
SYC-32	Amirantes	M/T	Saint-François and Bijoutier Islands	0.406

KBA code	Island group	Terrestrial /Marine	KBA name	Multi-criteria score
SYC-3	Cosmoledo	M/T	Astove	0.398
SYC-18	Inner	T	Curieuse Island	0.391
SYC-19	Amirantes	M/T	D'Arros Island and Saint Joseph Atoll	0.383
SYC-6	Farquhar	M/T	Farquhar - South Island and islets	0.375
SYC-9	Inner	T	Fond Ferdinand	0.352
SYC-49	Inner	M	Silhouette Marine National Park	0.344
SYC-22	Amirantes	M	Desroches Island - surrounding reefs	0.344
SYC-25	Amirantes	M/T	Alphonse Island and Lagoon	0.344
SYC-39	Inner	T	Nid d'Aigle (ridge and eastern slopes)	0.336
SYC-23	Inner	T	North Island (Ile du Nord)	0.336
SYC-56	Inner	T	Val d'Endor	0.328
SYC-26	Inner	T	Félicité Island	0.320
SYC-17	Inner	T	Cousine Island	0.320
SYC-27	Inner	T	Frégate Island	0.313
SYC-2	Inner	T	Anse Source d'Argent-Anse Marron	0.313
SYC-44	Inner	M	Cape Ternay / Ternay Bay Marine National Park	0.305
SYC-7	Inner	T	Fond Azore southern slopes to Anse Bois de Rose	0.305
SYC-34	Amirantes	M	Poivre Lagoon and surrounding reefs	0.297
SYC-45	Inner	M	Cocos Island Marine National Park	0.289
SYC-21	Amirantes	T	Desnoeufs Island	0.289
SYC-12	Inner	T	Grand Anse-Petite Anse-Fond Piment	0.281
SYC-53	Inner	T	La Veuve Special Reserve	0.273
SYC-28	Amirantes	T	Marie-Louise Island	0.258
SYC-10	Inner	T	L'Amitié Forest	0.250
SYC-37	Inner	T	Glacis Mountain - When she comes	0.242
SYC-4	Amirantes	M	African Banks	0.242
SYC-24	Farquhar	M/T	Providence Island and Bank	0.234
SYC-30	Inner	T	Sainte-Anne Island	0.234
SYC-11	Inner	T	Coral Mountain-Southern Hills dry forests	0.227
SYC-13	Inner	T	Grand Police wetlands	0.219
SYC-1	Inner	M	Anse Major / Anse Jasmin (marine area of MSNP)	0.219
SYC-14	Aldabra	M/T	Assumption Island	0.219
SYC-31	Amirantes	T	Etoile and Boudeuse Islands	0.211
SYC-57	Inner	T	La Misère-Dauban area: La Misère	0.195
SYC-8	Inner	T	Fond Diable and Pointe Josephine	0.188
SYC-40	Inner	T	Recif Island National Park	0.148
SYC-35	Inner	T	Mount Signal	0.148
SYC-33	Inner	T	Frégate Island	0.125
SYC-16	Inner	T	Conception Island	0.125
SYC-54	Inner	T	Kerlan River	0.109
SYC-55	Inner	T	Anse Petite Cour Boulders	0.078
SYC-29	Farquhar	T	Saint-Pierre Island	0.055

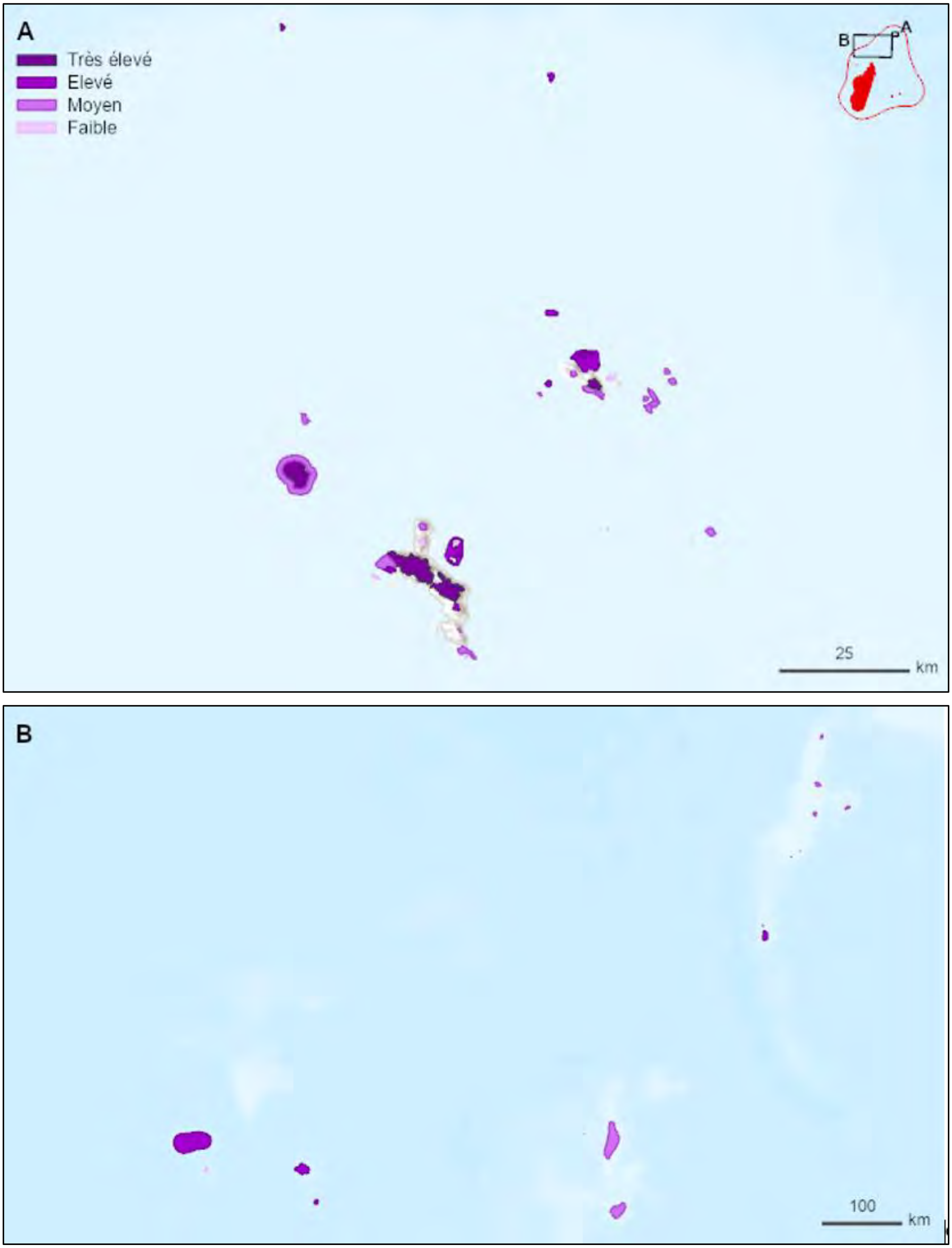

Figure 14 Relative importance of KBAs in the Seychelles for ecosystem services

6.4. Provisioning services: food and fuel

6.4.1. Madagascar

Fishing

Fishing constitutes a significant portion of people's income in Madagascar, constituting up to 70 percent of total income (Gough *et al.* 2020) for those living near the coast. In addition, fish can constitute up to 80 percent of protein intake (Mihari 2022). Fishing was, thus, identified as one of the most important ecosystem services for the rural population (Figure 15). Therefore, the government and many conservation NGOs are promoting responsible fishing as a response and adaptation to the impacts of climate change.

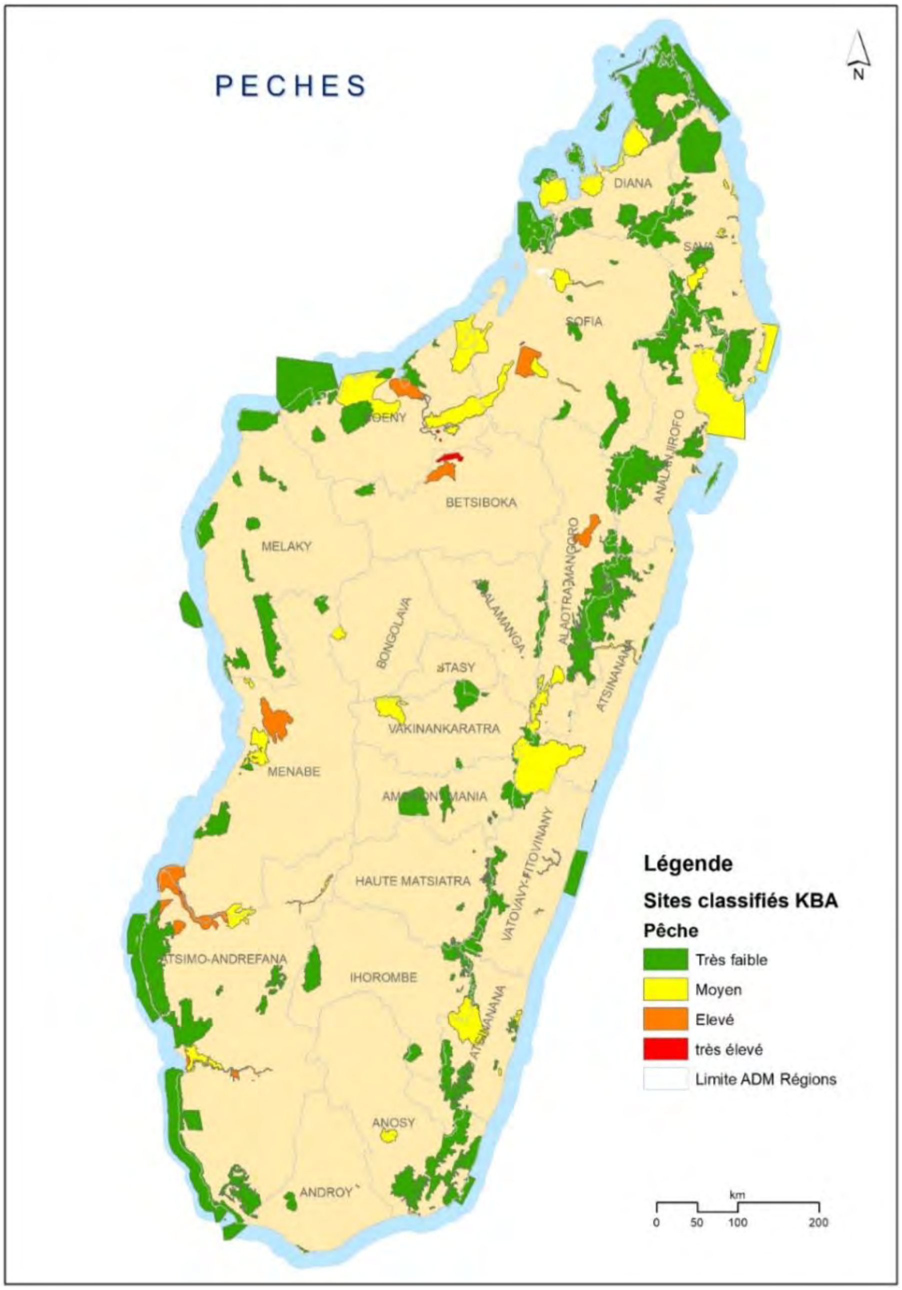

Figure 15 Relative importance of KBAs in Madagascar for fisheries (source: Fedele *et al.* 2021)

Agriculture

More than 80 percent of Madagascar's population is reliant upon agriculture (World Bank 2021). This makes agriculture an important ecosystem service for Madagascar. In addition, Madagascar has been identified as one of the most vulnerable countries to climate change. Figure 16 is based on an analysis of the extent of the cultivated area in and around each KBA. Interestingly, those KBAs with the largest cultivated area are located in southwestern Madagascar, where the climate is dry to arid. KBAs in south of Madagascar tend to have a larger cultivated area compared to KBAs in the north, where the cultivated area is low.

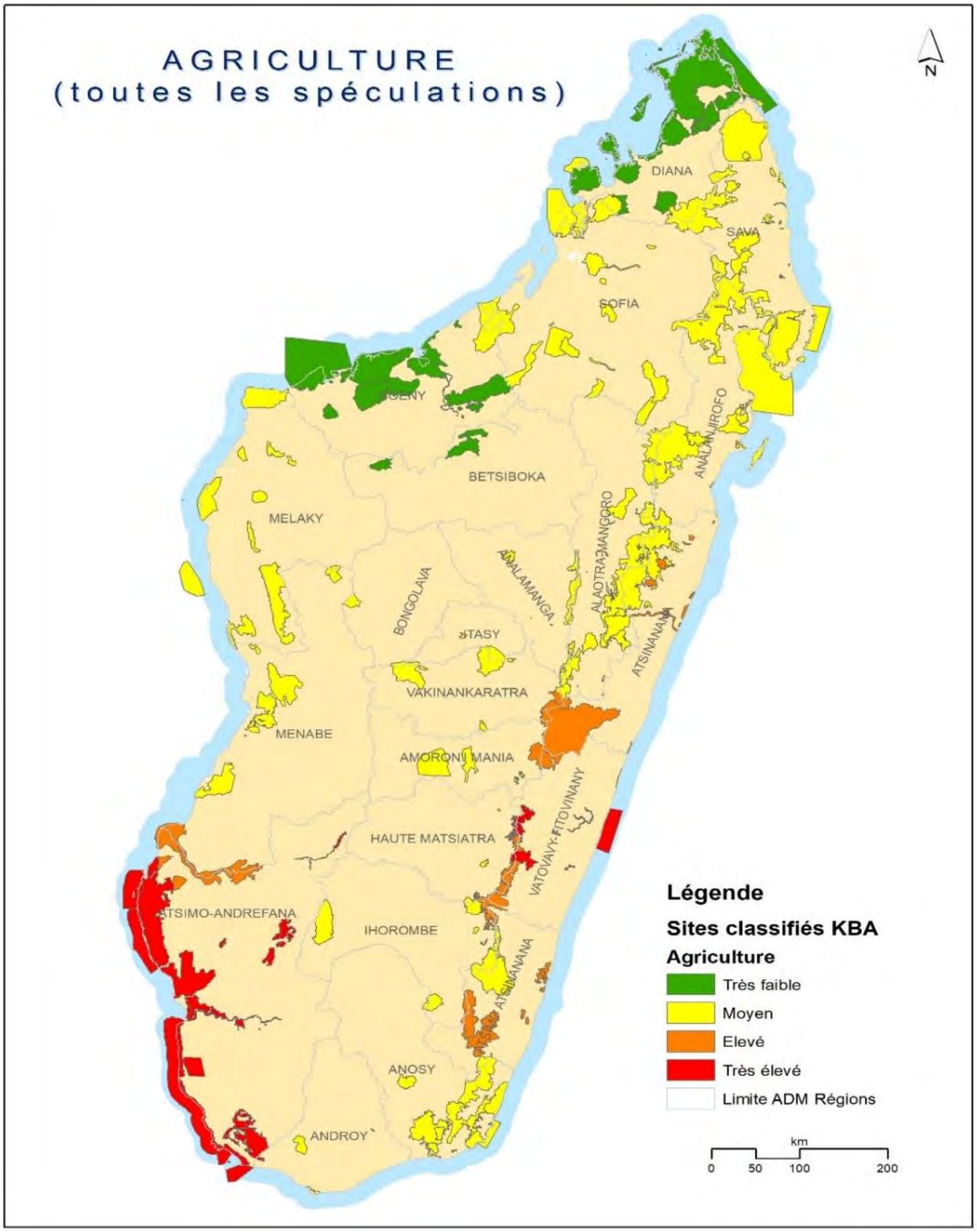

Figure 16 Relative importance of KBAs in Madagascar for agriculture (source: Fedele *et al*. 2021)

Fuelwood and non-timber forest products

The national need for fuelwood is estimated at about 18 million cubic meters per year (Ministry of Energy and Hydrocarbons, 2018), which is almost twice the country's production capacity (9 million cubic meters). This makes fuelwood a very important service provided by the ecosystem, and important for climate change adaptation. Fuelwood collection is especially important in the eastern part of Madagascar (Figure 17). Most of these KBAs are on the edge of natural forest or between blocks of natural forest.

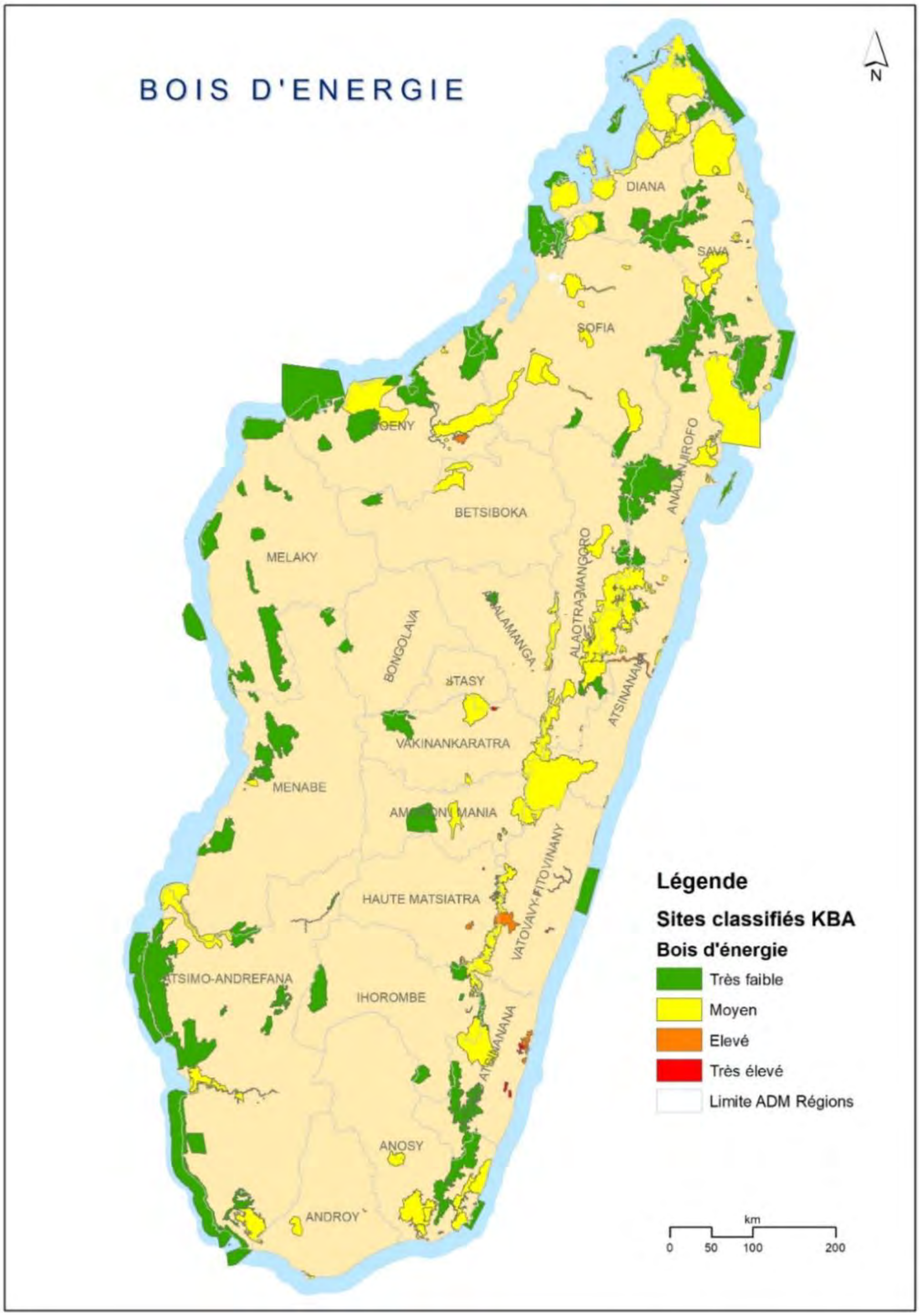

Figure 17 Relative importance of KBAs in Madagascar for fuelwood

6.4.2. Comoros

Commercial fishing

The coastal KBAs of the Comoros are fishing areas inhabited by a population of fishers who are economically reliant upon this resource. The 2020 fishery statistics bulletin identifies the landing ports and assesses the amount of catch per port. This has allowed an assessment of the amount of commercial fish caught in these KBAs, in order to establish a geographical estimate of the amount of fish caught per KBA (Figure 18).

Moreover, fishing families are the most vulnerable groups to the depletion of sources. It is women who sell the fish at the market. In bad weather, the whole chain, from the fisher to the trader to the retailer to the consumer, is strongly affected because the fishers cannot go to sea. Fish is the main source of protein for the majority of Comorian households.

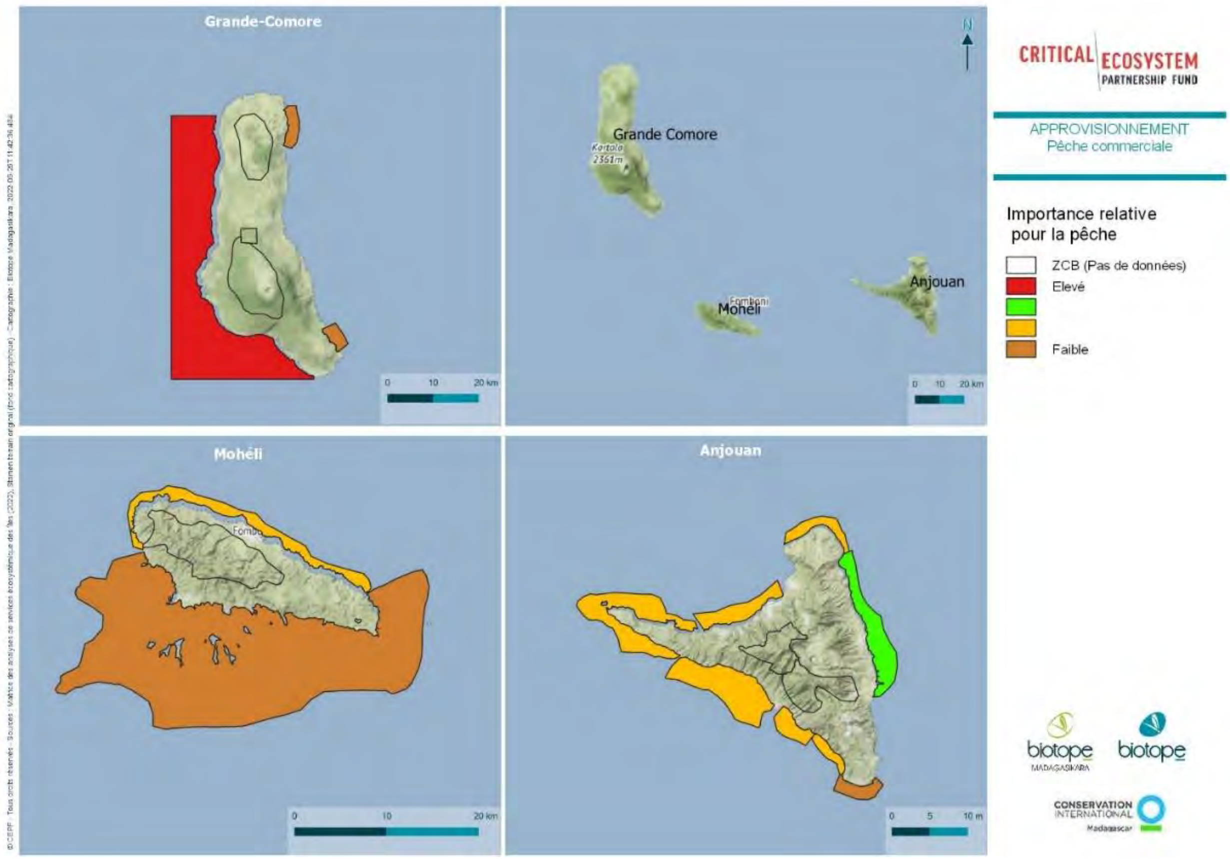

Figure 18 Relative importance of KBAs in the Comoros for commercial fishing

Wood energy

Wood is the main source of energy for Comorian families and the aromatic flower distillation industry. It is made up of trees cut down to make charcoal to be sold in urban centers or of dry wood collected during the clearing of agricultural land. Both of these products are transported to markets in towns and villages. This is a very profitable service, which the families have invested in promoting products to market.

Although wood harvesting appears to be limited at low and medium elevations, the high demand for this energy resource is increasing. The number of wood harvesters is gradually increasing in secondary forests undergoing restoration. The species most in demand for its abundance, quality and proximity is an invasive alien species, Chinese guava (*Psidium* *cattleyanum*), although some native species of ecological importance are felled for the same purpose.

Families using wood and charcoal from watershed forest KBAs were counted, in order to assess the proportion of the population using this service. These data were used to assess the relative importance of KBAs for wood energy supply (Figure 19).

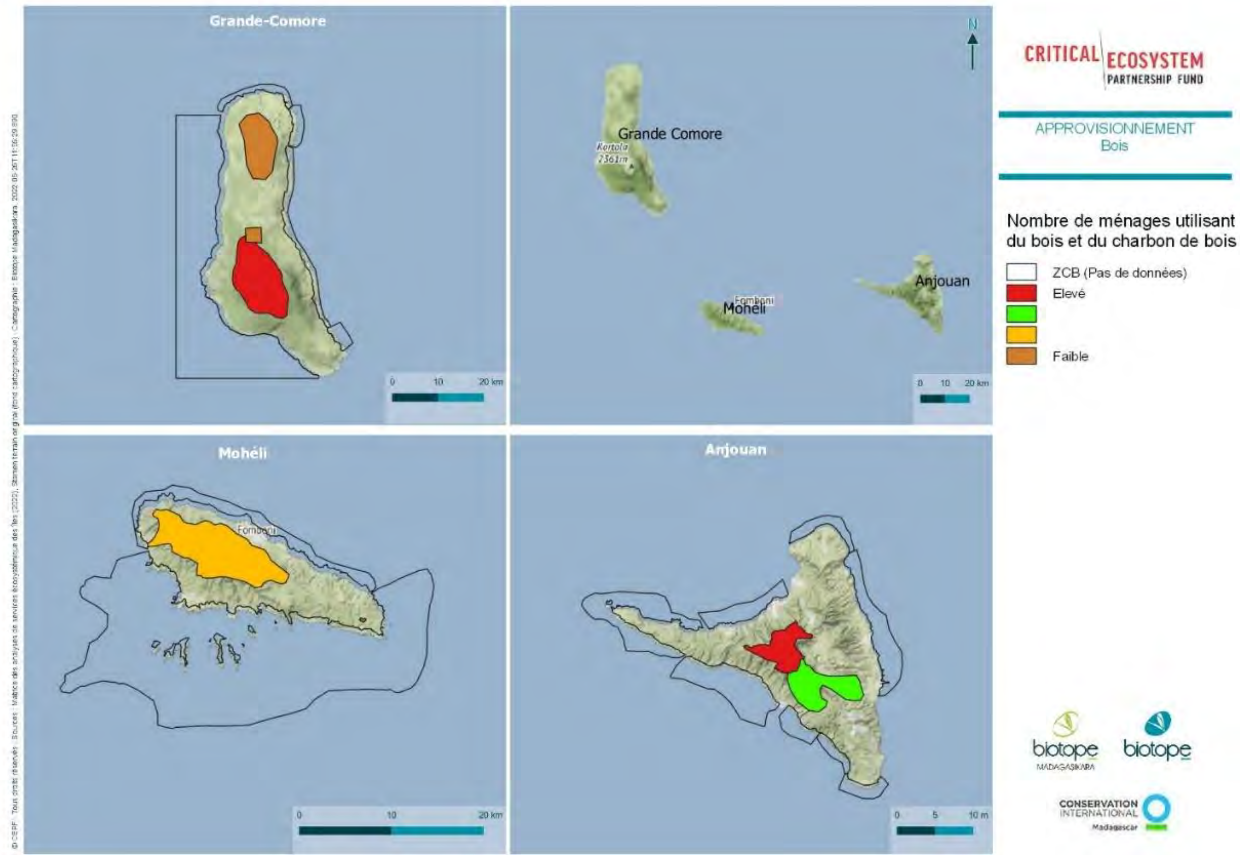

Figure 19 Relative importance of KBAs in the Comoros for wood energy supply

6.4.3. Mauritius

Commercial fishery

The fishing sector represents an important economic sector in Mauritius. It generates employment, it is a source of foreign income and it ensures food security. In addition, the fisheries sector employs some 22,000 people, working directly or indirectly, the majority of who work in the fish processing sector.

In 2019, local fish production was about 31,663 metric tons and the total export of fish and fishery products generated revenues of about MUR 13 billion, making up about 19 percent of national exports. In addition, the fisheries sector makes a vital contribution to the lives of coastal communities by supporting local livelihoods and tourism, and ensuring the supply of fresh fish to the local market. Currently, the fisheries sector is the mainstay of the blue economy in Mauritius. The most important KBAs for this ecosystem service are Saint Brandon and islets off the coast of Rodrigues (Figure 20).

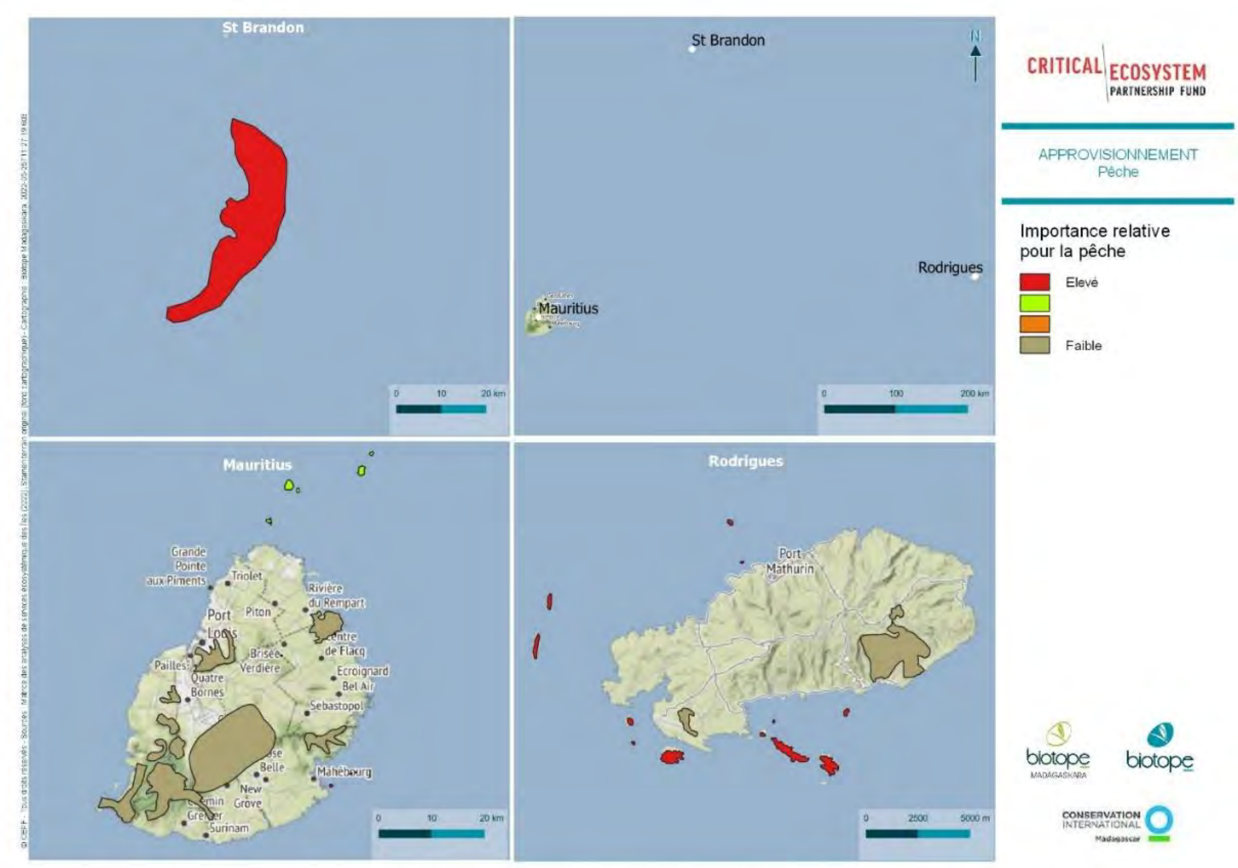

Figure 20 Relative importance of KBAs in Mauritius for commercial fishing

6.4.4. Seychelles

Commercial fishing

In the Seychelles, all marine KBAs provide food for humans, at least indirectly, in the case of protected KBAs, which protect fish stocks that spill over into surrounding areas. For terrestrial KBAs, their importance for commercial fishing is minimal (Figure 21).

The ongoing climate and biodiversity crises will certainly affect the fishing industry, through declining fisheries production. With increasing global fuel costs, in terms of resilience to climate change, the distance of fishing areas to ports and fish markets is also a factor to consider. Another factor to consider is the repeated bleaching of coral reefs and the possible effect this could have on fish populations in some areas (see Section 4.4.4).

Forestry products

Several KBAs provide timber, such as Morne Seychellois National Park, the Montagne Brûlée area, and Praslin National Park (Figure 22). Data on the volume of timber stocks, or on timber harvest were not available for this analysis, however, let alone in the form of spatial data. Other forest products include coco-de-mer nuts and palm leaves but data are limited or only locally relevant for a given KBA. Currently, this ecosystem service remains limited due to the high costs of local extraction, relative to the cost of imported wood products. Nevertheless, local communities occasionally enter forested KBAs (e.g., Morne Seychellois National Park) to collect timber for their own use. Because this is not normally allowed, the importance of this service is very marginal.

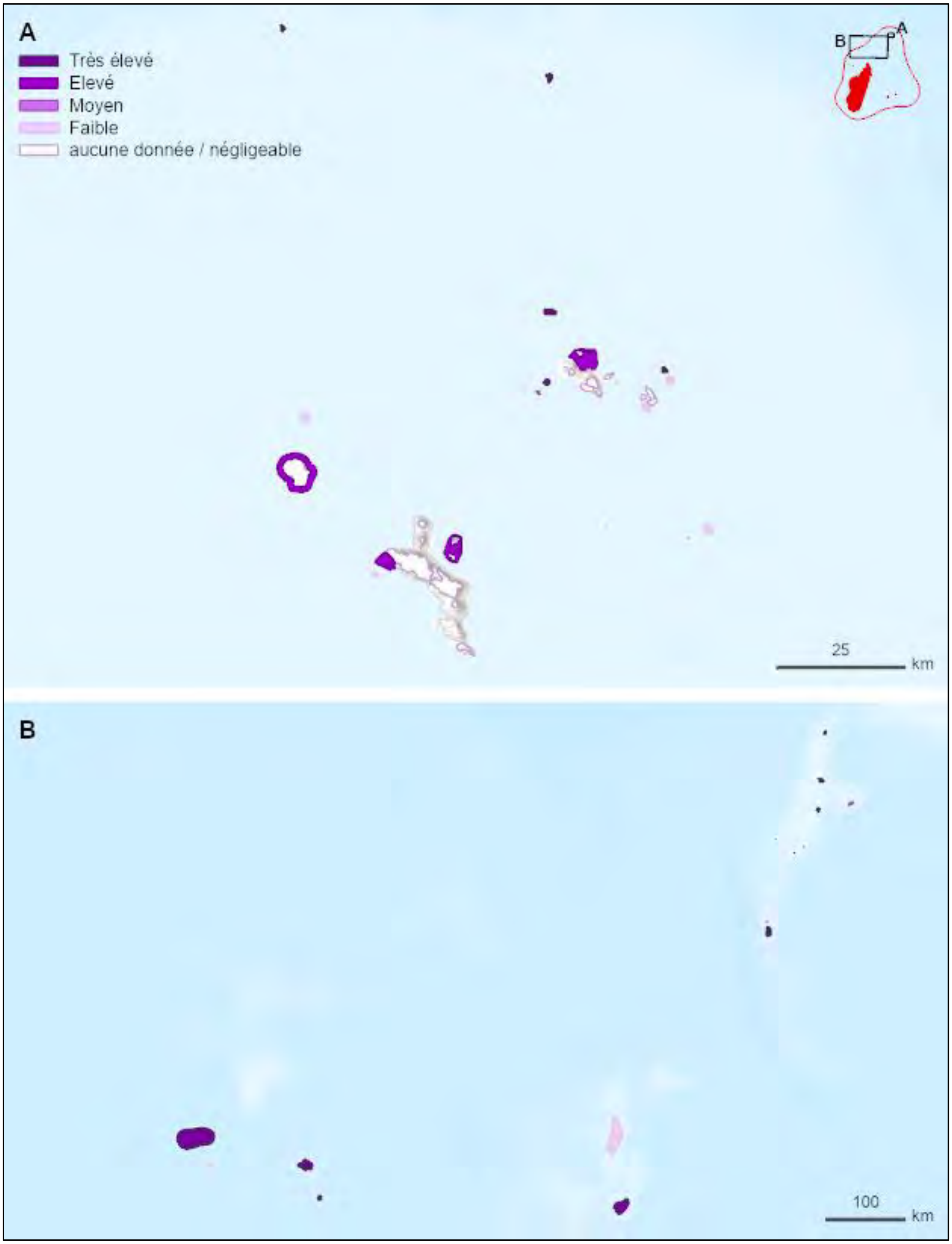

Figure 21 Relative importance of KBAs in the Seychelles for commercial fishing

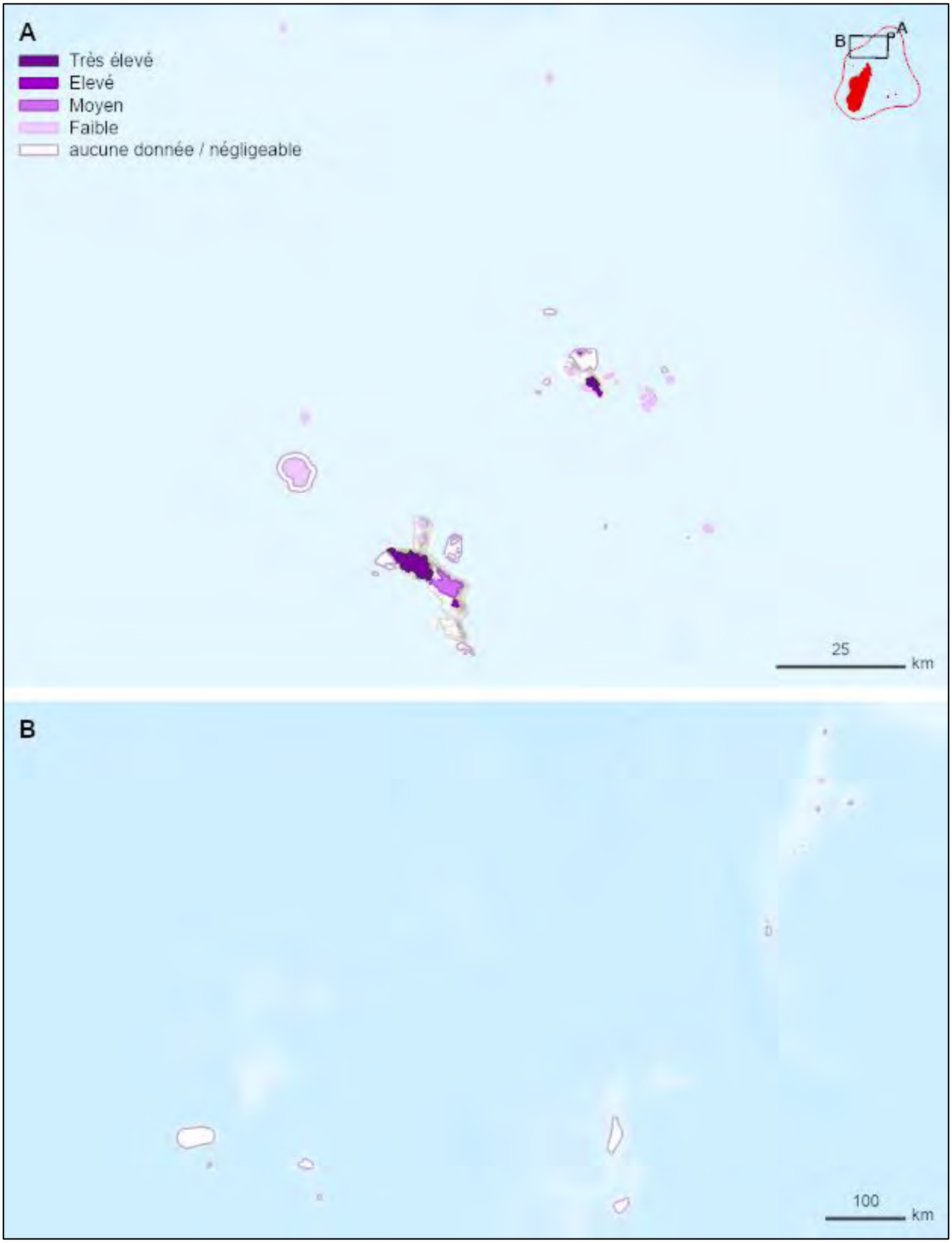

Figure 22 Relative importance of KBAs in the Seychelles for wood supply

Medicinal plants

The most popular medicinal plants targeted by local communities for collection in (semi-) natural ecosystems include *Psychotria pervillei*, *Craterispermum* spp., *Diospyros seychellarum*, *Aphloia theiformis* subsp. *sechellensis, Brexia microcarpa*, *Ochrosia oppositifolia* and *Pittosporum senacia* subsp. *wrightii*. Expert opinion was used to assess the relative importance of KBAs for the provision of medicinal plants (Figure 23).

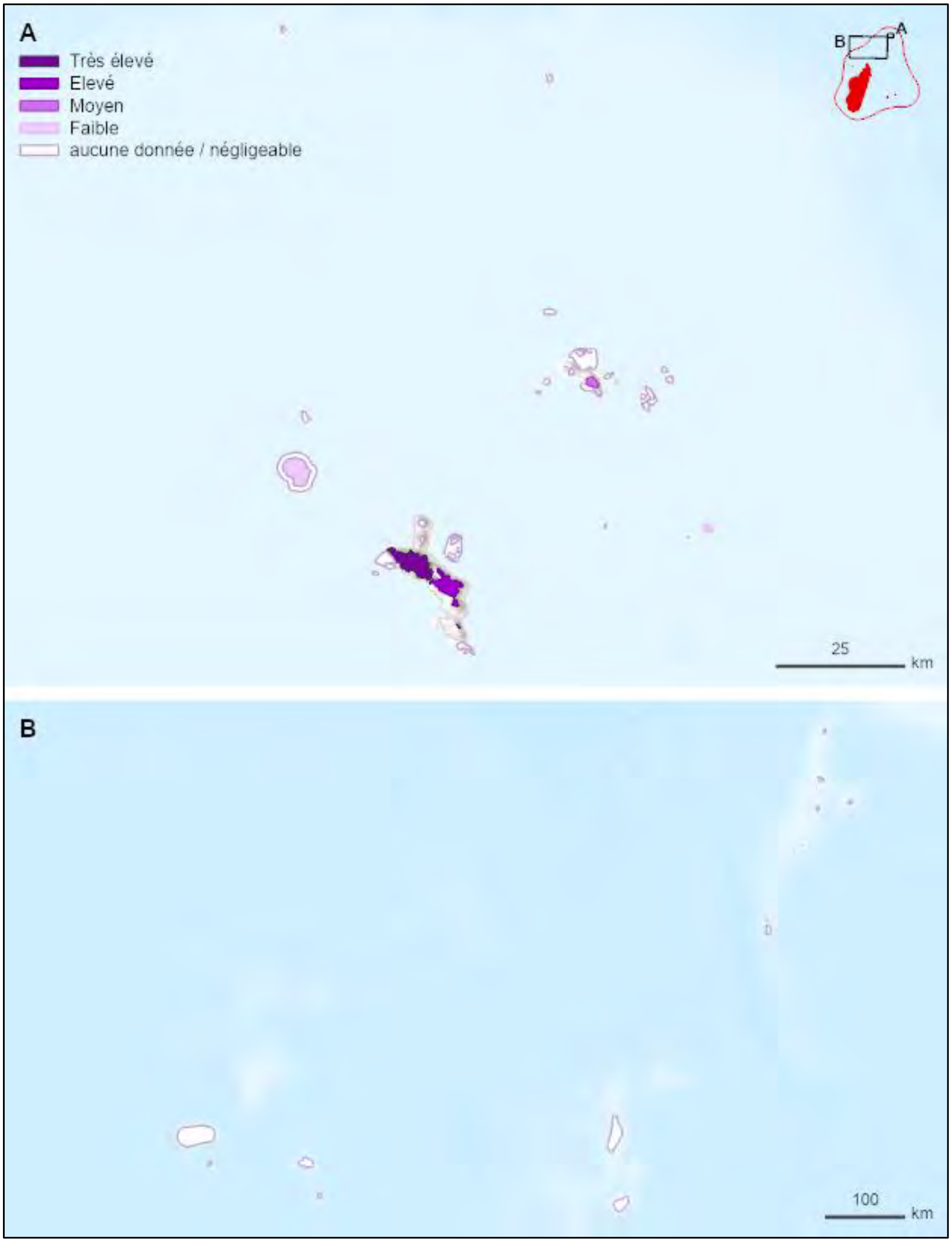

Figure 23 Relative importance of KBAs in the Seychelles for medicinal plants

6.5. Provisioning services: water

6.5.1. Madagascar

Water for irrigation

The priority ecosystem services identified for Madagascar included provision of fresh water for irrigation. The relative importance of KBAs for this service is shown in Figure 24.

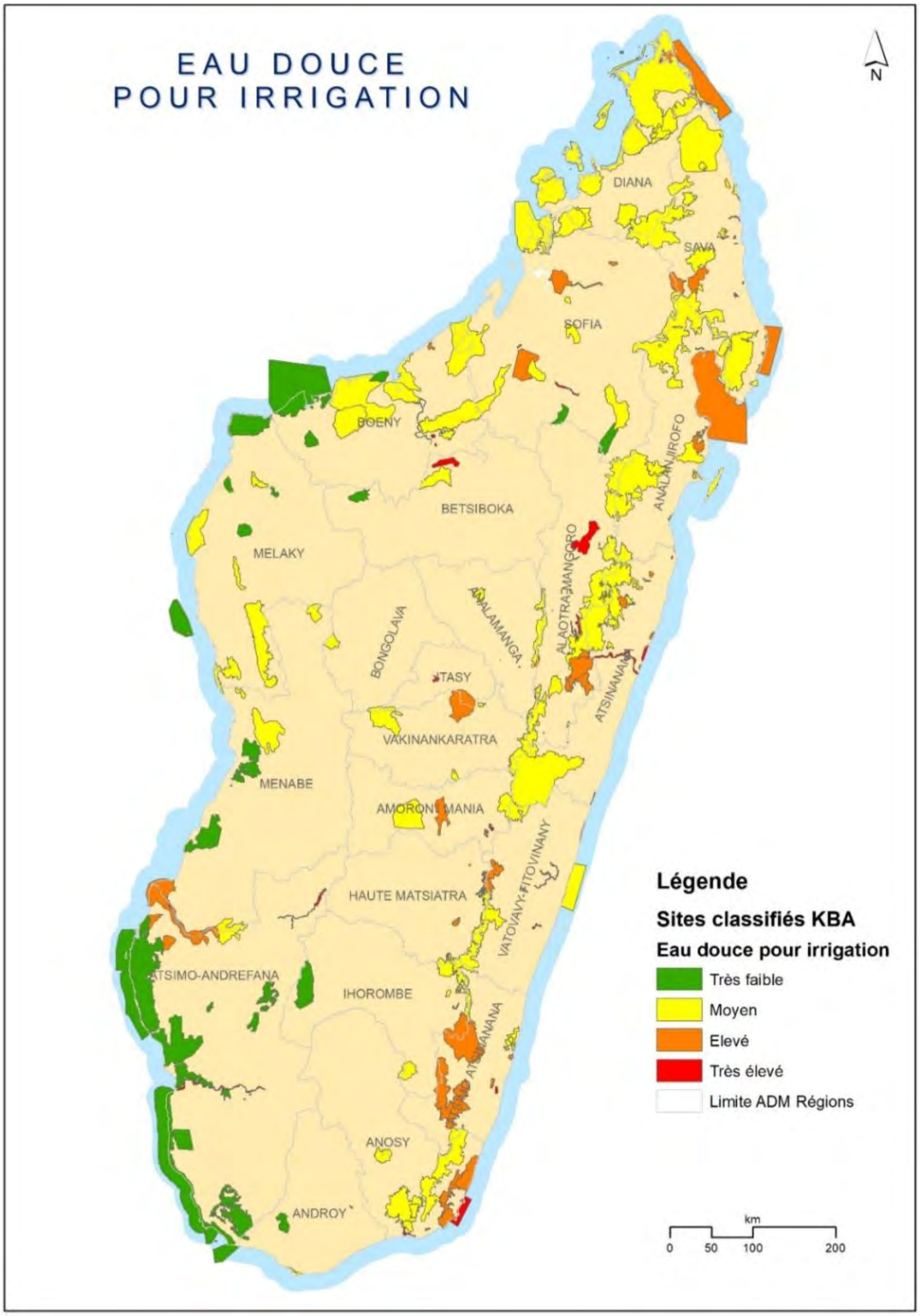

Figure 24 Relative importance of KBAs in Madagascar for water for irrigation

6.5.2. Comoros

Water for domestic use

The oldest islands of the Comoros (Mohéli and Anjouan) have an important hydrological system, comprising permanent or semi-permanent rivers. On the other hand, Grande Comore, the youngest island, has no rivers. Rainwater infiltrates under a very impermeable rocky soil to form groundwater at the coast.

Thanks to the forest ecosystems sheltering rivers with an average rainfall of 800 mm but which can reach 6,000 mm per year, the permanent or semi-permanent rivers make it possible to provide for the daily water needs of the population of these three islands. Catchment basins for decantation and storage are built upstream to allow the distribution to the houses by a system of canalization. The relative importance of KBAs in the Comoros for the provision of water for domestic use is shown in Figure 25.

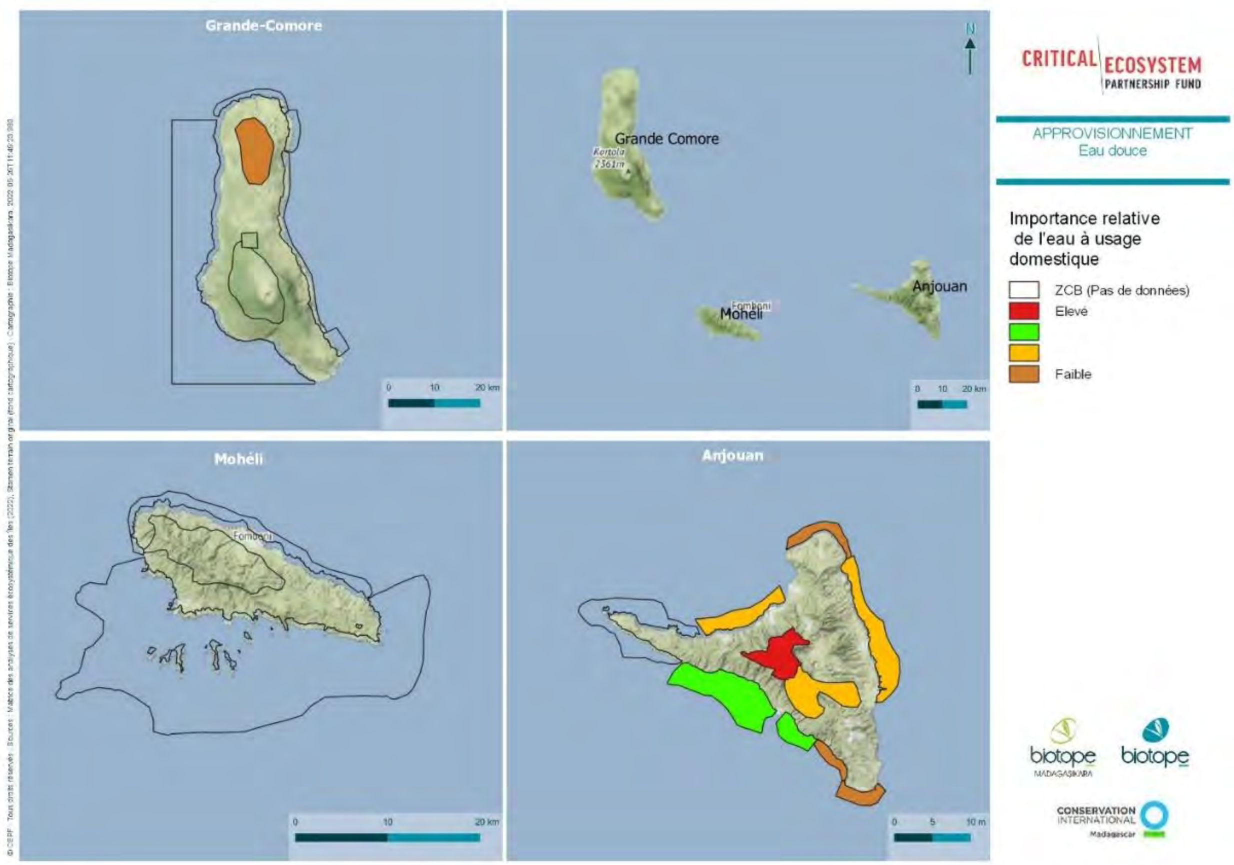

Figure 25 Relative importance of KBAs in the Comoros for water for domestic use

Water for irrigation

The importance of the river network in Mohéli and Anjouan has allowed the development of irrigated crops in these two islands. On the island of Mohéli, Mohéli National Park supports farmers to improve agricultural production in a sustainable way. Each of the three main islands in the Comoros has a wetland associated with a lake ecosystem. These lakes, small in terms of water volume, are fully protected and extraction of water for irrigation is prohibited.

The island of Grande Comore does not have permanent watercourses like Mohéli and Anjouan. Farmers there practice a type of rain-fed agriculture. They are, therefore, more vulnerable to current climate challenges. Watershed forests on Grande Comore are of elevated importance for provision of water for irrigation (Figure 26).

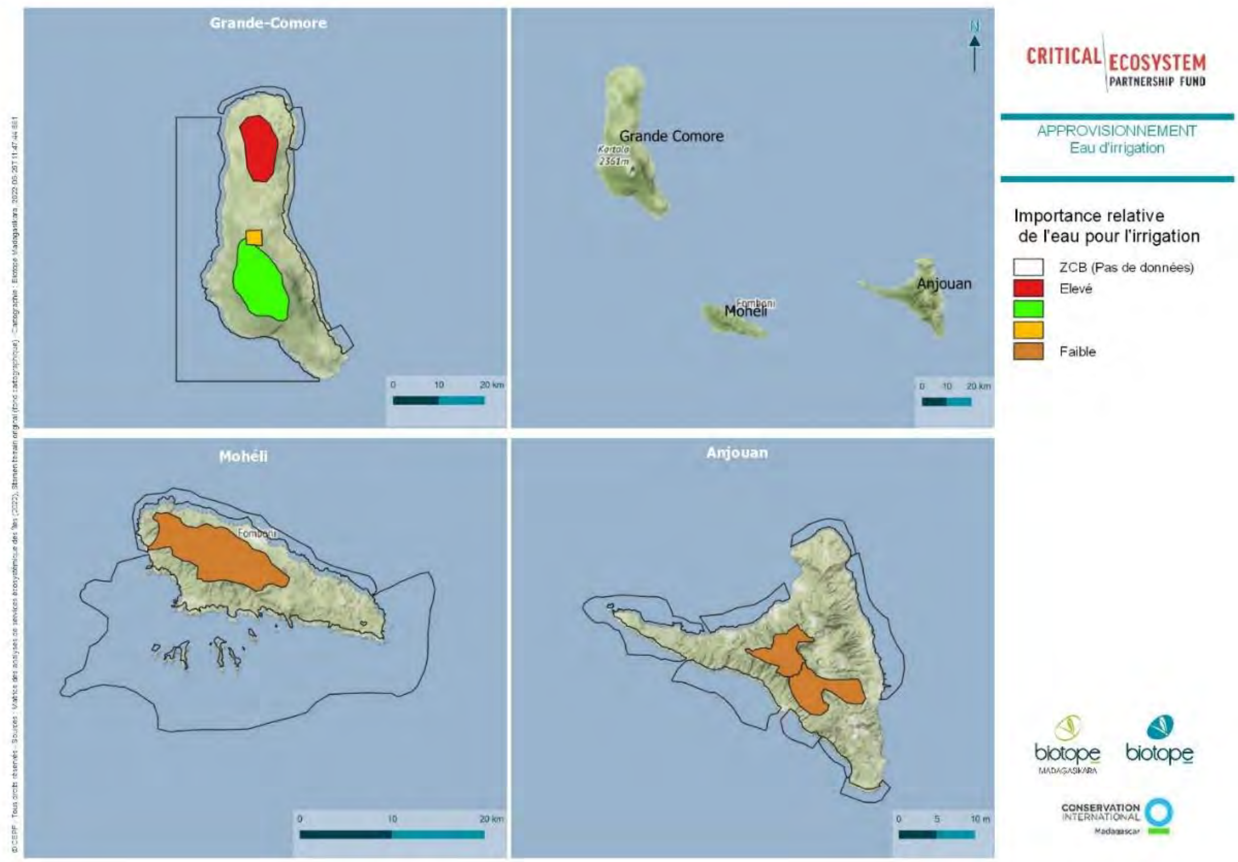

Figure 26 Relative importance of KBAs in the Comoros for water for irrigation

Water for hydroelectricity

Hydroelectricity is limited on the two islands where there are permanent watercourses. There are two hydroelectric dams on Anjouan and one on Mohéli. In the case of Anjouan, Mont Ntringui (Ndzuani highlands) KBA plays an important role in watershed protection for the dam (Figure 27).

6.5.1. Mauritius

Water for domestic use

Protected areas, while often focused on terrestrial protection and less frequently designed to protect freshwater resources, can be extremely important for the conservation of freshwater biodiversity and for the security of water needed for human survival and development. This is the case in Mauritius, where many terrestrial KBAs play an important role in the provision of water for domestic use (Figure 28).

In Mauritius, the main source of domestic water supply is groundwater (50 percent) which is extracted from 163 boreholes. The remaining 50 percent comes from surface sources, such as impoundments and river intakes.

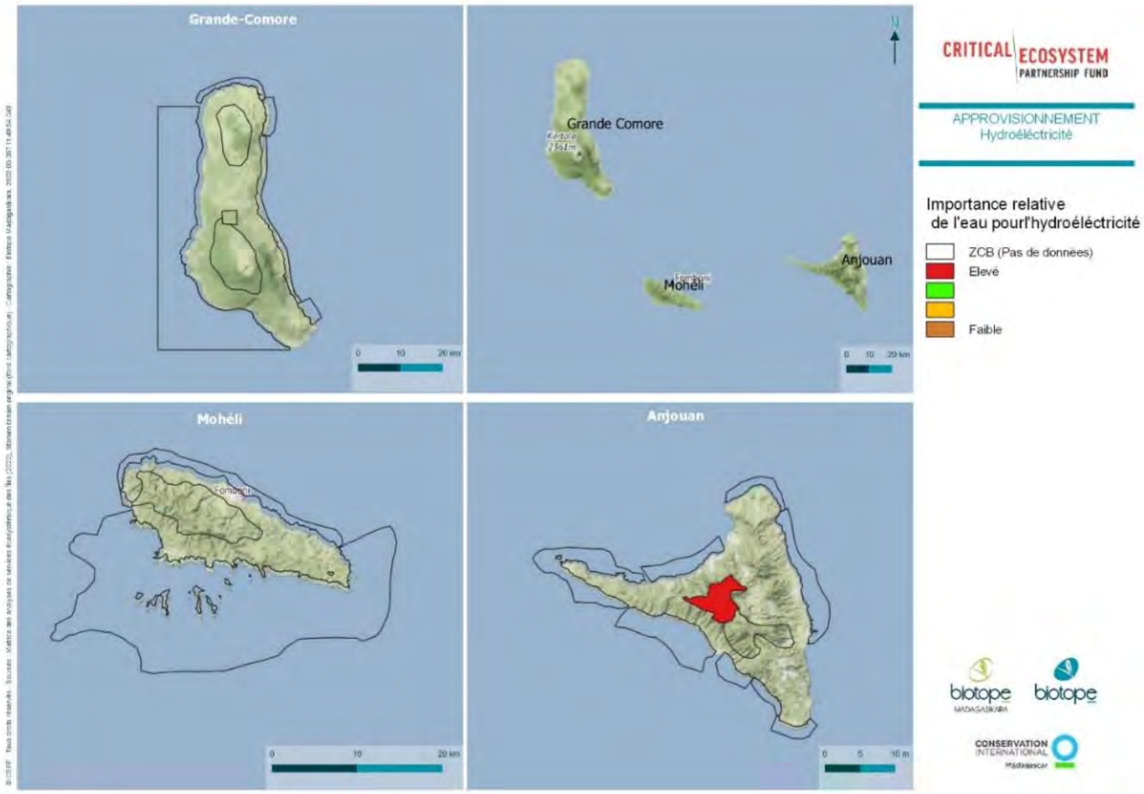

Figure 27 Relative importance of KBAs in the Comoros for hydropower generation

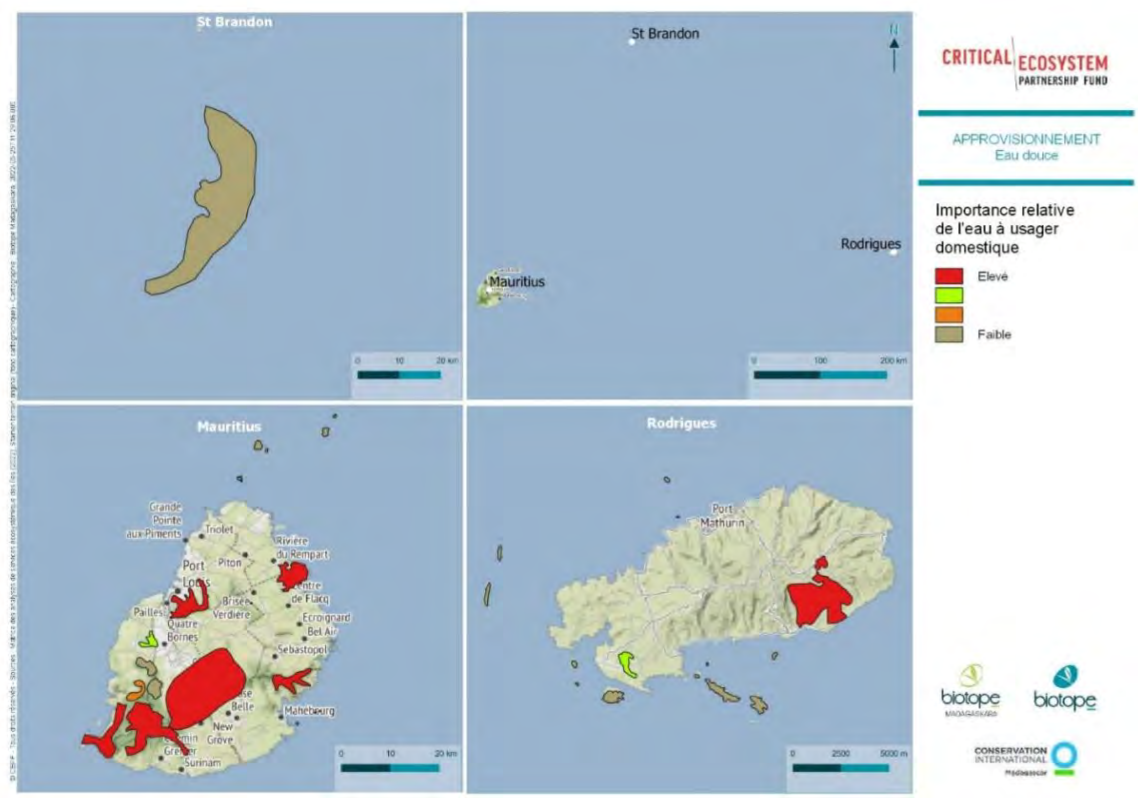

Figure 28 Relative importance of KBAs in Mauritius for water for domestic use

Water for irrigation

The large Mauritian sugar estates draw their water from rivers (there is no tax on this water), as much of their land is along these rivers. On the other hand, the government, through the Irrigation Authority, has planned irrigation programs for the benefit of small farmers. The water requirements in this sector vary from 30 to 100 mm^3. Initially, the water needed was obtained from natural springs, streams or rivers near the plantations, and few sugarcane farmers had holding tanks to store water for irrigation. The La Ferme and La Nicolière impoundments were built specifically to provide irrigation water for the sugar industry. Extensive feeder systems (such as the La Nicolière feeder and La Ferme distribution canals) were also constructed to feed the reservoirs and distribute the water over large areas. Irrigation projects are sometimes decided without complete technical data. As the population increases, the available water per capita inevitably decreases. In previous years, water used for irrigation was three times the annual consumption of potable water (domestic, tourist and industrial).

The total irrigated area in Mauritius has increased from 15,000 ha in 1970 to 19,000 ha in 2019, growing at an average annual rate of 0.52 percent. The relative importance of KBAs in Mauritius for provision of fresh water for irrigation is shown in Figure 29.

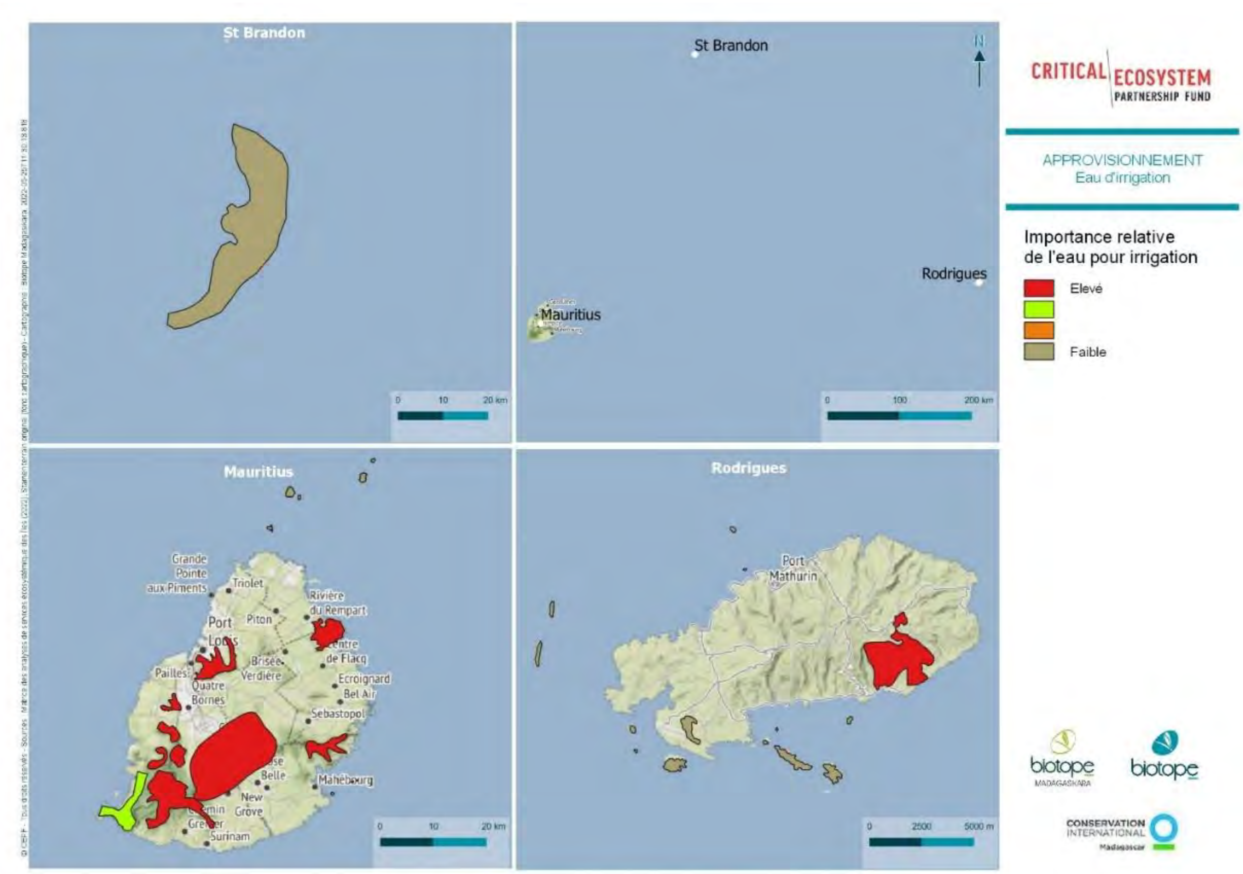

Figure 29 Relative importance of KBAs in Mauritius for water for irrigation

Water for hydroelectricity

Hydropower accounted for 3 percent of total electricity generated in Mauritius in 2019. Electricity generated by all hydroelectric plants was 98.6 GWh in 2019. Fluctuations in hydropower generation tend to follow annual rainfall levels. In the rainy season, hydroelectricity production can reach 125 GWh, while, in the dry season, it can drop to

57 GWh. Three watershed forest KBAs on the island of Mauritius were identified by experts as being important for this service (Figure 30).

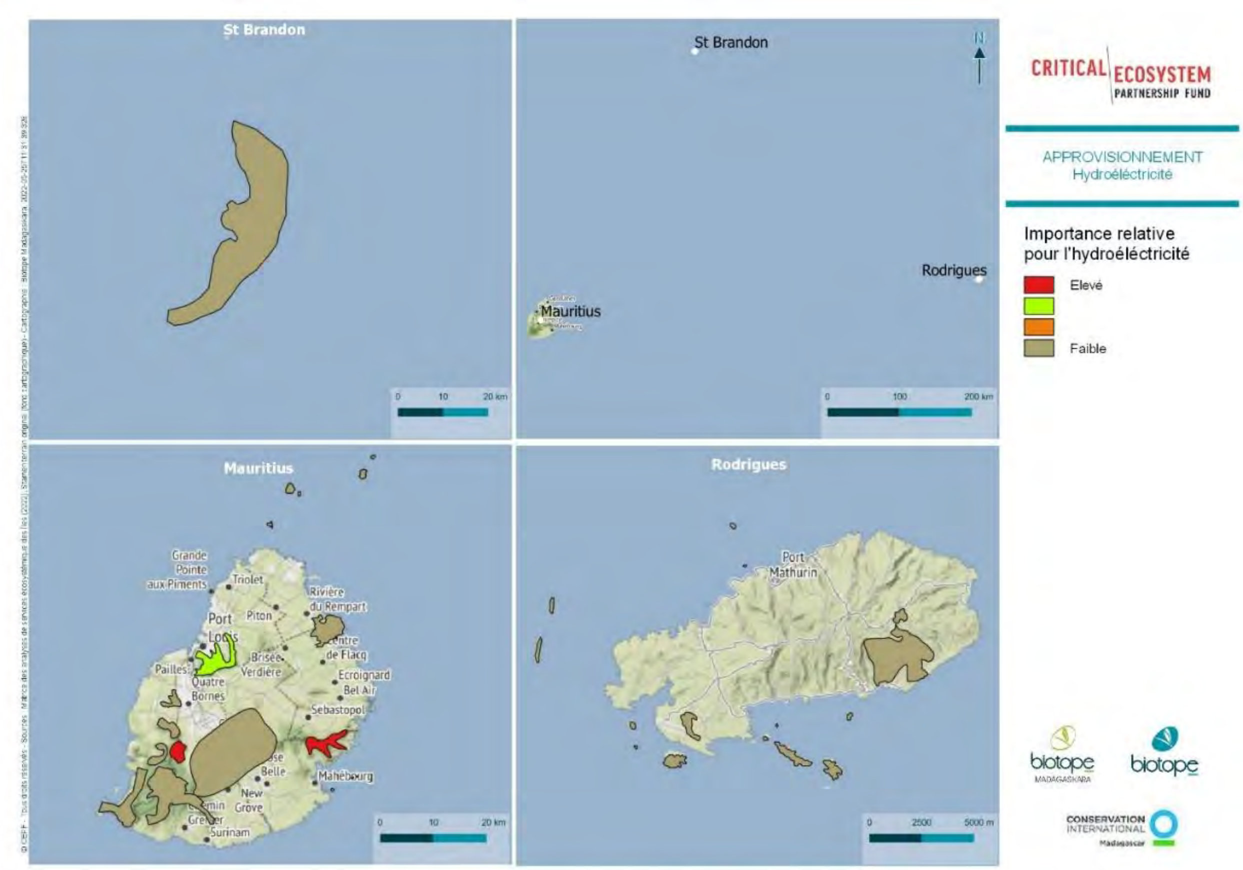

Figure 30 Relative importance of KBAs in Mauritius for hydropower generation

6.5.2. Seychelles

Water supply

Considering that the vast majority of the population is located on the three main islands of Mahé, Praslin, and La Digue, only the KBAs on these islands are potentially relevant to the provision of water resources in the context of climate resilience of the local population (Figure 31). Although water appears to be abundant on these islands, it is entirely dependent on the quality of the tiny watersheds there, as opposed to mainland areas with large watersheds. Therefore, and also given the increasing water consumption, it is clear that the population of the Seychelles, as well as its tourism industry, will be increasingly vulnerable to water scarcity, especially if deforestation (due to urban development) or forest fires affect the watersheds and compound the effects of climate change. Another concern for La Digue, where groundwater is the main source of supply (Futter and Dollar 2017), is the high vulnerability of the limited water table on this small island (about 1,000 ha), which is subject to irreversible salinization risk if overexploited, as well as pollution risks due to the lack or very limited graywater collection and treatment system on the plateau, where most of the habitat is concentrated.

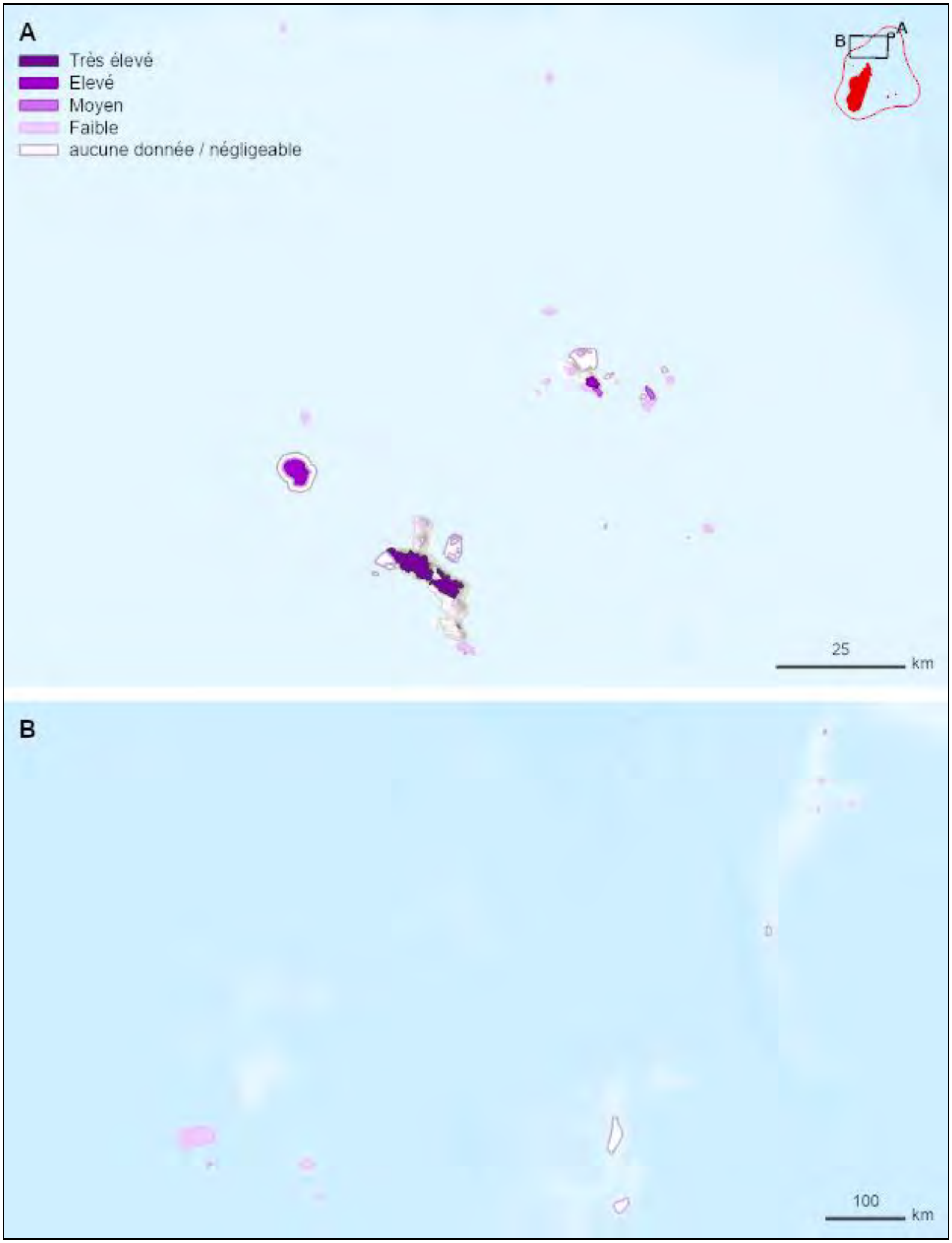

Figure 31 Relative importance of KBAs in the Seychelles for water for domestic use

6.6. Regulating and maintenance services

6.6.1. Madagascar

Coastal protection

Reefs and mangroves are the ecosystems that protect Madagascar from extreme weather events and climate change. Mangroves are mainly found in western Madagascar and cover a total area of 236,402 ha (Shapiro *et al.* 2019). Mangroves within two kilometers of the coastline help protect the coastline from cyclones and storm surges. The KBAs with the highest relative importance for coastal protection include the Three Bays complex, Mahajanga coastal zone, Nosy Varika, Nosy Be and the Satellite Islands, and Ile Sainte Marie (Ambohidena) (Figure 32).

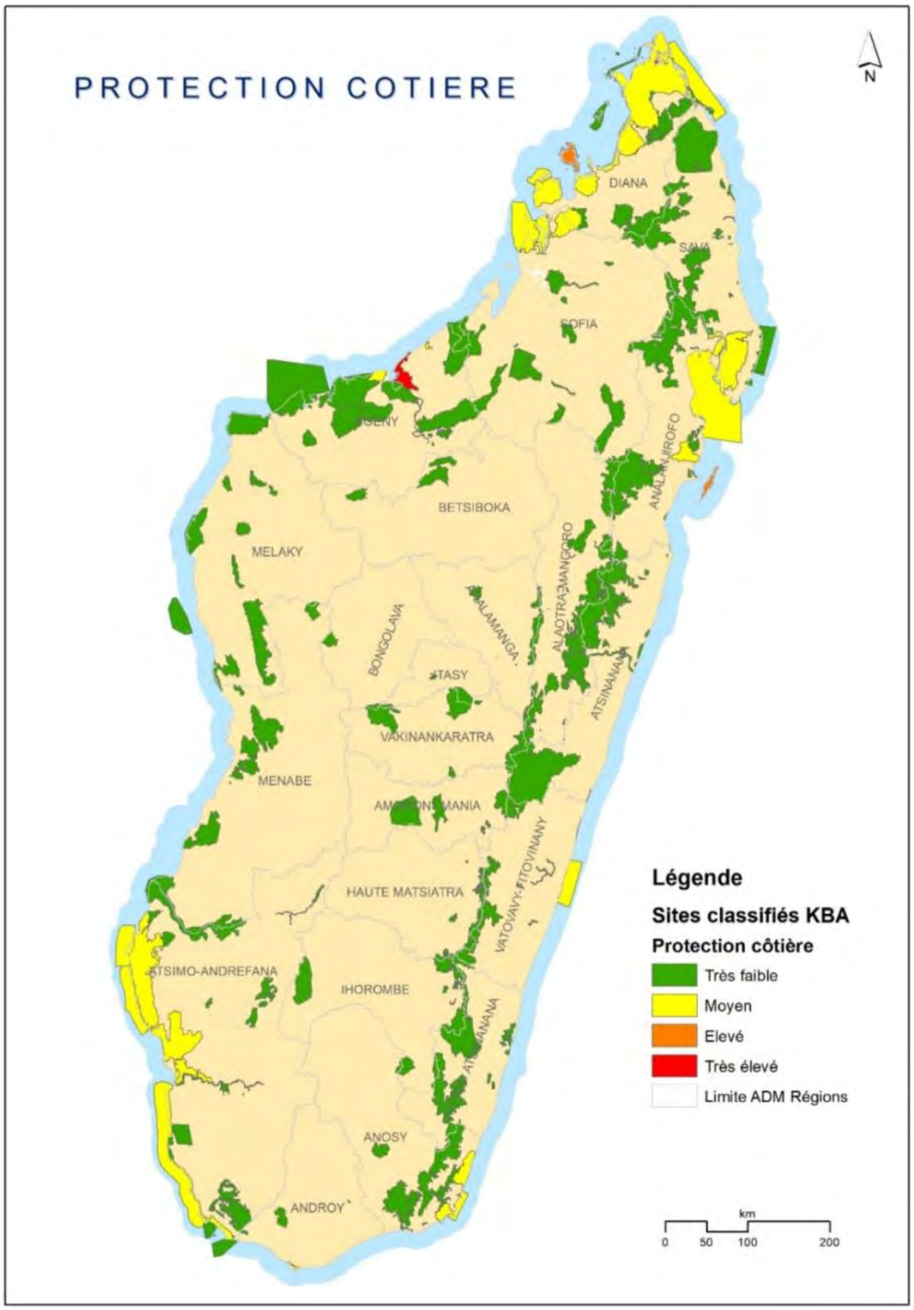

Figure 32 Relative importance of KBAs in Madagascar for coastal protection

6.6.2. Comoros

Flood protection

During storms, mangroves play a key role in protecting local populations and nearby infrastructure from large waves, storm surges and tsunamis (Figure 33). Watershed forests also play a key role in protection against flash floods and landslides (Figure 34).

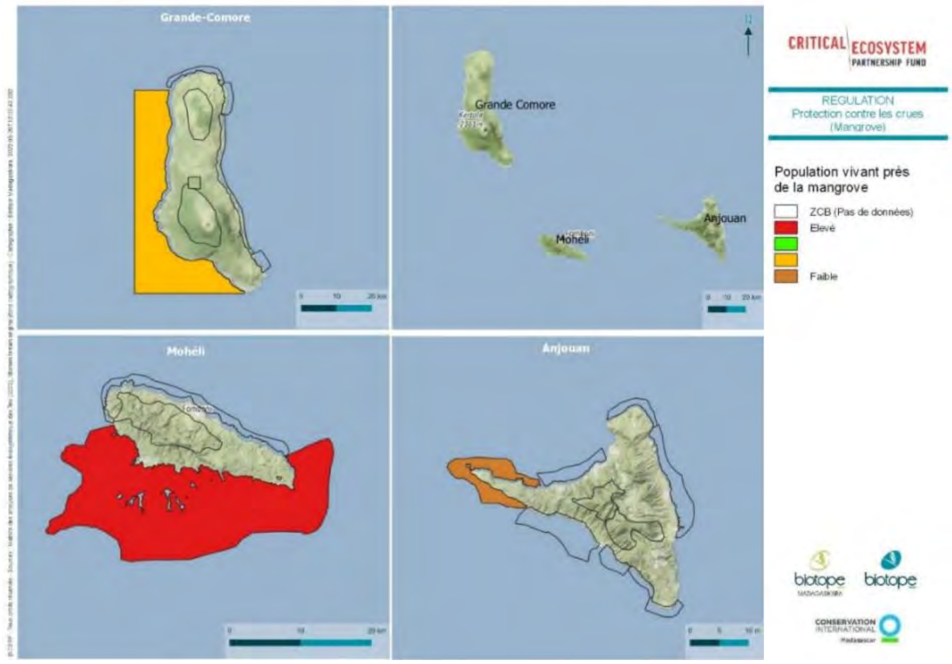

Figure 33 Relative importance of mangrove KBAs in the Comoros for flood protection

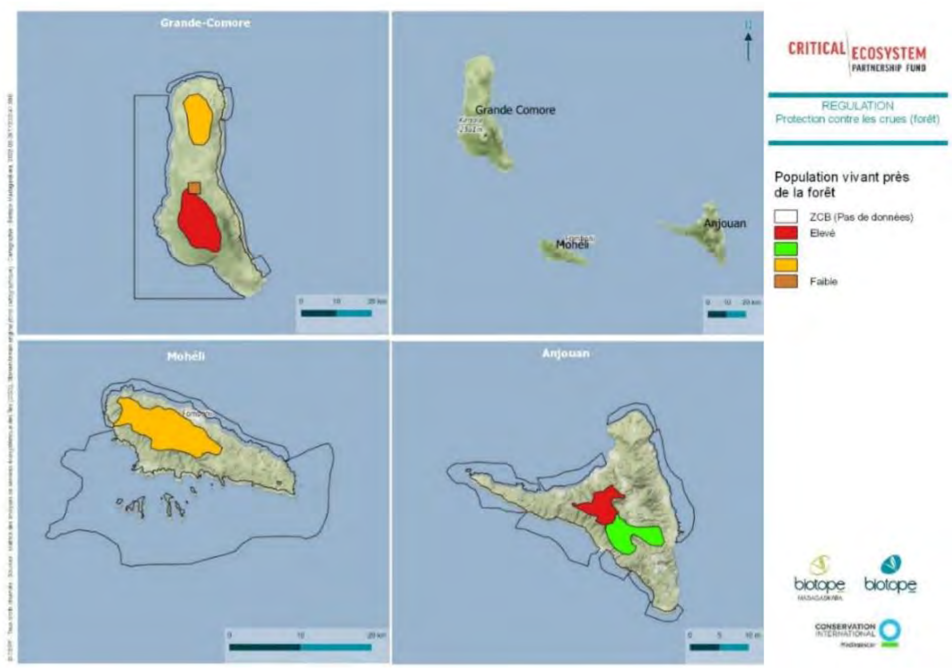

Figure 34 Relative importance of watershed forest KBAs in the Comoros for flood protection

6.6.3. Mauritius

Protection against cyclones

Tropical cyclones are by far the most significant hazard, causing about 80 percent of average annual losses per year (World Bank 2017). The cyclone season in the Republic of Mauritius runs from November to April, although severe storms can occur in any month. The frequency of extreme weather events, heavy rainfall and storms of tropical cyclone strength or greater, has increased significantly over the past two decades.

Tropical cyclones affect almost all aspects of the services provided by ecosystems, such as infrastructure protection, wildlife habitat provision, and carbon sequestration. Coastal KBAs with a high cover of forest or mangrove have the highest relative importance for protection against cyclones (Figure 35).

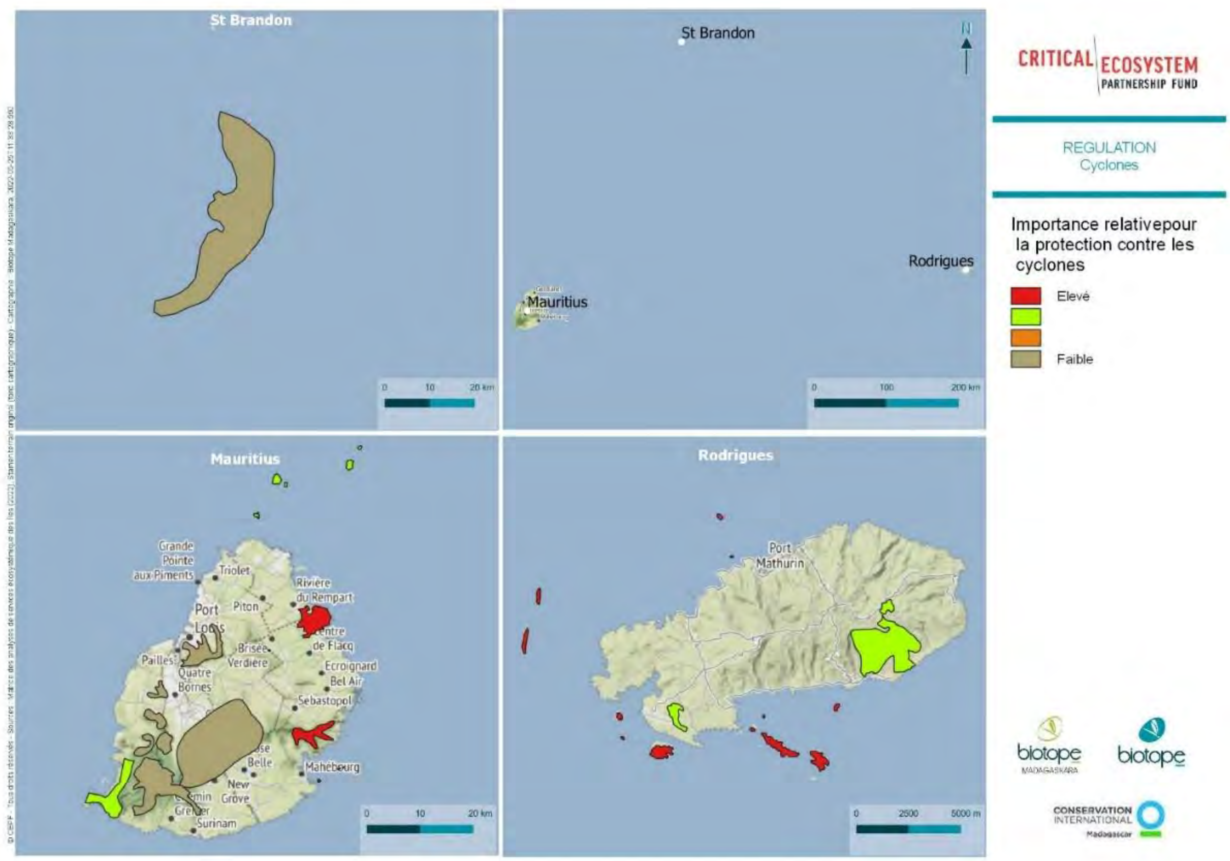

Figure 35 Relative importance of KBAs in Mauritius for protection against cyclones

Flood protection

According to the National Council for Disaster Risk Reduction and Management, in the Republic of Mauritius, floods that are caused by heavy/torrential rains account for more than 70 percent of catastrophic events each year. Of the many flash floods the country has experienced, the one that occurred in Port Louis on 30 March 2013, caused one of the highest numbers of deaths. Furthermore, according to the Strategic Framework and Action Plan for Disaster Risk Reduction (DRR Report 2013), it has been estimated that damage to buildings and infrastructure from floods over the next 50 years will cost Mauritius approximately US$2 billion (Anon 2019). Watershed forest KBAs have the highest relative importance for protection against floods (Figure 36).

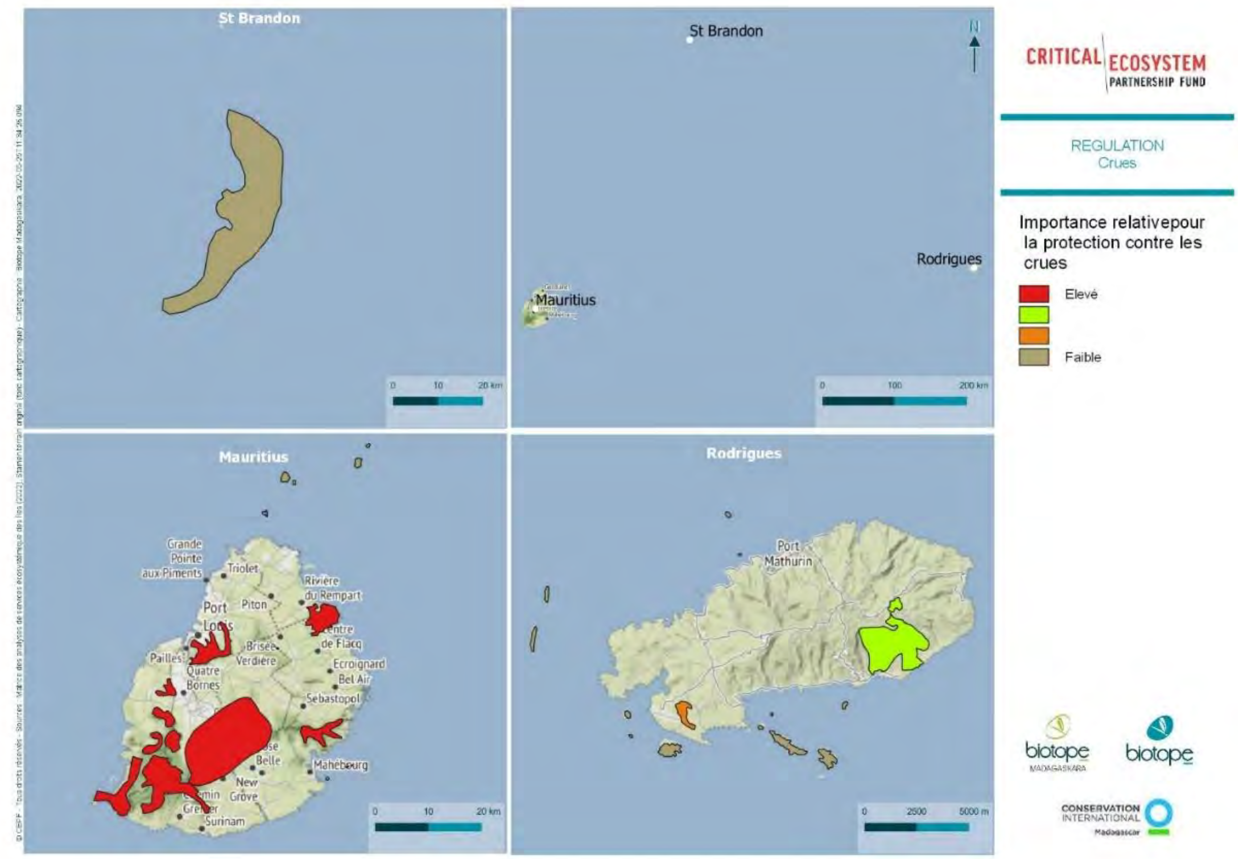

Figure 36 Relative importance of KBAs in Mauritius for flood protection

6.6.4. Seychelles

Flood protection

Flooding has occasionally occurred in the Seychelles in the coastal plateau areas of the islands of Mahé, La Digue, and (less frequently) Praslin, due to the high degree of urbanization (increased runoff and decreased infiltration), land reclamation, and deforestation of the watersheds.

In addition, it is important to note that rising sea levels will increase the risk of coastal flooding and saltwater intrusion into the soil of the islands. Watershed forest KBAs on the main island are the most important for the delivery of this ecosystem service (Figure 37).

Protection against cyclones

Protection from the impact of cyclones (against a background of projected increases in frequency and severity of these events due to climate change) is largely provided by marine and intertidal ecosystems, such as mangroves and coral reefs on the coastal shelf. The relative importance of these ecosystems for protection against cyclones is also influenced by the degree of exposure to swell and shoreline orientation (Figure 38).

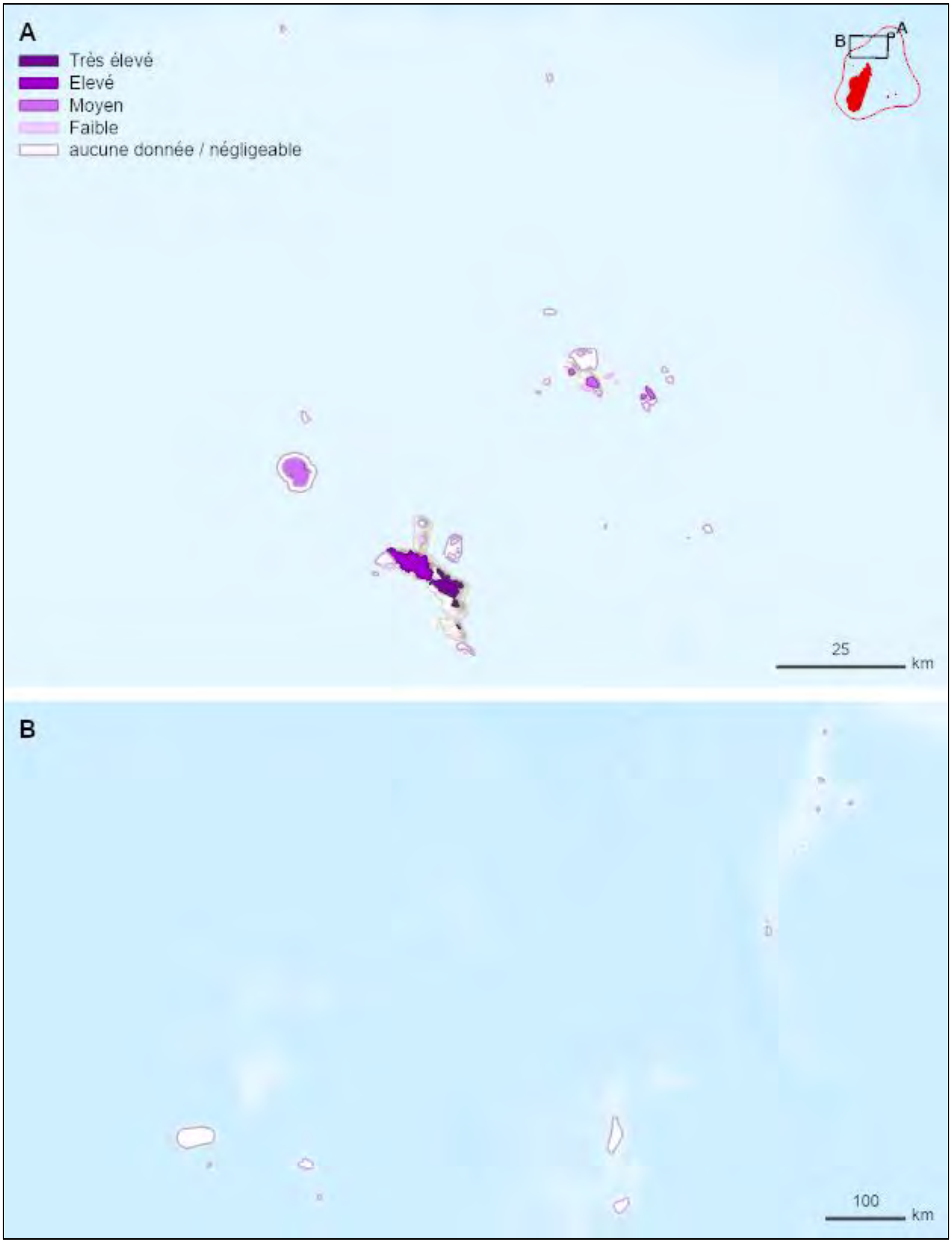

Figure 37 Relative importance of KBAs in the Seychelles for flood protection

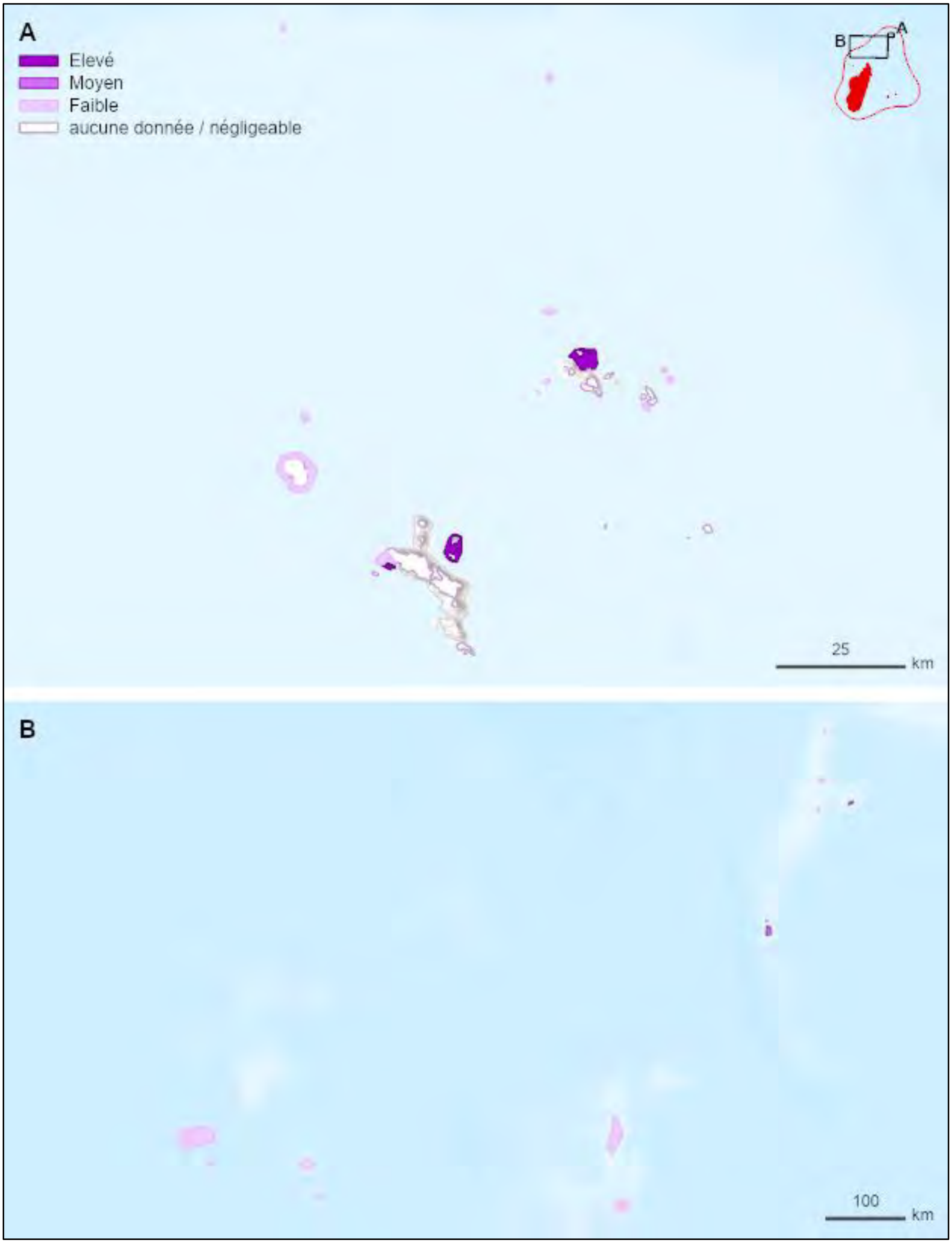

Figure 38 Relative importance of KBAs in the Seychelles for cyclone protection

Maintenance of habitats, species and genes

Some KBAs contribute significantly to nature conservation because of their exceptional biological value. They provide, for example, suitable habitats for some rare and endangered species, especially unique plants and animals that may be endemic forms found only in the Seychelles, including KBAs such as Morne Seychellois National Park, Praslin National Park and Silhouette National Park. KBAs may represent a reservoir of species with healthy, genetically diverse populations capable of repopulating areas where they are over-exploited or have disappeared. Some species that do not have immediate economic value may become a resource in the future (for example, plants that could provide medicines or flavors to produce perfumes, and ornamental species). KBAs also contribute to key biological life cycle processes. These include large KBAs, such as Aldabra Atoll or Cosmoledo Atoll, but also tiny islands, such as Aride, Cousin or Bird, that support internationally important concentrations of wildlife (seabirds, marine turtles) and contribute significantly to the functioning of the overall ocean ecosystem (Figure 39).

Figure 39 Relative importance of KBAs in the Seychelles for the maintenance of habitats, species and genes

Local climate regulation

The most relevant aspect for local communities in the Seychelles in terms of adaptation to climate change is not as much related to global climate as it is to local climate. Indeed, for tropical environments, in particular small islands like the Seychelles, the local climate is largely influenced by local forest cover, which is a key factor in water cycling and temperature regulation (Shaw 2003, Sheil and Murdiyarso 2009, Oglesby *et al.* 2010, Catling and Stroud 2012, Bunyard 2014, McAlpine *et al.* 2018, Sheil 2018). Consequently, it is the KBAs with the greatest forest cover that have the highest relative importance for local climate regulation (Figure 40).

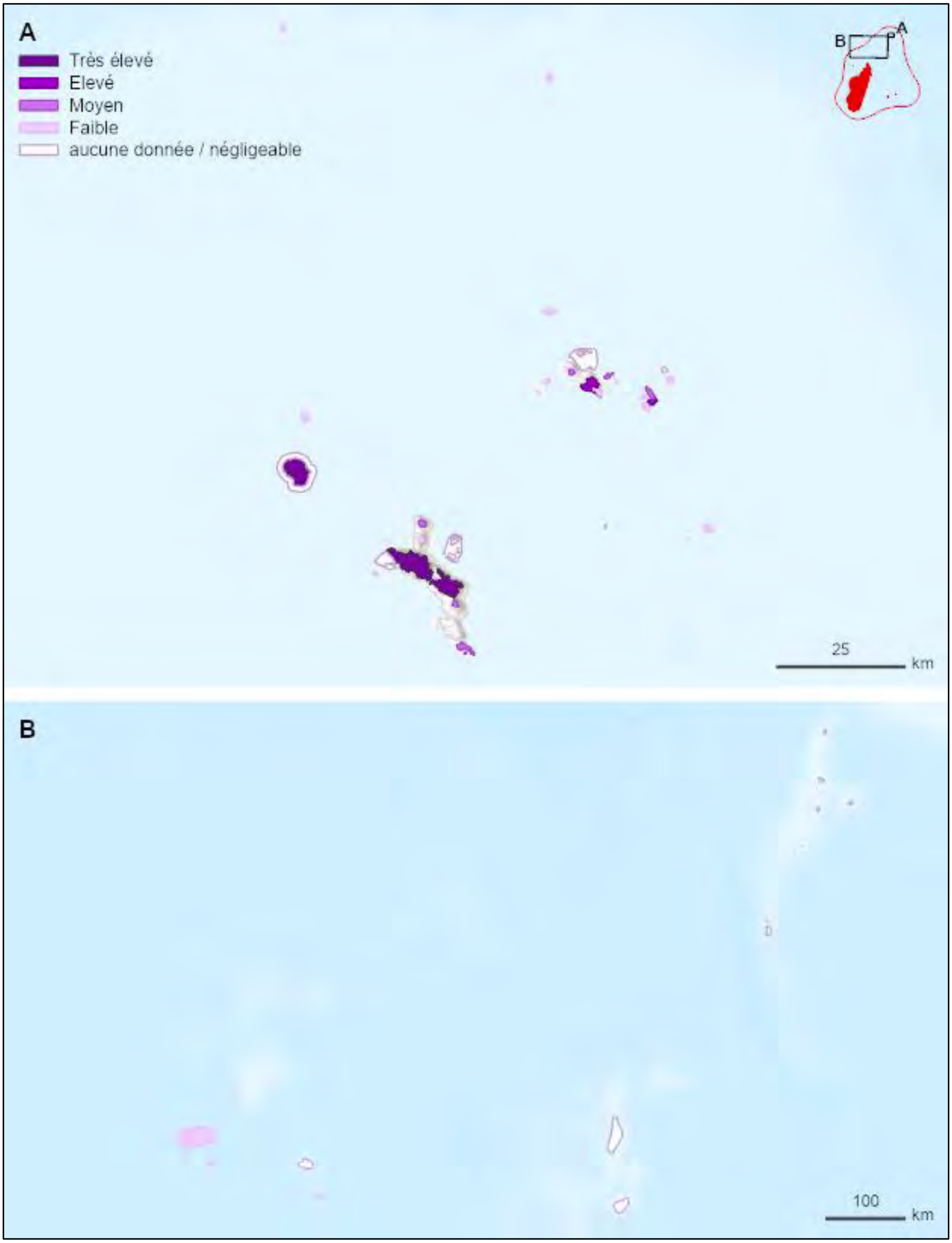

Figure 40 Relative importance of KBAs in the Seychelles for local climate regulation

6.7. Cultural Services

6.7.1. Madagascar

Ecotourism

Ecotourism data are only available for 32 protected KBAs managed by Madagascar National Parks. The KBAs that received the most visitors in 2012 were Isalo National Park, Mantadia National Park and Analamazaotra Special Reserve, Ranomafana National Park, Nosy Be and Satellite Islands (Nosy Tanihely), and Ankarana Special Reserve. It should be noted that these data are limited only to certain sites and relate to a single year. However, much of the ecotourism in Madagascar is centered on the national park system. Thus, even though this data set is incomplete, the national parks have relatively high values for this service.

Ecotourism, including visiting coastal ecosystems such as mangroves and reefs for recreational activities such as diving and sport fishing, is a cultural ecosystem service. With a coastline of nearly 5,000 km, Madagascar is one of the most popular ecotourism destinations in the world (http://bossiadventures.com/). This ecosystem service is measured by US dollars spent. The KBAs concerned are those in the northwest of Madagascar, around Nosy Be, Nosy Hara, Mitsio Archipelago and the coast between Ampasindava, Vohilava and Nosy Be. In southwestern Madagascar, significant values are observed north of Tulear, especially in Ranobe PK32 Protected Area and Baie de Salary KBAs, and in the northeast at Ambodivahibe.

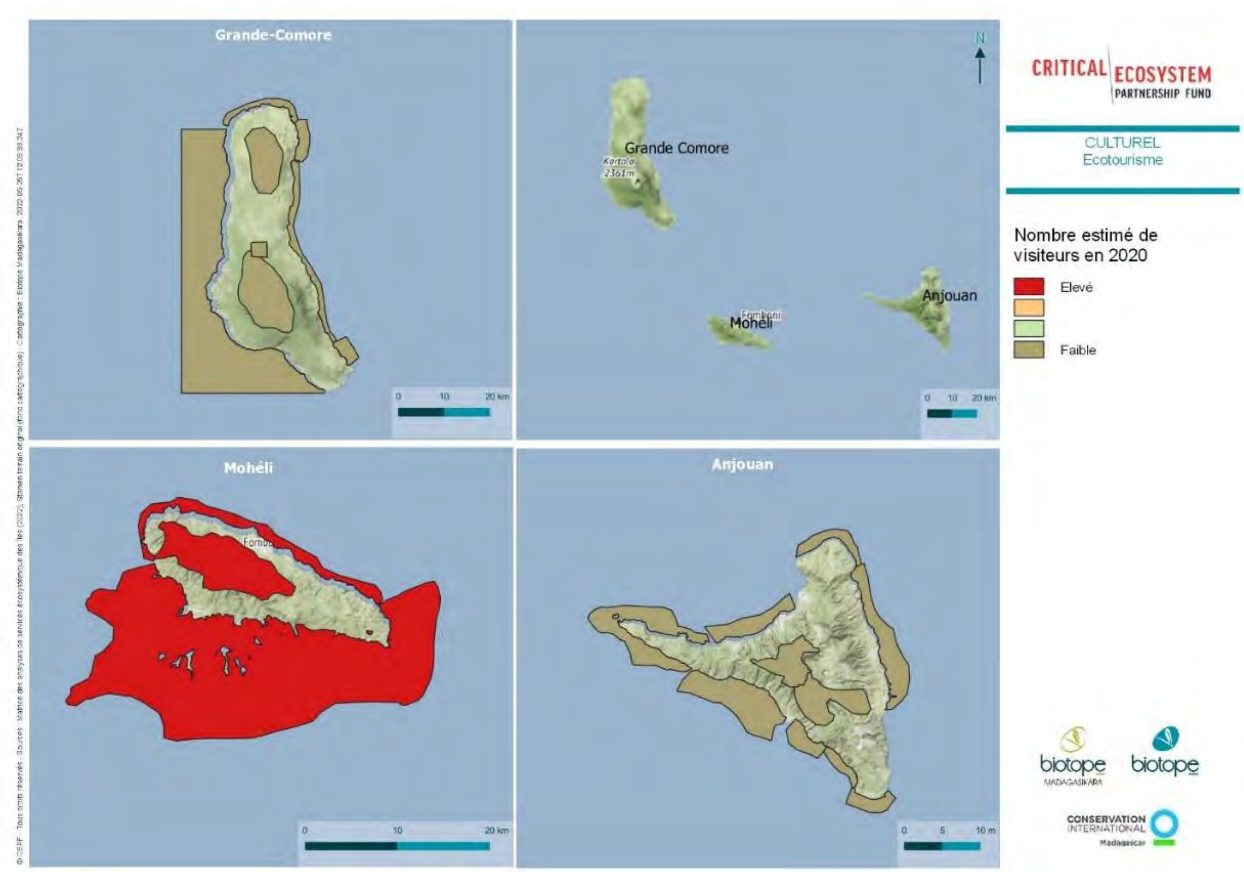

Figure 41 Relative importance of KBAs in the Comoros for ecotourism

6.7.1. Comoros

Ecotourism

The Union of the Comoros is a country with ecotourism potential, although the infrastructure for the promotion of ecotourism is currently either underdeveloped or non-existent. The recent creation of protected areas is, nevertheless, very promising for the development of this sector. Currently, it is the KBAs on Mohéli, the location of Mohéli National Park, that are considered the most important for ecotourism (Figure 41).

Cultural values

Two Comorian KBAs include natural sites or monuments of cultural interest, such as lake ecosystems and mangroves that are places of spiritual pilgrimage. The forest massifs of Grande Comores cover vestiges of colonial residences of historical and cultural interest, such as the Convalescence, the old industrial village of the Boboni era, the industrial and administrative site of the Nioumbadjou era for the Karthala and the House of Humblot on the Grille massif (Figure 42).

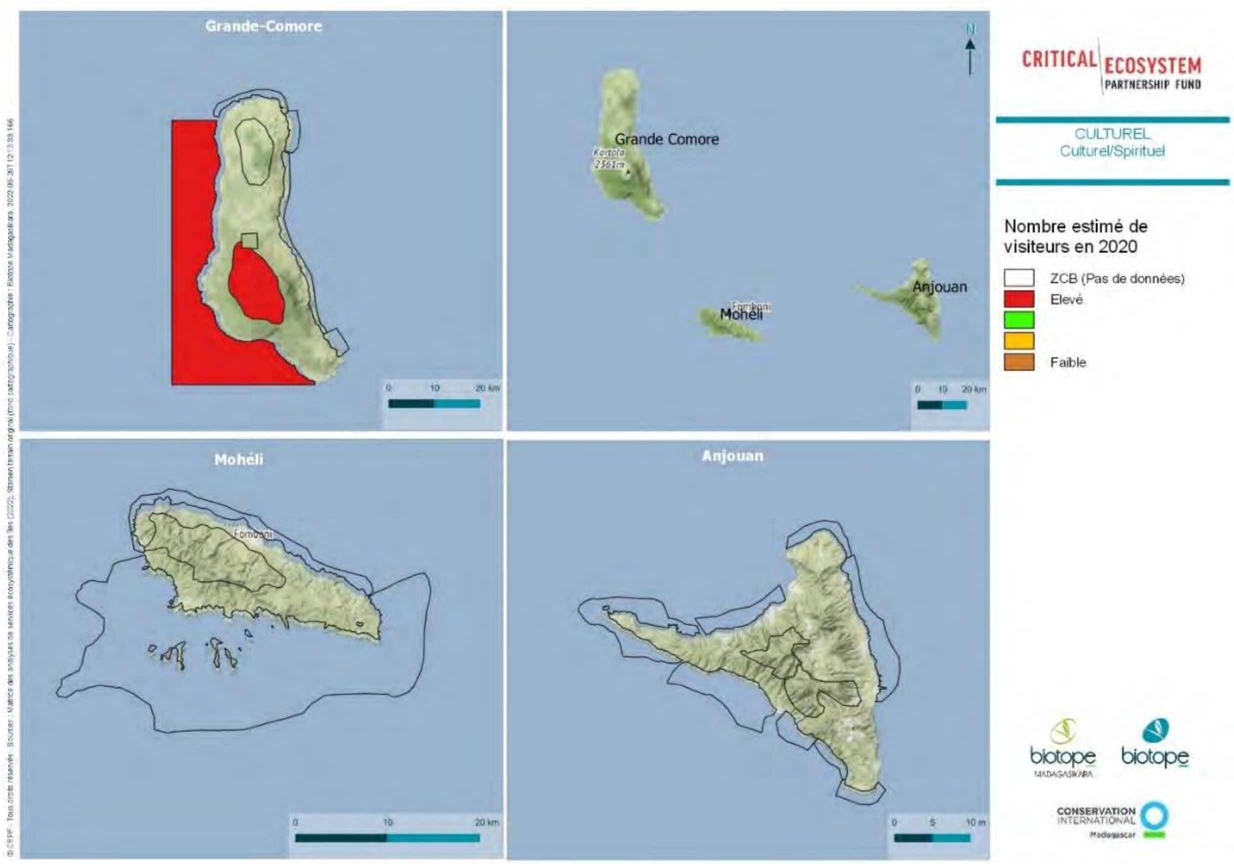

Figure 42 Relative importance of KBAs in the Comoros for cultural values

6.7.2. Mauritius

Ecotourism

Tourism is a major sector of the economy of Mauritius and Rodrigues (Seetanah *et al.* 2015) and is even considered the main economic sector. Several KBAs on the island of Mauritius are fully or partially open to visitors (Figure 43). They have beautiful landscapes, unique fauna and flora, and offer immense and often untapped ecotourism potential. These KBAs have functional tourism projects but there is also room for more authentic ecotourism projects.

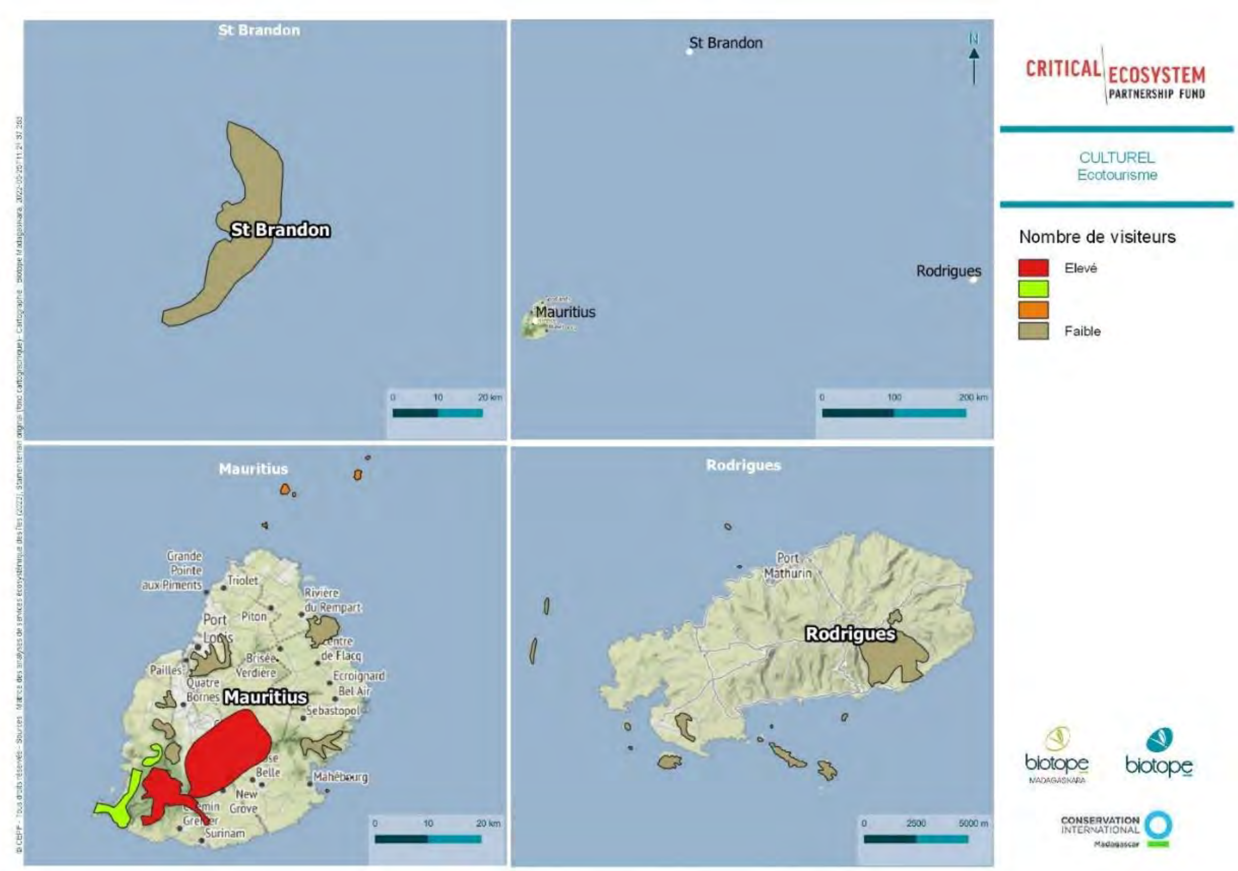

Figure 43 Relative importance of KBAs in Mauritius for ecotourism

6.7.3. Seychelles

Ecotourism

Nature-based tourism is the most important source of income for the Seychelles, where a large proportion of employment opportunities are linked to hotels and the tourism industry. In addition, less intensive and more sustainable forms of tourism aimed at discovering the natural assets of the Seychelles (hiking trails, endemic animals and plants, medicinal plants, historical and cultural assets, etc.) with nature guides and in closer contact with local communities are being developed. Beneficiaries include nature guides and local communities involved in ecotourism activities (guest houses, small farmers, handicraft producers, etc.). The relative importance of KBAs in the Seychelles for ecotourism is shown in Figure 44.

Figure 44 Relative importance of KBAs in the Seychelles for ecotourism

Cultural values

In the Seychelles, as in many island states, the natural environment is closely linked to the cultural values of local communities. KBAs provide, therefore, an important ecosystem service by connecting people to their culture and history. Some sites, such as Aldabra World Heritage Site, but also other remote atolls such as Cosmoledo or Farquhar, or natural sanctuaries such as Aride or Cousin Islands, have great importance in Seychellois culture and spirituality (Figure 45). In addition, functional ecosystems provide environmental education opportunities for children and scholars.

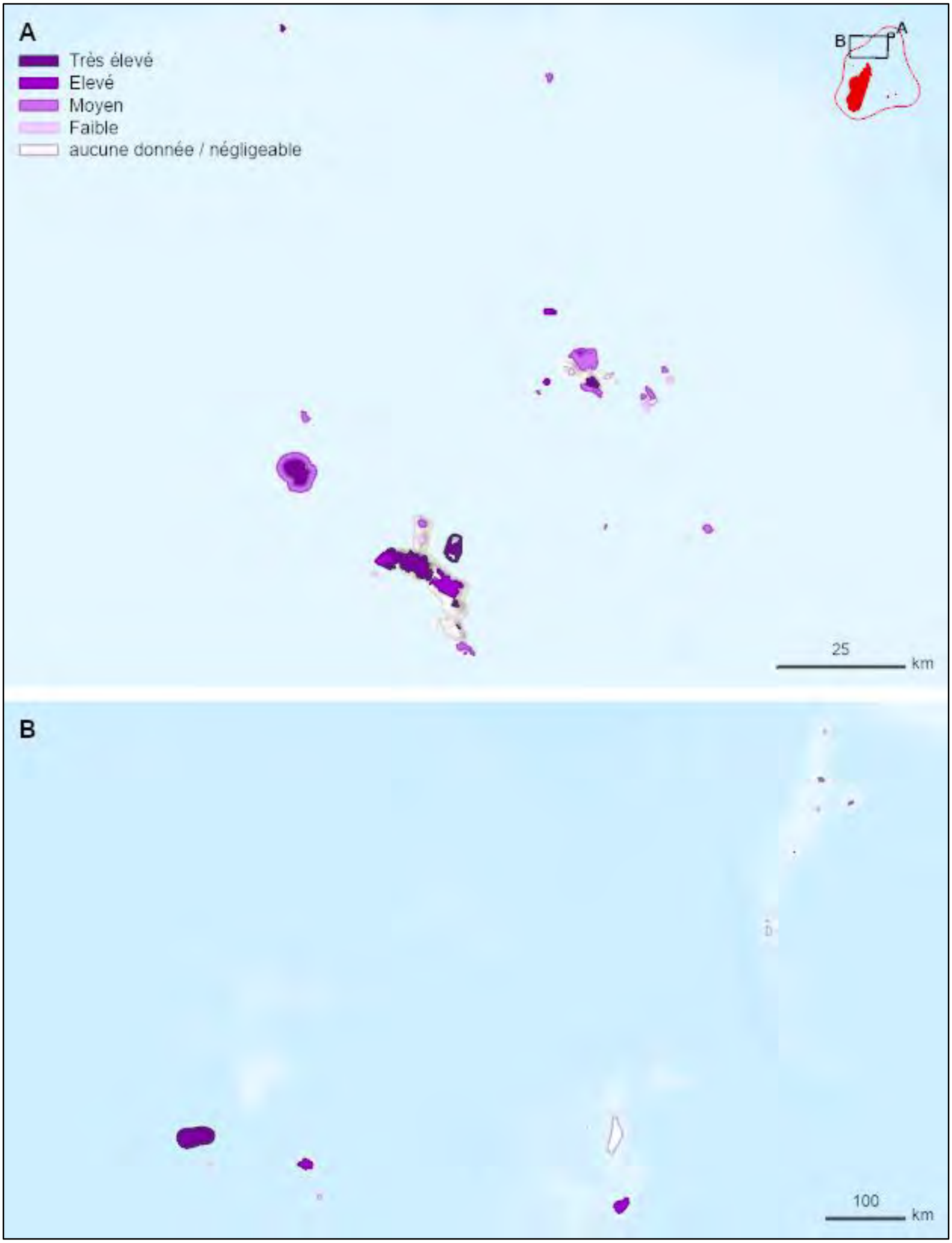

Figure 45 Relative importance of KBAs in the Seychelles for cultural values

7. THREAT ASSESSMENT

This chapter provides an overview of the main threats to biodiversity in the MADIO Hotspot and is closely linked to Chapter 8, which deals with socio-economic aspects. The chapter was developed on the basis of information gathered from literature reviews, interviews with experts, and exercises conducted during the national consultations.

The pressures and threats that affect biodiversity and ecosystems can be anthropogenic or natural. All ecosystems and species are affected, including wetlands and their flora (Bamford *et al.* 2017, Maharombaka *et al.* 2017), and terrestrial habitats and species. Anthropogenic activities include agriculture, landfills, filling, illegal collection, fires, and urbanization, while natural events include cyclones, storms, floods, and drought. The intensity and occurrence of natural phenomena such as cyclones and drought are exacerbated by climate change, while invasion by alien species is also a major threat, especially to freshwater habitats and species (Berisel and Lévêque 2010, Maharombaka *et al.* 2017).

Tables 40, 42, 43 and 45 summarize the main threats to biodiversity and ecosystems in each country, showing threats to terrestrial and marine ecosystems, as well as to wetlands. The severity of each threat is assessed, as well as, where possible, its root causes.

7.1. Madagascar

Madagascar faces significant environmental challenges that threaten the ecological functions and ecosystem services that ensure the country's well-being and socio-economic development. These include deforestation, degradation of natural areas, land and coastal erosion, accelerated depletion of natural resources, disappearance of endemic species, and climate change. In addition, there are threats from mining activities encroaching on forests and protected areas, illegal logging of precious wood, invasive species, pollution and the use of wood as a primary energy source for the population.

Generally speaking, all natural ecosystems in Madagascar must be considered to be threatened. The origins are diverse and are mainly linked to human activities (need for wood to meet energy demands, construction and infrastructure, overgrazing, and transportation), although other causes can be cited, such as climatic hazards, and proliferation of invasive alien species.

7.1.1. Threats to terrestrial ecosystems

Deforestation, forest degradation and fragmentation

The main cause of deforestation is the traditional agricultural technique known as *tavy*. In this traditional practice, fields are prepared by burning, used for crops, and then fallowed for around 10 years. When long cycles are respected, this practice can be effective and productive for subsistence agriculture. Population pressure has, however, led farmers to shorten the cycles and use *tavy* on steep, high slopes, with low yields and high rates of soil degradation and erosion, leaving large abandoned areas that are quickly colonized by weeds and secondary pioneer or invasive species.

Another very important factor is internal migration, driven by drought and famine in the far south of Madagascar, which is leading to conflicts over land and deforestation in other regions of the country, most notably in the Menabe Region, including within Menabe Antimena protected area. The factors driving internal migration are discussed further in Section 11.7.1.

Grazing pressure is also a major driver of deforestation and forest degradation, particularly in the western and southern regions of Madagascar. Grasslands are expanding at the expense of natural habitats due to population growth and economic and cultural principles favoring increased herding. In addition, the burning of grasslands before the rainy season to promote regrowth often results in uncontrolled fires that destroy forests and natural habitats. It is possible that the renewal and clearing of grasslands by fire has eliminated some of the native biodiversity.

In 1953, Madagascar's natural forests covered 16.0 million hectares, or about 27 percent of the national territory. Madagascar lost 44 percent of its natural forests between 1953 and 2014, including 37 percent between 1973 and 2014. Nevertheless, for all four forest types, with the exception of the thorny forest, Madagascar observed a gradual decrease in the deforestation rate after 1990: from 205,000 ha/year (1.6 percent/year) over the period 1973-1990 to 42,000 ha/year (0.4 percent/year) over the period 2000-2005. From 2005 onwards, the deforestation rate gradually increased and more than doubled over the period 2010-2014 (99,000 ha/year or 1.1 percent/year) compared to 2000-2005 (Vieilledent *et al*. 2018). A trend of accelerating deforestation for the next 10 years was observed, according to the Ministry in charge of the environment and forests (MEEF 2017). A significant increase in deforestation is expected by 2028, especially for the dry forests of the west and the humid forests of the northeast. A projected loss of 70,000 ha between 2018-2028 is estimated for the Atsimo Andrefana Region, while the projected loss for the Boeny Region is 100,000 ha.

Finally, demand for fuel (firewood and charcoal) is an important factor in the degradation of forest ecosystems. Wood fuel represents 92 percent of the energy sources used by the Malagasy population.

Mining

Rising world market prices and economic stimulus policies have led to an increase in mining operations, both large and small, which can have a significant impact on ecological systems, including forests. Mining in the north (Ankarana), which began in 1996, has resulted in a 10 percent loss of forest in the Ankarana Special Forest Reserve, which covers 18,000 ha. Small-scale mining can irreparably damage forest areas and increase fragmentation. Although the percentage of total national forest loss due to mining is relatively small, the impacts may be more permanent, given the associated earthworks (ETOA 2008).

Mining exploration is increasing and will become a major threat in Madagascar. Barren Island is an example, even though it is an important area for birds and a future protected area (Durban Vision); destructive phosphate exploration has begun there. Future threats to birds in the marine and coastal environment include oil and gas exploration, as many large areas of Madagascar's west coast are potential areas for oil exploration.

Soil erosion, sedimentation and pollution

One of the biggest environmental problems in Madagascar is soil erosion. Deforestation in the highlands of Madagascar, coupled with the alteration of natural geological and soil conditions, results in widespread soil erosion, which can reach 400 t/ha per year in some areas. For Madagascar, whose economy is based on agricultural production, the loss of this soil is particularly costly.

Overexploitation of natural resources

Overexploitation of natural resources continues to be a scourge for Madagascar and, if left unchecked, will reduce the impact of Madagascar's biodiversity conservation efforts. Illegal and unregulated exploitation of wildlife, forest products, precious minerals, and fisheries has grown and is under increasing public attack.

Illegal trade in wildlife and other natural resources (notably rosewood) poses a serious threat to their survival. In 2009, an estimated 52,000 metrics tons were extracted from 100,000 trees of rosewood (*Dalbergia* spp.) and ebony (*Diospyros* spp.), including more than 60,000 trees in protected areas, representing a degradation of at least 4,000 ha of protected areas and 10,000 ha of unclassified natural forest.

Wildlife trafficking also poses a significant risk to reptiles (tortoises and chameleons), as well as orchids and succulents, among others. Without protection, Madagascar radiated tortoise (*Astrochelys radiata*) sold as a pet, could disappear within two decades (Platt 2010), while Madagascan big-headed turtle (*Erymnochelys madagascariensis*), the island's only endemic freshwater turtle, is illegally exported to Asian markets as traditional medicine.

Madagascar's native species have been victims of the illegal wildlife trade. Although it has been illegal to kill or keep lemurs as pets since 1964, today lemurs are hunted in areas where they are not protected by local taboos. Carnivores are also widely hunted as sources of protein, while reptiles and amphibians are collected for the international pet trade, in particular chameleons, geckos, snakes and turtles are targeted.

The waters around Madagascar are used for large-scale fisheries. Foreign fishing boats approach the artisanal fishing areas, much to the displeasure of the locals. Sharks, sea cucumbers, and lobsters are fished at rates that threaten the sustainability of the resource availability.

For seabirds (in particular, terns), the main direct threats are egg collection and hunting.

Invasive alien species

In 2018, the managers and promoters of 98 protected areas described the main threats to the biodiversity of their sites and identified invasive alien species, including 32 species of flora and 11 of fauna (Goodman *et al.* 2018; Tables 37 and 38).

Table 37 Invasive plant species at protected areas in Madagascar

Acacia dealbata,	*Brugmansia candida*	*Leucaena leucocephala*	*Pontederia crassipes*
Vachellia farnesiana	*Cecropia peltata,*	*Litsea glutinosa*	*Psiadia altissima*
Acacia mangium	*Cinnamomum* sp.	*Melaleuca quinquenervia,*	*Psidium cattleyanum*
Acrostichum sp.	*Cissus quadrangularis*	*Mucuna paniculata*	*Ravenala madagascariensis*[19]
Aframomum angustifolium	*Clidemia hirta*	*Nastus* sp.	*Ricinus communis*
Agave angustifolia	*Cynanchum mahafalense*	*Opuntia stricta*	*Rubus alceifolius*
Agave sisalana	*Grevillea banksii*	*Pinus* sp.	*Salvinia molesta*
Auccoumea klaineana	*Mesosphaerum suaveolens*	*Pinus patula*	*Solanum mauritianum*
Bambusa sp.	*Lantana camara*	*Pithecellobium dulce*	*Tristemma mauritianum*

Table 38 Invasive animal species at protected areas in Madagascar

Acridotheres tristis	*Canis lupus*	*Rattus rattus*
Batrachochytrium dendrobatidis	*Channa striata*	*Technomyrmex albipes*
Tilapia rendalli	*Ophicephalus striatus*	*Corvus splendens*
Duttaphrynus	*Viverricula indica*	

[19] Although endemic, this species is invasive.

At the national level, 934 plant and animal taxa have been reported as invasive, introduced and/or weeds. Based on field observations, 74 species (52 plants and 22 animals) are known to be invasive.

By way of example, the proliferation of Asian spined toad (*Bufo melanostictus*) endangers ecosystems in the east of the country. The number is currently estimated at 20 million, five times more than in 2016, and the species is classified as an invasive and dangerous species.

7.1.2. Threats to marine ecosystems

Domestic, agricultural, and industrial pollution also cause various types of harm to marine ecosystems, particularly in areas of urban concentration and near port areas. The proliferation of small-scale, unregulated mining operations along rivers also exposes downstream marine and coastal ecosystems to intense disturbance. Pollution, including accidental oil spills, is also not negligible in some coastal parts of Madagascar (East, South and South-East).

7.1.3. Threats to freshwater ecosystems

Major changes in land use, especially the increase in agriculture, the detour of rivers by dams, dykes and pipelines, and the drainage of upland and lowland marshes for rice cultivation, are diminishing water quality and quantity, impacting the survival of freshwater biodiversity and the provision of essential ecosystem services.

The loss of freshwater habitats in Madagascar continues apace, despite conservation efforts. Many wetlands are being transformed into areas for crops or aquaculture, at the expense of the ecosystem as well as the particular biodiversity found there. When the banks of rivers, lakes, marshes are stripped of their forest cover, soils clogged with various nutrients quickly accumulate and silt up these places as well.

Table 39 summarizes the main threats to Madagascar’s ecosystems, including their severity, causes and consequences.

Table 39 Threats to Madagascar's ecosystems

Ecosystem		Threats	Causes	Severity	Consequences
TERRESTRIAL ECOSYSTEMS	Coastal forests (currently very fragmented)	Collection of firewood	Population growth and density	High	Disruption of the ecosystem, allowing invasive species to establish themselves
		Timber harvesting	Lack of good governance	Medium	
		Slash-and-burn agriculture	Uses and customs	High	
		Hunting, harvesting and extraction	Lack of good governance	Low	
		Mining	Undervaluation of biodiversity goods and services	Medium	
		Intense cyclone and sea level rise	Insufficient adaptation measures	Medium	
	Dense lowland forests of the east (0-800 m altitude)	Expansion of cash crops grown on slash-and-burn	Unsustainable production and consumption patterns	High	Decrease in watershed protection
		Mining	Undervaluation of biodiversity goods and services	High	Decrease in soil erosion prevention
		Timber exploitation, including precious woods	Lack of good governance	Medium	Decrease in CO_2 sequestration capacity of
		Hunting, harvesting and extraction	Lack of appropriate laws	Medium	Disruption of ecosystem functioning
		Deforestation and clearing by selective cutting	Lack of good governance	High	Habitat Fragmentation
	Dense humid forests of medium altitude (800-1,200 m)	Clearing for agriculture	Unsustainable production methods	High	Degradation of the habitat of 8 threatened lemur species
		Illegal cutting	Lack of good governance	Medium	Forest degradation
		Hunting, harvesting and extraction	Lack of appropriate laws	Low	Disruption of ecosystem functioning
	Dense humid forests of the east and central highlands (1,200-2,000 m)	Forest fires in dry season	Unsustainable production and consumption patterns	High	Disruption of ecosystem functioning
		Wood cutting	Poverty and demography	Low	Increased spread of invasive species
		Fires for pasture renewal	Unsustainable production and consumption patterns	High	Forest and soil degradation
	Western moist forests (within the western dry biome)	Forest fires for agriculture and grazing	Uses and customs	High	Forest and soil degradation
		Illegal cutting	Lack of good governance	Medium	Forest Degradation

Ecosystem		Threats	Causes	Severity	Consequences
	Western sub-humid forests (riparian forest)	Forest fires for agriculture and grazing	Unsustainable production and consumption patterns	High	Forest and soil degradation
		Selective cutting	Lack of good governance	Medium	Decrease in CO_2 sequestration capacity
		Collection of horticultural plants	Unsustainable production and consumption patterns	Low	Disruption of the ecosystem, allowing invasive species to establish themselves
		Hunting	Lack of good governance	Medium	Disruption of ecosystem functioning
		Mining	Undervaluation of biodiversity goods and services	Medium	Decrease in soil erosion prevention
	Riparian forests (50-1,700 m); specific natural habitats	Clearing of land for cultivation on slash-and-burn	Uses and customs	High	Dilution of ecological connectivity (biological corridor)
		Selective wood cutting	Unsustainable production and consumption patterns	High	Decreased water quality protection (this habitat acts as a natural filter)
		Cutting of firewood and charcoal	Unsustainable production and consumption patterns	High	Decrease in CO_2 sequestration capacity
		Artisanal mining	Lack of good governance	Medium	Risk of habitat/species loss
	Tapia forests (500-800 m) in the western and central parts	Manufacture of charcoal	Unsustainable production and consumption patterns	High	Problem of tree regeneration
		Collection of firewood	Unsustainable production and consumption patterns	Medium	Decrease in CO_2 sequestration capacity
		Timber collection	Lack of good governance	Low	Decrease in CO_2 sequestration capacity
		Grazing	Uses and customs	Medium	Habitat degradation
		Change in fire regime (more frequent)	Unsustainable production and consumption patterns	High	Habitat degradation
	Western dry forests	Slash-and-burn agriculture (*Hatsake*: corn cultivation)	Unsustainable production and internal migration	High	Decrease in cultivable areas
		Collection of plant species	Lack of appropriate laws	Medium	Migration to the north
		Hunting	Lack of appropriate laws	Medium	Disappearance of endemic and threatened biodiversity
		Manufacture of charcoal	Unsustainable production and consumption patterns	High	Loss of forests

Ecosystem		Threats	Causes	Severity	Consequences
	Southern and southwestern dry thickets and forests	Slash and burn agricultural practice	Unsustainable production and consumption patterns	High	Regression of socio-economic benefits
	Coastal scrub of the southwest	Conversion to crop fields	Unsustainable production and consumption patterns	High	Reduction of ecosystem services
	Secondary grassy formations or Roranga (0-2,700 m)	Cash crop	Unsustainable production and consumption patterns	Medium	Regression of socio-economic benefits
		Grazing and agriculture	Unsustainable production and consumption patterns	High	Habitat fragmentation
		Mining	Undervaluation of biodiversity goods and services	Low	Loss of biodiversity and fragmentation
		Collection of useful and medicinal plants	Unsustainable production and consumption patterns	Medium	Reduction of ecosystem services
	Savannahs of the west and the central highlands (conditioned by frequent fire)	Very repetitive bushfires	Lack of good governance	High	Aridity of the soil
		Soil erosion by runoff accentuated by steep topography	Upstream deforestation	High	Sedimentation
	Dry deciduous forests of the karst system (west coast)	Illegal mining	Lack of good governance	Low	Loss and fragmentation
		Illegal collection of endemic flora and fauna and CITES	Lack of good governance	Low	Integrity of the karst substratum
		Cutting of forestry wood	Lack of good governance	Medium	Decrease in CO_2 sequestration capacity
		Oil exploration	Undervaluation of biodiversity goods and services	Medium	Loss of habitats and biodiversity
		Mining activities	Undervaluation of biodiversity goods and services	Medium	Loss of biodiversity
		Bushfires	Uses and customs	High	Habitat degradation
		Quarrying	Poverty	Low	Environmental degradation
		Invasive species	Insufficient safeguards	Low	Loss of threatened species
		Urbanization	Demographics	Low	Decrease in CO_2 sequestration capacity
		Tourism	Undervaluation of biodiversity goods and services	Low	Disruption of ecosystems
		Climate change	Environmental degradation	Medium	Regression of socio-economic benefits

Ecosystem		Threats	Causes	Severity	Consequences
	Agricultural ecosystems	Genetic erosion of agrobiodiversity	Poverty; lack of scientific knowledge; underutilization of local knowledge	High	Loss of productivity; food insecurity
CONTINENTAL AQUATIC ECOSYSTEM	Lakes and ponds (150 cm deep)	Climate change	Environmental degradation	High	Changes in physico-chemical properties: degradation of surface water quality
		Overexploitation of fishery resources	Lack of good governance	High	Decrease in surface area
		Rampant demographic growth	Lack of awareness	Medium	Sustainability of Lake Biological Resources
		Proliferation of invasive aquatic plants	Insufficient safeguards	High	Drying up of springs due to deforestation and watershed degradation
		Selective conversion of lake, marsh and pond areas into rice fields	Demographics	Low	Imbalance of the ecological function
		Sedimentation due to deforestation and bush fires	Upstream degradation; shoreline degradation	Medium	Shrinkage and depth reduction; erosion of riverbeds
	Freshwater marshes (continental and coastal) with a hydrological regulation and water purification role	Heavy sedimentation due to deforestation, clearing of vegetation, silting and bush fires	Intense deforestation	High	Shrinkage in area
		Climatic variation and high concentration of precipitation	Environmental degradation	High	Regression of socio-economic benefits
	Groundwater (porous or fissured aquifers in karstic environment)	Pollution	Insufficient appropriate legislation	High	Loss of almost all architectural species on the reef slope
		Erosion, silting and siltation	Deforestation	High	Increased turbidity of continental waters
		Mining	Lack of good governance	Low	Reduction of ecosystem services

Ecosystem		Threats	Causes	Severity	Consequences
MARINE & COASTAL ECOSYSTEMS	Coral reefs in the northeast (cyclone passage zone, from Cap d'Ambre to Masoala)	Strong waves	Natural disasters	High	Mechanical degradation of corals
		Increase in temperature	Climate change	High	Coral bleaching
		Water desalination	Flooding and continuous rainfall	High	Degradation of mangroves
	Coral reefs of the east (fringing reefs from Cape Masoala to Bay of Toamasina)	Intensive fishing	Lack of good governance	Medium	Coral bleaching
		Sedimentation	Intense deforestation	Medium	Advanced state of degradation
		Extraction of corals	Lack of good governance	Medium	Irreversibility of bleaching for reefs under stress
		Various pollutions	Insufficient appropriate legislation	High	Loss of marine biodiversity, degradation of human health
		Natural disasters (hurricane zone)	Climate change	High	Habitat change
		Increase in temperature	Climate change	High	Migration of certain species
	Coral reefs of the south coast	Marine pollution by oil spill	Lack of good governance	High	Impact on the production of neritic lobsters
		Intensive industrial fishing	Lack of good governance	High	Decrease in inventory
		Illegal collection of marine resources (black corals)	Lack of good governance	High	Disruption of marine ecological function
		Coastal erosion by sea level rise	Climate change	High	Disturbance of marine habitats
	Coral reefs of the southwest and west coasts	Intensive fishing (Great reef of Toliara)	Lack of good governance	High	Coral bleaching
		Large sedimentation volume	Intense deforestation upstream	High	Increased turbidity in coastal waters
		Pollutions (various sources)	Insufficient appropriate legislation	Medium	Loss of architectural species on the reef slope
		Temperature increase	Climate change	Medium	Replacement of architectural species by algae; decrease in fish biomass
	Coral reefs of the northwest and west coasts	Terrigenous sedimentation	Massive soil erosion due to recurrent deforestation	High	Degradation of fringing reefs
		Intensive fisheries in populated areas	Demographics	Medium	Coral bleaching
		Temperature increase	Climate change	Medium	Coral bleaching

Ecosystem		Threats	Causes	Severity	Consequences
	Northeast coast seagrass beds	Coastal development	Insufficient appropriate legislation	Medium	Damage to seagrass beds
		Population growth		Medium	
		Sea level rise and temperature increase	Climate change	High	Phenomenon of species migration
		Increased frequency and intensity of storms	Climate change	High	Habitat disturbance
	Northwest coast seagrass beds	Sedimentation	Deforestation on the ground	Medium	Increased runoff due to deforestation and mangrove cutting
		Intensive fisheries in coastal areas	Lack of good governance	High	Increase in turbidity
		Algae blooms	Climate change	Medium	Disruption of ecological function
		Coastal development (infrastructure and pollution)	Insufficient appropriate legislation	High	Continued decline of biotic components
		Temperature increase	Climate change	Medium	Loss of seagrass biomass and diversity; reduction in the amount of large herbivorous fish; decrease in the coverage of the meadows
	Southwest coast seagrass beds	Increased sediment loads	Intense deforestation upstream	High	Degradation of the physical environment
	East coast seagrass beds	Sedimentation	Deforestation	High	Decrease in seagrass cover in coastal waters
		Development of destructive fishing practices (seine fishing on beaches)	Lack of good governance	High	Decrease in inventory
		Trawling	Lack of good governance	Low	Disturbance of marine habitats
		Trampling	Lack of good governance	Medium	Reef destruction
		Coastal development (infrastructure and pollution)	Unsustainable production methods	Medium	Disturbance of marine habitats

Ecosystem		Threats	Causes	Severity	Consequences
	Mangroves of the northwestern coast (98% of the mangroves of Madagascar)	Collection of wood (timber, construction, heating and charcoal)	Lack of good governance	High	Breakdown of the coastal protection function of mangroves
		Aquaculture	Unsustainable production methods	High	Breakdown of the coastal protection function of mangroves
		Conversion to rice farming	Unsustainable production methods	Medium	Breakdown of the coastal protection function of mangroves
		Conversion to building land	Unsustainable production methods	Low	Breakdown of the coastal protection function of mangroves
		Prolonged flooding	Climate change	Low	Breakdown of the coastal protection function of mangroves
		Strong winds and cyclones	Climate change	Medium	Breakdown of the coastal protection function of mangroves
		Excessive sedimentation	Deforestation	High	Breakdown of the coastal protection function of mangroves
	West coast mangroves	Excessive sedimentation	Deforestation; internal migration	High	Degradation phenomena

7.2. Comoros

7.2.1. Threats to terrestrial ecosystems

In the three islands of the Comoros, the accelerated degradation of ecosystems and natural resources is largely attributable to the increased vulnerability of the population as a result of demographic, economic, social and environmental pressures. In 1986, the forest area was estimated at 12,375 ha. Between 1973 and 1983, forests decreased by 36 percent on Grande Comore, 73 percent on Anjouan and 53 percent on Mohéli, in favor of food crops. During this period, Anjouan lost 5,950 ha of forest compared to 5,000 ha on Grande Comore and 1,800 ha on Mohéli.

Natural forests, heather steppe and savannahs are threatened by: (i) uncontrolled and unsustainable logging for timber and service wood; (ii) exploitation of minerals (basaltic slags); (iii) uncontrolled land clearing for the expansion of cultivated land in the absence of land use planning; (iv) uncontrolled bushfires and fires for pasture or slash-and-burn cultivation; (v) insecurity of tenure over cultivable land; (vi) high population growth rates; (vii) unclear legal ownership of agricultural land; (viii) inadequate forestry legislation and incomplete and unenforced environmental legislation; and (ix) introduction and development of exotic species, such as Chinese guava (*Psidium cattleyanum*).

Deforestation contributes to the disappearance of many species, some of which may not have been known by science or inventoried.

The clearing of land for food crops does not spare sensitive areas or those with steep slopes, and very often leads to intense erosion and landslides. Both phenomena contribute to land degradation and considerable loss of habitats and biodiversity. For historical and technical reasons, the multipurpose (low slope) lands that were suitable for food crops are largely occupied by cash crops, mainly cloves and ylang-ylang. This poor use of space, aggravated by unsuitable cultivation techniques, has resulted in the degradation of cultivable land on the low slopes, forcing farmers to be constantly on the lookout for new land, particularly in the forest area. Agroecosystems are threatened by soil erosion and depletion, as well as the replacement of these systems by field crops and monocultures and the introduction of exotic species and varieties.

Bush fires are still common and originate most often in crop plots and grazing lands, resulting in the destruction of habitats and heritage animal and plant species. Repeated wildfires are more destructive and give little chance for biodiversity to recover. Fire is considered a major threat to ecosystems on small islands, such as the Comoros. For small populations of plants and animals with a limited distribution, even small fires can have serious consequences. In addition to direct damage, fires often pave the way for the establishment of invasive alien species.

On Grande Comore, where the soil is porous, surface water resources are almost non-existent. Immediately after rainfall stops, the canalized water runs off and infiltrates rapidly to leave dry streambeds. Anjouan is currently facing a serious problem of loss of surface water resources. While 49 perennial streams were recorded in 1950, by 1970 there were only about 30, and only four perennial streams remain today.

This situation is directly related to the problems of land clearing and soil erosion caused by increasing demographic pressure. Although there are no measurements of the flow and sustainability of rivers and streams to assess the changes that have occurred in recent years, the vast majority of rivers and streams dry up in the dry season (from July to November).

Many natural species, mainly on Grande Comore, are specific to lava flows, which are slowly colonized by a pioneer flora. These lava flows in the process of colonization are open-air laboratories to understand the dynamics of vegetation succession. The extraction of basaltic slag for crushing, accentuated by urbanization, constitutes a threat to these dynamic ecosystems.

In the Comoros, the land situation is characterized by an unclear legal status. Rather than run the risk of the tenant trying to appropriate the land, landowners prefer to leave their land unused rather than rent it out. This refusal to rent land causes a large segment of the population without land to occupy the state's forest estates, which constitute the country's last land reserves. This occupation also leads to the disappearance of habitats and species of flora and fauna that are still little known.

Demographic pressures are a major constraint for any biodiversity conservation policy. The proportion of unskilled, unemployed and landless adults is growing steadily. This category of the population is likely to increase considerably with the poor performance of the education system. These unemployed young people, future heads of households, without the possibility of learning a trade, present a serious threat to the protection of the last forest relics and therefore to the conservation of fauna and flora, despite the current provisions for the creation of national parks.

7.2.2. Threats to marine and coastal ecosystems

Coastal and marine ecosystems are threatened by erosion and the removal of materials for construction, pollution by household waste due to the increase in the volume of non-degradable and non-recyclable waste (plastic packaging and containers) and the discharge of wastewater in urban areas. Coral islands, banks and reefs are threatened by habitat destruction due to unsustainable, traditional exploitation methods (such as fishing on coral reefs), high fishing pressure on the coastal reef zone, climate change (ocean warming and acidification, and sea level rise), and excessive sedimentation due to soil erosion following deforestation. Seagrass beds, which are the staple food of globally threatened marine turtles and dugongs, are threatened by oxygen depletion in the water caused by reef destruction and temperature increases. Threats to the nearshore environment include pollution from household waste, sewage, unsustainable traditional fishing methods, dynamite fishing (an isolated and infrequent occurrence).

The biodiversity of coastal ecosystems is also strongly threatened by anthropogenic actions. These threats include:

- Extraction of natural coastal materials (sand and pebbles) for construction, which has led to the disappearance of certain beaches, of particular concern are those where marine turtles nest.
- Pollution linked to coastal urbanization (household waste deposits on the coast, urban waste and hydrocarbons, and waste water).
- Erosion of the coastal zone, accentuated by heavy rains and leading to the important discharge of terrigenous deposits on the beaches, and sea waves (sudden and unexpected sea level rise observed recently).
- Exploitation of mangrove stands for construction and charcoal making.
- Sea level rise and coastal erosion destroying infrastructure, which the government struggles to rebuild.
- Anarchic urbanization, without any respect for urbanization plans.

An example of this would be the disappearance of beaches due to abusive sand extraction, which accelerates coastal erosion. In 1987, the General Directorate of Public Works reported the disappearance of 11 out of 25 beaches on Grande Comores and seven out of 18 beaches on Anjouan in 10 years, mainly due to major construction works (airports, hospitals, schools and mosques). Unfortunately, in the absence of systematic monitoring of these ecosystems, the current rates of degradation are not known.

7.2.3. Threats from invasive alien species

Common myna (*Acridotheres tristis*), a bird of the starling family introduced to the region from Asia, is well established in the Comoros. Although no study has been carried out to date on the impacts of the introduction of this species to the Comoros, unlike some neighboring countries, it is clear that it constitutes a threat to native forest birds.

Common agama (*Agama agama*), a lizard that was observed for the first time in the Comoros in 1994 in the capital is reproducing very quickly. At the current rate of spread, experts fear the effects of its introduction into the natural habitat of Comoro iguana (*Oplurus cuvieri comorensis*), an extremely localized species, restricted to cliffs on the north of Grand Comore.

Invasive alien plant species also represent a very significant threat to ecosystems. For the Comoros, an FAO study in 2004 indicated a list of 16 invasive woody species, while stressing that "*in the Comoros archipelago reliable information is limited. (...) With the exception of Mayotte, awareness of the potential danger to biodiversity and crops posed by plant invasions remains low*" (Vos 2004).

Between April 2017 and July 2018, a regional project of the southern Indian Ocean islands (the Comoros, Mauritius and the Seychelles) called INVA'ZILES prepared a national hierarchical list of invasive alien species. From an analysis of the 1,013 taxa distributed in 130 families, it emerges that there are 11 invasive present in natural environments (including *Acacia auriculiformis*, *Clidemia hirta*, *Erigeron karvinkianus*, *Merremia peltata*, and *Psidium cattleyanum*) and 148 potentially invasive species.

Table 40 presents the results of an analysis of the level of invasiveness of exotic vascular plant species found in the Comoros. This analysis was based upon expert opinion. The results show that more than 170 species are potentially invasive, out of which six are very invasive in natural ecosystems with known impacts, and six are invasive in the wild with unknown impacts.

Table 40 Level of invasiveness of exotic vascular plant species in the Comoros

Level of invasiveness	Category	No. of species	Percentage (%)
5	Very invasive in natural ecosystems with impact	6	<1
4	Invasive in the wild and impact unknown	6	<1
3+	Invasive in anthropogenic and natural ecosystems	29	4
3	Invasive in anthropogenic ecosystems	73	10
2+	Beginning of invasion and potentially invasive	7	1
2	Naturalized and potentially invasive	50	7
1	Non-invasive	158	21
0	No data	53	7

Table 41 summarizes the main threats to the Comoros' ecosystems, including their severity, causes and consequences.

Table 41 Threats to the Comoros' ecosystems

Severity	Threat	Causes	Ecosystem(s) affected	Species affected
High	Pollution from waste and household refuse	Lack of waste management; insufficient waste management	Mangrove area on the islands of Grande Comore, Anjouan and Mohéli Coastal zone	Crabs; birds; mangrove plants; coral; reef fish
	Agricultural expansion	Demographic growth; rural poverty	Lowland dry forest at 0-800 m (the two slopes of Karthala; the Grille massif, the Dibwani plateau) High altitude zone between 1,200 and 1,800 m (both sides of Karthala) Lowland dry forest at 0-800 m (Itsamia and lake Boudouni) Lowland forest at 0-800 m (Mount Ntringui) Dense forest at high altitude from 1,200 to 1,600 m (Mount Ntringui)	Terrestrial fauna and flora; sensitive species
	Urbanization	Demographic growth; high demand for land for real estate development	Lowland forest from 0-800 m (both sides of Karthala; the grid massif, the Dibwani plateau) Dry forest of low altitude of 0-800 m (Mount Ntringui) Coastal zone of the three islands	Terrestrial fauna and flora
	Cutting of firewood	Demographic growth; growing need for biomass energy; development of the ylang-ylang distillery industry	Lowland forest from 0-800 m (both sides of Karthala; the grid massif, the Dibwani plateau) Lowland dry forest at 0-800 m (Mount Ntringui) Forest at medium altitude	Terrestrial fauna and flora
	Timber cutting	Demographic growth; high demand for wood for the construction of wooden and solid houses	Lowland forest from 0-800 m (both sides of Karthala; the grid massif, the Dibwani plateau) Lowland forest at 0-800 m (Mount Ntringui) Forest at medium altitude Mount Mledjele Mohéli	Terrestrial fauna and flora
	Slash-and-burn agriculture and fires	Demographic growth;high demand for arable land	Lowland dry forest of 0-800 m (both sides of Karthala; the grid massif, the Dibwani plateau) High altitude zone between 1,200 and 1,800 m (the two sides of Karthala; the massif of the grid) Lowland forest from 0 to 800 m (Mount Ntringui) Dense forest of high altitude from 1,200 to 1,600 m (Mount Ntringui)	Terrestrial fauna and flora

Severity	Threat	Causes	Ecosystem(s) affected	Species affected
	Timber cutting	Demographic growth	High altitude zone between 1,200 and 1,800 m (the two sides of Karthala; the massif of the grid) Dense forest of high altitude from 1,200 to 1,600 m (Mount Ntringui)	Terrestrial fauna and flora
	Invasive plant	Deforestation and land clearing; lack of a national control strategy	Coastal zone and cultivation zone between 0 and 800 m in altitude on all three islands High altitude area between 1,200 and 1,800 m of forest massif on all three islands	Terrestrial fauna and flora
	Coal production	Demographic growth; increasing need for biomass energy	High altitude zone between 1,200 and 1,800 m (the two sides of Karthala; the massif of the grid) Dense forest of high altitude from 1,200 to 1,600 m (Mount Ntringui)	Terrestrial fauna and flora
	Extraction of natural coastal materials for construction (sand, pebbles)	Urban development	Beaches (Grande Comore) Beaches (Mohéli)	Green turtle; hawksbill turtle; sensitive flora and fauna of coastal areas
	Silting	Deforestation; cultivation of cleared land	Mangroves (Mohéli)	Crabs; birds; mangrove trees
	Grazing	Demographic growth	Lowland dry forest at 0-800 m (Itsamia and lake Boudouni)	Terrestrial fauna and flora
	Reduction of river flows	Deforestation	Lake Dzialandze at the top of Mount Ntringui	Aquatic fauna and flora
	Sedimentation	Deforestation	Lake Dzialandze at the top of Mount Ntringui	Aquatic fauna and flora
Medium	Cutting of mangrove wood	Need for firewood	Mangroves (Grande Comore)	Crabs; birds; mangrove trees
	Non-respect of the geometrical pitch	Urban and hotel development	Mangroves (Grande Comore)	Crabs; birds;and mangrove woods
	Erosion	Deforestation of watersheds	Seagrass beds (Grande Comore) Seagrass beds (Mohéli) Beaches (Mohéli National Park Zone) Coral reefs on all three islands	Fauna and flora of seagrass beds; marine turtles; algae; dugong
	Trampling of coral reefs	Lack of means to go offshore for fishermen; low awareness	Coral reefs (Grande Comore) Coral reefs (Anjouan)	Acropora coral; clownfish, parrotfish; holothurians; crustaceans

Severity	Threat	Causes	Ecosystem(s) affected	Species affected
	Grazing	Demographic growth	Lowland dry forest at 0-800 m (both sides of Karthala; La Grille massif, Dibwani plateau) High altitude zone between 1,200 and 1,800 m (both sides of Karthala) Lowland dry forest at 0-800 m (Mount Ntringui) High altitude dense forest at 1,200-1,600 m (Mount Ntringui)	Terrestrial fauna and flora
	Chemical pollution	Products and chemical inputs for market gardeners	Lowland dry forest at 0-800 m (both sides of Karthala; La Grille massif, the Dibwani plateau) Lake Dzialandze at the top of Mount Ntringui Lowland dry forest at 0-800 m (Mount Ntringui)	Terrestrial fauna and flora; aquatic fauna and flora
	Urbanization	Demographic growth	Lowland dry forest at 0-800 m (Itsamia and Lake Boudouni)	Terrestrial fauna and flora
	Cutting of firewood	Demographic growth	Lowland dry forest at 0-800 m (Itsamia and Lake Boudouni)	Terrestrial fauna and flora
	Timber cutting	Demographic growth	Lowland dry forest at 0-800 m (Itsamia and Lake Boudouni)	Terrestrial fauna and flora
	Destructive fishing	Harpoon and dynamite fishing	Coral reefs (Anjouan) Coral reefs (Grande Comore)	Acropora coral; clownfish; parrotfish; holothurians
	Sedimentation	Deforestation	Coral reefs (Grande-Comores) Coral reefs (Anjouan) Coral reefs (Mohéli)	Acropora coral; clownfish; parrotfish; holothurians
	Habitat destruction	Conversion to agricultural land	Islets on the Bimbini peninsula on Anjouan	Seabirds
Low	Cutting of mangrove wood	Construction of houses; manufacture of dugouts	Mangroves (Grande Comore) Mangroves (Mohéli)	Crabs; birds; mangrove trees
	Destructive fishing	Harpoon, beach seine and mosquito net fishing; harpoon and dynamite fishing	Seagrass beds (Grande Comore) Coral reefs (Grande Comore) Coral reefs (in Mohéli National Park)	Fauna and flora of seagrass beds; marine turtles; algae
	Turtle poaching	Direct consumption; commercialization of turtle meat	Beaches (Grande Comore) Beaches (in Mohéli National Park)	Marine turtles
	Extraction of corals	Ornamentation	Coral reefs (Grande Comore)	Acropora corals; clownfish; parrotfish; holothurians

Severity	Threat	Causes	Ecosystem(s) affected	Species affected
	Coral bleaching	Climate change	Coral reefs (Grande Comore) Coral reefs (in Mohéli National Park)	Acropora corals; clownfish; parrotfish; holothurians
	Sedimentation	Deforestation	Coral reefs (Grande Comore) Coral reefs (in Mohéli National Park)	Acropora corals; clownfish; parrotfish; holothurians
	Coral destruction	Invasion by crown-of-thorns starfish	Coral reefs (Grande Comore) Coral reefs (in Mohéli National Park)	Acropora corals; clownfish; parrotfish; holothurians
	Seabird predation	Predation by introduced mongooses; egg collection	Ndroudé island (Grande Comore)	Seabirds
	Coelacanth bycatch	Fishing	Underwater caves (Grande Comore)	Coelacanth
	Location of quarries	Urbanization	Lowland dry forest 0-800 m (both sides of Karthala) Lowland dry forest from 0 to 800 m (Mount Ntringui)	Terrestrial fauna and flora
	Hunting	Need for bush meat	High altitude zone between 1,200 and 1,800 m (both sides of Karthala) High altitude dense forest from 1,200 to 1,600 m (Mount Ntringui)	Terrestrial fauna
	Trampling of coral reefs	Lack of means to go offshore for fishermen	Coral reefs (in Mohéli National Park)	Acropora corals; clownfish; parrotfish; holothurians
	Fish disturbance	Maritime transport	Sub- and mid-littoral ecosystems (Anjouan)	Whales; dolphins; rays; sharks
	Marine pollution	Oil spill; lack of waste and garbage management	Coral reefs (Grande Comore) Coral reefs (Mohéli) Coral reefs (Anjouan)	Acropora corals; clownfish; parrotfish; holothurians
	Lava flow	Volcanic eruption	High altitude zone between 1,200 and 1,800 m (both sides of Karthala)	Terrestrial fauna and flora

7.3. Mauritius

In the Republic of Mauritius, economic growth, as well as changing patterns of production, consumption and service delivery are putting pressure on the environment as never before. Some of the sectors in important areas, such as health services, education, energy, food, sanitation and transport, that seek to satisfy the demands of the country's population are perceived to be in direct or indirect competition with ecosystem and biodiversity conservation. While these sectors contribute to a vibrant economy, if not properly integrated with the preservation of native biodiversity and ecosystems, they will add undue pressure on the islands' fragile environment. For example, demand for land and water on the island of Mauritius is expected to increase (MOE 2011). The island has one of the highest proportions of built-up area in the world, a large part of which endures long water cuts on a daily basis, and, in some places, there are temporary acute water shortages, especially during periods of low rainfall. The drive to build and replace greenery, including forest, with concrete has accelerated since the original ecosystem profile was prepared in 2014. Water scarcity is also a critical issue on Rodrigues.

In addition, the recent COVID-19 pandemic has caused some uncertainty in funding for restoration efforts and species monitoring, as well as logistical delays and difficulties in staff recruitment and movement, and decreased visitation and education activities (MWF 2021). While these effects have had impacts on biodiversity, simultaneously, the decrease in economic activity has had beneficial impacts on plants and animals. Although it is difficult to assess the outcomes of the COVID-19 pandemic, it is safe to assume that the overall impacts on terrestrial biodiversity conservation have been negative. For instance, the closure of beaches caused people to trek into the forests, which, if unchecked, may have impacts on biodiversity. On the other hand, marine conservation may have benefited from reduced pressure on the coastline.

The main threats to biodiversity of the different ecosystem types discussed and ranked during the stakeholder consultation for the 2014 ecosystem profile remain valid. Overall, there is low government commitment to conservation, resulting in low allocation of funds and lack of trained personnel for proper monitoring and enforcement. Policy makers and civil society have a low appreciation and understanding of the need for environmental protection and conservation of indigenous biodiversity. Not surprisingly, there are still too few active NGOs. Corporate social responsibility (CSR) funds are only available to registered NGOs, which excludes stakeholders who could contribute, such as research institutes and universities.

Protected area research activities contribute to conservation due to the presence of researchers in the field (Tatayah 2011, Florens 2013b, Laurance 2013). However, funding for research is very limited, as are the institutions involved. In addition, few people are qualified to conduct good quality research and there are few opportunities to train young people in conservation activities or research. Biological repositories are somewhat neglected, with the exception of plant collections.

In addition, there is a need to update the status of species already on the IUCN Red List and to increase the scope of the taxonomic groups that are assessed. While a number of plants, birds, bats and reptiles found on Mauritius and Rodrigues have been assessed or reviewed, there are an overwhelming number of taxa that have not yet been assessed. However, for many groups, particularly for marine biodiversity and certain groups of insects, there is still a need to create a species list and determine the distribution of species, and some groups have been little studied or not studied at all. This lack of reference is a barrier to objectively defining protected areas and conservation actions. Finally, categorization and mapping is needed for terrestrial and marine ecosystems. Table 42 summarizes the main threats to Mauritian ecosystems, including their severity, causes and consequences.

Table 42 Threats to ecosystems in the Republic of Mauritius

Threat	Causes		Severity			Consequences
	Direct causes	Indirect causes	Immediacy	Extent	Intensity	
Terrestrial ecosystems						
Invasive alien species	Land use change; economic development (increased business, tourism); lack of awareness of the local population about risks of horticultural imports and pets	Inadequate management (especially for plants); weak border and inter-island control capacity; weak policy implementation; climate change	Short-/Long-term	Large	High	Biodiversity decline, loss of endemic species, decline in provision of ecosystem services, and loss of future restoration potential; limited control; ambiguous legislation on control over mountain reserves; some existing strategies not yet implemented due to lack of funding
Land use change	Economic development Population growth	Lack of management capacity; lack of execution capacity; weak policy implementation	Short-/Medium-/Long-term	Small/ Medium	High	Unsustainable development; precautionary principle not applied; abandonment of agricultural land and conversion to built-up areas
Fire	Human activities	Climate change	Short-/Medium-term	Small/ Medium	High	Loss of forest cover; facilitation of invasive alien species spread; increased erosion with increased sedimentation (inland and marine waters); decline in provision of ecosystem services
Storms, droughts and other natural disasters	Climate change	Greenhouse gas emissions	Long-term	Large	High	Diminished ability to adapt to climate change; increased impacts of IAS
Pests and diseases	Increase in epidemics related to invasive alien species	Climate change	Long-term	Medium /Large	High	Loss of economic resources; diversion of limited resources to deal with pandemic
Habitat fragmentation	Infrastructure development; agricultural expansion	Lack of management capacity; weak policy implementation	Medium-/Long-term	Medium /Large	High	"Extinction debt"; invasion by alien species; biodiversity decline; loss of endemic species; decline in provision of ecosystem services; loss of future restoration potential

Threat	Causes		Severity			Consequences
	Direct causes	Indirect causes	Immediacy	Extent	Intensity	
Freshwater ecosystems						
Reclamation or filling of marshes	Economic development; increase in built-up areas (of construction); agriculture	Lack of management capacity; weak policy implementation	Medium-/Long-term	Small/ Medium	Medium	Loss of biodiversity and ecosystem services, increased sedimentation, decreased value as ecological corridors Decrease in groundwater levels
Sedimentation	Land use change; deforestation	Lack of management capacity; weak policy implementation	Medium-/Long-term	Small	Large	Decline in water quality and associated loss of biodiversity and ecosystem services.
Pollution and eutrophication	Economic development; lack of awareness; lack of wastewater treatment; accumulation of persistent organic pollutants	Lack of management capacity; weak policy implementation; lack of application; lack of biosafety protocol	Medium-/Long-term	Medium /Large	Medium /High	Decline in water quality and associated loss of biodiversity and ecosystem services, reduced value as ecological corridors
Loss of forest cover, increase in invasive alien species	Low awareness; economic development	Lack of management capacity; weak policy implementation	Long-term	Medium	Medium /High	Loss of biodiversity and ecosystem services; reduced value as ecological corridors
Increased droughts, flooding and salinity	Climate change	Greenhouse gas emissions	Long-term	Large	Unknown	Loss of biodiversity and ecosystem services
Marine and coastal ecosystems						
Overexploitation	Economic pressures; overfishing; poor fishing practices	Insufficient management, control and monitoring capacity	Short-/Medium-/Long-term	Small/ Medium /Large	Medium	Unsustainable exploitation of resources; loss of income with impact on livelihoods; increased cost of living; potential phase shift in some habitats
Unsustainable tourism	Increased demand from tourism	Economic pressure	Short-/Medium-/Long-term	Small/ Medium	High	Localized problem but can have a strong impact on biodiversity
Illegal fishing	Economic pressures; overfishing; poor fishing practices	Insufficient management, control and monitoring capacity	Short-/Medium-/Long-term	Large	High	Use of illegal fishing gear

Threat	Causes		Severity			Consequences
	Direct causes	**Indirect causes**	**Immediacy**	**Extent**	**Intensity**	
Fisheries bycatch	Inappropriate fishing practices	Insufficient management, control and monitoring capacity	Medium-/Long-term	Large	Medium /High	Illegal fishing of protected species (turtles, etc.)
Erosion and sedimentation	Increased discharge of fresh water into the sea	Insufficient management, control and monitoring capacity	Short-/Medium-/Long-term	Large	High	Loss of habitat
Land-based pollution	Sedimentation	Deforestation	Medium-term	Medium	Low/ Medium	Some habitats that are heavily impacted and disappearing (e.g., seagrass beds)
Marine debris: offshore drift, non-degradable solids	Industrial and domestic waste from land and boats, abandoned fishing gear	Poor waste management in the region; lack of awareness; high use of plastic bags	Short-/Medium-/Long-term	Large	Medium /High	Secondary deaths (dolphins, turtles, etc.)
Invasive alien species	Ballast water	Increased maritime trade	Short-/Medium-/Long-term	Large	Medium /High	No baseline data (but a new study has been undertaken and data should be available soon)
Coral bleaching, sea temperature rise, sea level rise, extreme events	Climate change	Greenhouse gas emissions	Long-term	Large	High	Major factor but not fully understood; Barrier to continued restoration of reefs
Oil spills	Increase in maritime trade and recreational traffic	Weak control of vessel movements; insufficient response capacity	Short-term	Small/ Medium	Medium /High	Impact on marine and coastal ecosystems

7.4. Seychelles

Table 43 is based on the 4th National Report to the Convention on Biological Diversity (CBD), which was adapted during the stakeholder consultations conducted in preparation of the 2014 ecosystem profile. The identified threats were reassessed by participants at the national consultation in March 2022, according to their immediacy, extent and intensity. Other elements of the table were updated to incorporate feedback from stakeholders, and the updated analysis is presented in Table 44.

Table 43 Threats to ecosystems in the Seychelles assessed in 2014

Threat	Direct and indirect causes	Consequences
Terrestrial ecosystems		
Invasive alien species	Change in land use; increased trade and tourism; lack of public awareness of risks of horticultural imports; lack of capacity and techniques to respond to existing problems in areas with endemic biodiversity; lack of biosecurity in border controls and inter-island movements	Degradation of biodiversity; decline of ecosystem services; loss of future development potential
Fire	Human activities; climate change	Loss of forest cover; accelerated spread of invasive alien species; increased erosion and sedimentation; decline in ecosystem services
Diseases	Increase in introduced diseases; climate change	Loss of economic resources; redirection of limited resources to cope with new diseases
Freshwater ecosystems		
Drainage/Canalization	Economic development Lack of planning, management and capacity building	Loss of biodiversity and ecosystem services; increased sedimentation in the marine environment
Sedimentation	Land use change; deforestation; lack of management capacity	Decline in water quality; loss of biodiversity and ecosystem services
Pollution	Economic development; low awareness; lack of management capacity	Decline in water quality; loss of biodiversity and ecosystem services
Invasive alien species	Lack of awareness	Loss of biodiversity and ecosystem services
Coastal and marine ecosystems		
Overexploitation of marine resources	Economic development; insufficient management measures and capacity; perverse incentives	Unsustainable exploitation of resources; loss of income and other livelihood impacts; increased modification of certain habitats, increased frequency of diseases
Pollution	Economic development; oil exploration and exploitation	Decline in water quality; loss of biodiversity and ecosystem services
Rise in sea temperature	Climate change	Changes in currents and nutrient inputs; changes in distribution of pelagic resources; changes in weather patterns; increased frequency of coral bleaching events
Sea level rise	Climate change	Loss of biodiversity; coastal erosion; potential impact on economic activities and human settlements on coastal plains
Ocean acidification	Climate change	Reduction of coral calcification rate; impacts on shell formation and coral recruitment

Source: Adapted from the 4th National Report to the CBD.

During the national consultation in March 2022, stakeholders in the Seychelles also assessed the level and types of threat affecting each of the 57 KBAs in the country. The results of this analysis are presented in Appendix 5.

7.4.1. Threats to terrestrial ecosystems

Invasive alien species are the most significant threats to forest ecosystems in the Seychelles, because their impact is compounded by other factors, such as land-use change, increased international and inter-island trade and transport, development of the tourism and hiking industry, and climate change. The impacts of all these factors affect forests on a large scale and, over the long term, and can have dramatic consequences in terms of habitat loss, decline in ecosystem functions and, even, extinction of endemic species.

Among the invasive alien species that affect the Seychelles, diseases and vectors represent a formidable threat that can have dramatic consequences, both ecological and economical, as well as for public health. For example, the increased abundance of Asian tiger mosquito (*Aedes albopictus*) is responsible for increased transmission of dengue and Chikungunya fevers.

Increased severity of droughts and storms linked to climate change is also likely to have widespread negative impacts on forest ecosystems and biodiversity, although native plants appear to be more resistant to these stresses than exotic plants.

Fire also has a very high destructive potential but normally has more localized consequences, as does the clearing of forests for infrastructure or residential development.

7.4.2. Threats to freshwater ecosystems

Invasive alien species are probably the most widespread and acute threat to freshwater wetlands in the Seychelles, resulting in net losses of biodiversity and environmental services. Water lettuce (*Pistia stratiotes*) and, to a lesser extent, water hyacinth (*Eichhornia crassipes*) have covered much of these wetlands in the Seychelles, being a good example of the ecological catastrophes that can follow introduction of invasive species.

Pollution, due to the lack or under-capacity of sewage treatment plants, is also a considerable threat to most of the coastal wetlands in the Seychelles, which are almost always close to residential areas (Grand Police wetlands, in southern Mahé, are one of the few exceptions).

Drainage and infilling continue to be major threats to coastal wetlands, as nearby construction developments too often encroach on them. Freshwater animals such as mud turtles have seen their habitat on Mahé greatly reduced in recent decades, and their numbers have declined accordingly.

7.4.3. Threats to coastal and marine ecosystems

Overfishing and climate change are currently the two greatest threats to marine and coastal biodiversity, with the former making ecosystems less resilient to the latter. There are also other threats, such as pollution, sedimentation and reclamation.

Overfishing has confounding and aggravating, contemporary and historical aspects in coastal waters, particularly the 12,000 square miles of the Mahé Plateau. Major components of the megafauna have disappeared (seals, crocodiles) or been significantly reduced in numbers and/or biomass (turtles, sharks). The functional extirpation of these species from the ecosystem can be expected to induce significant and long-term impacts on the stability and productivity of marine shelf and bank ecosystems. This situation has been exacerbated over the past 40 years by the sustained overfishing of demersal stocks on the Mahé Shelf, with marked historical declines in populations of various grouper species and continued overfishing of key economic stocks, such as emperor red snapper (*Lutjanus sebae*).

The Seychelles' ocean waters have also been affected by historical whaling and the contemporary expansion (from the 1980s onwards) of industrial and semi-industrial fleets, both regionally and nationally, raising concerns about the long-term sustainability of tuna and associated fisheries (as well as bycatch of species such as sharks and turtles).

The general and crosscutting impacts of current and projected climate change are poorly understood but the major coral bleaching event of 1998 provided a glimpse of the serious potential consequences for the future. Coral reefs on the Mahé Plateau, apart from some localities, did not show strong recovery from this event and recovery was further hampered by subsequent (albeit less severe) bleaching events. Recent studies indicate that the effects of coral reef decline will soon become apparent in the catch and composition of the fishery.

Pollution is a secondary threat, due to Seychelles' small population and limited industrial and agricultural base. All the same, it is increasing year by year. Pollution impacts, coupled with sedimentation and reclamation activities, have had significant effects on the coastal habitats of the main populated islands. Indeed, the main area of pollution loading and reclamation is along the east coast of Mahé, and the collapse of some fish species in local fishing catches (such as *Epinephelus ongus* and *Leptoscarus vaigiensis*) has been attributed to the reclamation of key habitats. The east coast of Mahé is also the main nursery area for multiple shark species and the consequences of the ecosystem changes presented above on these species are still unknown.

Table 44 Threats to ecosystems in the Seychelles assessed during stakeholder consultations in March 2022

Threat	Causes		Severity			Consequences
	Direct causes	**Indirect causes**	**Immediacy**	**Extent**	**Intensity**	
Terrestrial ecosystems						
Invasive alien species	Land use change; economic development (increased trade and tourism); lack of public awareness of risks of horticultural imports	Lack of management capacity for border control and inter-island control; climate change.	Long-term	Large	High	Biodiversity decline; loss of endemic species; decline in provision of ecosystem services; loss of future development potential
Land-use change	Economic development	Lack of management capacity, policy implementation, etc.	Short-/Medium-term	Small/ Medium	Medium	Disappearance due to residential development, infrastructure, etc.
Fire	Human activities	Climate change	Short-/Medium-term	Medium	Medium	Loss of forest cover; facilitation of spread of invasive alien species; increased erosion; increased sedimentation; decline in provision of ecosystem services
Climate change	Frequent droughts; storms; impacts of invasive alien species		Long-term	Large	Unknown	Unknown
Pests/ vectors/ diseases	Increase in diseases related to invasive alien species; climate change	Climate change	Medium-/Long-term	Medium / Large	High	Loss of economic resources; diversion of already limited resources to deal with epidemic
Habitat fragmentation	Increased fragmentation		Medium-/Long-term	Medium	Unknown	Lack of information on consequences (related to residential development, roads)
Freshwater ecosystems						
Drainage/ canalization	Economic development; residential development; agriculture	Lack of management capacity, policy implementation, etc.	Medium-/Long-term	Medium / Large	Medium	Loss of biodiversity and ecosystem services; increased sedimentation in the marine environment
Sedimentation	Land-use change; deforestation	Lack of management capacity	Medium-/Long-term	Medium	Medium	Degradation of water quality and associated loss of biodiversity and ecosystem services

Threat	Causes		Severity			Consequences
	Direct causes	Indirect causes	Immediacy	Extent	Intensity	
Pollution/ eutrophication	Economic development; low awareness; lack of wastewater treatment; lack of enforcement; accumulated persistent organic pollutants	Lack of management capacity	Medium- /Long-term	Medium / Large	Medium/ High	Degradation of water quality and associated loss of biodiversity and ecosystem services
Invasive alien species	Lack of awareness; lack of biosafety protocol (contamination of marshes)		Long-term	Medium	Medium / High	Loss of biodiversity and ecosystem services
Climate change	Prolonged drought; large floods; increase in salinity		Long-term	Large	Unknown	Unknown
Coastal and marine ecosystems						
Overexploitation	Economic development; overfishing; fishing overcapacity for sea cucumbers, lobsters and sharks; poaching	Lack of management capacity; inappropriate/ perverse incentives.	Medium- /Long-term	Medium / Large	Medium/ High	Unsustainable resource exploitation; significant loss of future income and impact on livelihoods, cost of living, etc.; potential phase change in some habitats
Bycatch (sharks, turtles)	Handicrafts and fashion accessories		Medium- /Long-term	Large	Unknown	A major problem in the semi-industrial longline fishery
Pollution	Economic development; urbanization; inadequate industrial and domestic sanitation	Lack of management capacity	Medium-term	Medium	Low/ Medium	Impacts on some localized coastal habitats and production (also a much broader threat from shipping and oil exploration)
Offshore debris / non-degradable solids (marine debris)	Industrial and domestic waste from land and boats; abandoned fishing gear	Poor waste management; lack of education; use of plastic bags in stores	Short- /Medium- /Long-term	Large	Medium/ High	Lack of information

Threat	Causes		Severity			Consequences
	Direct causes	Indirect causes	Immediacy	Extent	Intensity	
Invasive alien species	Ballast water; promotion of farming of marine organisms (which can significantly increase this risk)		Medium-/Long-term	Unknown	Unknown	Lack of information; actual occurrence of marine invasive alien species unknown but continued degradation and stress levels of reef habitats suggest that there is potential for the establishment of invasive alien species
Climate change (sea temperature rise, sea level change, coral bleaching, localized salinity change, loss of critical habitats: seagrass beds, etc.)	Human activities		Medium-/Long-term	Large	High	Economic losses in the artisanal fishery and tourism industries; increased cost of living; potential for ecosystem phase change and increased coastal erosion; changes in the occurrence and distribution of pelagic resources; changes in weather conditions; increased frequency of coral bleaching events; loss of biodiversity; potentially disastrous socio-economic impact, as economic activity and human habitation are concentrated on the coastal plains
Reclamation	Economic development; urban development		Long-term	Medium	High	This has had a very marked impact on some species, also on the east coast of Mahé, with the center of the vast majority of the reclamation being key breeding habitat for various species
Sedimentation	Urban development		Short-/Medium-/Long-term	Small	Low/ Medium	Degradation of coral reefs, economic loss in the artisanal fishing and tourism industry

8. SOCIO-ECONOMIC CONTEXT

8.1. Demographics

As the figures in Table 45 show, the population of the hotspot countries is dominated by Madagascar, which comprises 93 percent of the total population of the four countries.

Table 45 Demographics of the hotspot countries

Country	Population	Year of data	Area (km²)
Comoros	742,287	2017	2,170
Mauritius	1,260,000	2021	1,974
Madagascar	28,177,762	2018	587,041
Seychelles	99,202	2021	455

The main population indices show a gap between Madagascar and the Comoros on the one hand, and the Seychelles and Mauritius on the other. Madagascar's population growth is particularly strong, with an annual growth rate of about three percent; it is estimated that Madagascar's population will be well over 33 million by 2030. This growth rate is relatively higher than that of other sub-Saharan countries (average 2.4 percent) and the islands of the Indian Ocean (with the exception of the Comoros, which averages 1.97 percent). In the current context, this leads to increased pressure on natural resources and biodiversity.

In the Comoros, the average density is very high (407 inhabitants/km²) and varies significantly from one island to another, as well as within islands. Population density is particularly high on Anjouan, where it reaches 772 inhabitants/km², thus causing important socio-economic and environmental problems. The country is experiencing strong demographic pressure, resulting in high and increasing urbanization. The share of the urban population has grown from 28 percent in 2003 to 31 percent in 2017.

As for the Republic of Mauritius, the average population density on the island of Mauritius is about 630 persons/km², among the highest in the world, although population growth is low (0.4 percent in 2012), with a crude birth rate of 10.3 in 2021 (compared to 10.6 in 2020). The population density on the island of Rodrigues is 404 persons/km².

In the Seychelles, the average population density is 212 persons/km², with 58.4 percent of people living in urban areas.

8.2. Ethnicity, language and religion

The Malagasy population is made up of 18 ethnic groups, spread throughout the country, each of which has its own language. Despite this, the country's official language is "Malagasy", a single language spoken by the entire population and taught throughout the island. The second official language is French, while English has been progressively practiced for some years. There are no official statistics concerning religion. Nearly half of the Malagasy population identifies as Christian, while the other half practices the ancestral religion and about 10 percent of Malagasy people say they are Muslims.

The population of the Union of the Comoros is largely composed of people of Bantu ethnicity. Comorian is the first official language, followed by French and Arabic. Islam is the state religion, with 97 percent of the population practicing Sunni Islam.

The population of the Republic of Mauritius is composed of different ethnic groups, the majority of which are of Indian origin on Mauritius, and of African origin on Rodrigues. Another part is of Chinese and European origin, while people of mixed ancestry occupy an important place. Mauritian Creole, inspired by French, is spoken by a large majority of the population, as well as French, although English is the official language of the country. On

Rodrigues, the lexicon of Rodriguan Creole was formalized only in 2022. With regards to religion, Hinduism is the majority religion practiced in Mauritius (49 percent of the population), followed by Islam (17 percent), but the 'Creole' population is also important. The last ethnic census of Mauritius was conducted in 1972, and there have been major ethnic, social and cultural changes since then.

In the Seychelles, the population is a mixture of African, Malagasy, European and Asian cultures resulting from the colonial slavery era that prevailed when the first settlers came with enslaved people from Mauritius and Réunion, and the arrival of Indian and Chinese workers and families during the 19th and 20th centuries. The population is predominantly Christian (over 90 percent), mainly Roman Catholic but also Anglican. Other religions include Hinduism, Islam and Bahai. There are three official languages in the Seychelles: English (the administrative language); Creole (the dominant spoken language); and French.

8.3. Development trends

Madagascar's Human Development Index (HDI) score of 0.528 (2019) places the country in the low human development category, ranked 164th out of 189 countries and territories. Between 2000 and 2019, Madagascar's HDI value increased from 0.462 to 0.528, an increase of 14.3 percent. According to the National Institute of Statistics (INSTAT), the Gross Domestic Product (GDP) growth rate was -7.1 percent in 2020, while the poverty rate for the same year was 71.5 percent (National Survey on the Monitoring of the Millennium Development Goals). This followed a 4.4 percent growth in GDP in 2019. The country thus entered a recession in 2020, due to the COVID-19 pandemic, when real GDP declined by 4 percent.

For the Comoros, the HDI score is 0.554 (2019). The country is characterized by extreme poverty affecting a quarter of the population, an overall poverty rate affecting 42.4 percent of the population (World Bank, 2018), and persistent inequality, despite a decline in the Gini coefficient from 0.55 to 0.45 between 2004 and 2014 (United Nations 2020). Poverty and inequality are, in large part, explained by the prevailing economic context in the Comoros, but also by the absence of a reliable social protection system. The government's limited financial resources prevent it from implementing a redistribution policy to benefit the most vulnerable social classes, which accentuates inequalities, particularly related to gender. The Union of the Comoros is a Small Island Developing State (SIDS) and was one of the Least Developed Countries until the end of 2019. Following a reassessment by the World Bank, the country joined the list of Lower Middle Income Countries.

As for the Republic of Mauritius, social and economic indicators are comparable to those of Organization for Economic Cooperation and Development (OECD) countries. Its HDI score of 0.804 in 2019 ranks it 66th among the 189 countries and territories assessed. Inequality exists within the Republic of Mauritius, although the incidence of absolute poverty is relatively low, despite pockets still prevailing in some suburban and coastal areas of Mauritius and Rodrigues islands. Rodrigues' level of development has improved, as indicated by the increase in its relative development index from 0.347 in 2000 to 0.557 in 2011, but also indicating that Rodrigues is the second poorest region in Mauritius. Pockets of poverty are in some ways correlated with where descendants of enslaved people live, such as traditional coastal fishing communities. These communities are particularly vulnerable because government investment is more focused on higher education in an attempt to promote economic growth. Yet children from poor families, such as those found on the coast of Mauritius and Rodrigues islands, are less likely to benefit from this policy.

Social and economic indicators in the Seychelles are also comparable to those of OECD countries, and poverty is marginal. This is due to the government's emphasis on education, health, housing, and other social development programs. The country's social indicators have remained strong and it has an HDI value of 0.796. The Seychelles has one of the highest HDI scores in Africa and is well on its way to achieving the Sustainable Development Goals (SDGs) (four of which have already been achieved). Nevertheless, poverty and deprivation exist in Seychelles but are difficult to measure or have not been measured sufficiently in the past. According to World Bank data, the poverty rate is about 2.5 percent, but a 2020 study by the Seychelles National Statistical Office found that 12 percent of the population was multi-dimensionally poor and suffered from deprivations related to standard of living, education, health and employment.

In general, in addition to climate change, the current global health and geopolitical context (including the COVID-19 pandemic, monkeypox virus, and Russia-Ukraine war) is not without impacts on the economies of each country, which are becoming more and more tense. It is evident that the Indian Ocean islands’ remoteness has not spared them from these events.

8.4. Main economic sectors

8.4.1. Madagascar

From 2013 until before the COVID-19 pandemic, GDP growth in Madagascar steadily increased and entered a stabilization phase in 2018 (World Bank data). The tertiary sector has been the main driver of economic growth since 2015, particularly services, estimated at 5.4 percent in 2018. Within this sector, trade has been dynamic, with a 4.1 percent increase in 2017.

In Madagascar, nearly 80 percent of the population is engaged in agricultural activities. However, this sector does not contribute significantly to economic development. Between 2014 and 2017, the agricultural sector contracted by an average of 0.8 percent per year, indicating that the economic growth of recent years has not had a positive impact on the living conditions of the rural population. One reason for this is low agricultural productivity, due to insufficient use of modern technology, lack of connectivity to markets to facilitate the transport of goods, and unfavorable weather conditions. Apart from agricultural work, rural households have few alternative activities that can generate sufficient income to mitigate the impact of crop failure and weather shocks.

Nonetheless, as a cash crop producing country, Madagascar can rely on export revenues from vanilla, cloves and other spices. For example, the significant increase in vanilla prices boosted export revenues in 2017, allowing the Central Bank to accumulate more foreign exchange reserves than expected. Nevertheless, as the current situation shows, the price of vanilla can experience significant fluctuations at the global level, which can have significant impacts at the national level. Madagascar is also known for its mineral wealth. Two major mining companies are established in the country, for the exploitation of nickel-cobalt in the east and ilmenite in the southeast.

Fishing has also been a foreign exchange earner for years and the country plans to expand its Exclusive Economic Zone (EEZ) in the context of development of a blue economy. In 2018, the fisheries sector accounted for nearly 7 percent of national GDP and made up 6.6 percent of exports (FAO data).

Finally, tourism, particularly ecotourism, is the third largest foreign exchange earner, contributing to 10 percent of GDP (pre-COVID-19). Visits to protected areas and scuba diving take precedence over beach tourism, demonstrating the particular interest of foreign tourists in nature in Madagascar.

8.4.2. Comoros

The Comorian economy is dominated by the agriculture and trade sectors. It is characterized by very limited production capacity, which accounts for 61 percent of the primary sector and 34 percent of the tertiary sector, respectively. The primary sector is focused on the production of three crops of high commercial value (vanilla, cloves and ylang-ylang) which provide the bulk of the country's export earnings (around 95 percent). Food production, mainly bananas, copra and tubers, as well as fishing for local consumption, remain underdeveloped. The tertiary sector alone accounts for an average of 54 percent of GDP (INSEED SCN 93, 2019 series), followed by the primary sector (32 percent of GDP).

Agriculture provides employment for a large part of the Comorian population. It is poorly mechanized and marked by low yields, due in part to the use of rudimentary production technology. Agricultural productivity is very low and farmers live in a situation of economic insecurity.

As for industry, it is in an embryonic state. As a result, national production is struggling to meet the demand of Comorian households, which is increasingly boosted by remittances from migrants. The Comoros are becoming increasingly dependent on imports, to the detriment of the country's trade balance, which has been growing steadily from one decade to the next, particularly in relation to countries such as Tanzania and the United Arab Emirates.

The Comorian economy faces several problems related to the size of demand, supply, transaction and transport costs, and the weakness of economies of scale in defining profitable production choices. The access that enterprises have to productive resources is very limited, as financial institutions do not offer services that enable them to acquire the operating goods they require.

There are, however, opportunities that can contribute to the sustainable development of the country. These include: (i) tourism, as the country has an extremely rich and varied tourist heritage, consisting of important environmental wealth and a particularly attractive tropical environment which remain under-exploited; (ii) the blue economy, as the country can take advantage of the potential of the oceans, seas and coasts to eliminate overfishing and other harmful fishing practices, by opting for approaches that promote growth, conservation and sustainable fishing and ending illegal fishing, while promoting the sustainable management of aquatic resources and marine biodiversity; and (iii) the use of renewable energies including geothermal, hydro, wind and solar as opportunities to provide energy in sufficient quantity and quality and at affordable cost.

8.4.3. Mauritius

The sustained increase in national income has been driven by the textile industry, construction and manufacturing, tourism, and financial services. Today, the services sector accounts for 67.7 percent of Mauritius' GDP. Further diversification of the economy is linked to the expansion of the service sectors (information and communication technology and business process outsourcing). Other economic sectors that are expanding are the seafood, real estate, and energy industries. Mauritius is also investing to become a health tourism destination and a regional center for higher education (MOE 2011). The economy is driven by local and foreign investment. Foreign direct investment was estimated at US$41 million in 2005, US$589 million in 2011 and up to US$245 million in 2020. Mauritius is considered an investor-friendly country and enjoys a number of competitive advantages (social, cultural, political and environmental) over other African countries. However, some economists argue that recent programs to restructure the economy may not soothe "its exposure to the vagaries of international trade but continue a historical pattern of development that addresses struggling economic performance by refining and then replacing one small set of industries with another" (Kothari and Wilkinson 2013). Nevertheless, it is clear that living standards and education have improved dramatically in recent decades (Shobee 2009).

Sugar industry

In 2018, the sugarcane industry accounted for about 0.65 percent of GDP. Although representing a small percentage of GDP, the agricultural sector employs 3.5 percent of the population. With the end of the ACP-EU protocol that guaranteed sugar export quotas in 2000, the price of sugar fell by 36 percent in four years. Mauritius has shifted the focus of the sugarcane industry to electricity generation, as well as the production of specialty sugars for export. The area devoted to sugarcane has been reduced and covers an area of 54,182 ha of land in 2017.

Textile and clothing

Although it contributes only 3.4 percent of GDP in 2019, the textile and apparel industry remains a key sector in Mauritius, generating over MUR 22.4 billion (US$630 million) in export earnings.

Tourism

The tourism industry in Mauritius began in the early 1950s but it began to grow steadily as an important economic option after independence in the early 1970s (Prayag 2011). In order to diversify the economy and reduce dependence on sugar exports, the government encouraged the establishment of hotels with tax incentives. These incentives led to an increase in tourist arrivals and the incentives provided by the government led to a rapid increase in the number of hotels and hotel capacity, a trend that has continued to the present. The statistics in this section are based on official government figures, unless otherwise noted.

The number of tourist arrivals has steadily increased over the years, from 965,000 tourist arrivals in 2012 to 1,383,488 in 2019. The Mauritian tourism industry focuses on selective, high-end, quality tourism. This choice is set on the national tourism policy, as the tourism industry is considered a pillar of the economy and seen as a key factor in the overall development of the country. The country's gross revenue from tourism has steadily increased over the past decade. About half of this spending is on accommodation, while entertainment and shopping account for about 20 percent. As a result, most tourist spending is captured by large hotels, with little revenue distributed to other smaller related businesses. While tourism may bring short-term economic benefits to the poorer part of society, it is unlikely to make a sustainable longer-term contribution to poverty reduction (Sharpley and Naidoo 2010).

8.4.4. Seychelles

The private sector is the largest contributor to GDP and employment in the Seychelles. In 2018, the private sector accounted for about 60 percent of GDP and about 65 percent of the formal labor force. As mentioned earlier, the two main driving sectors of the Seychellois economy are tourism and fishing. Industrial fishing is the country's largest source of foreign exchange after tourism (and the largest during the COVID-19 period, which reduced the number of visitors). Foreign direct investment inflows have increased in recent years, following the construction of several high-end hotels and a residential project on Perseverance Island but are expected to slow down.

Fishing (before COVID-19) provided about 6,000 jobs, or 17 percent of formal employment, and contributed from 8 to 20 percent of GDP. Fisheries products account for 92 percent of national exports. Tuna fishing, an increasingly important sector of the economy (Shareef and McAleer, 2008), is the main fishing activity in the country and the port of Victoria is the largest port in the Indian Ocean for tuna landings. Tuna fishing in the Seychelles began in 1982 and has since largely outgrown artisanal fishing (Payet 2006). Prior to COVID-19, tourism contributed 19 percent of direct employment, or over 25 percent of GDP, and the majority of revenue was in foreign currency. In addition, some tourist facilities play an important direct role in nature conservation programs, particularly on private islands, by co-funding programs to eradicate invasive species (particularly rats) and restore habitats, as well as to conserve or reintroduce native wildlife.

According to the Seychelles National Statistical Office (2019), the other economic sectors include: transport, storage, communication and information (16.3 percent); government services (12.7 percent); financial services, insurance and real estate (8.7 percent); construction, electricity, gas, water supply and sewage (5.6 percent); other wholesale and retail trade (5.6 percent); other manufacturing (2.5 percent); and agriculture, which accounts for only 1.3 percent of GDP (the forestry sector is almost non-existent). Downstream oil is an important economic sector, with the potential for oil and gas production in the Seychelles. Exploration has taken place over the past decade and has provided interesting prospects.

According to the Seychelles National Development Strategy (NDS) for 2019-2023, the blue economy is one of the main engines of growth and development, driven by tourism and fisheries. This plan provides a model for sustained growth through strategic positioning of the government as a facilitator. The NDS is based on six pillars: (i) good governance, transparency and accountability; (ii) people-centered development; (iii) social cohesion; (iv) innovative economy; (v) economic transformation; and (vi) environmental sustainability and resilience. It also takes into account international commitments, such as Agenda 2030, the SDGs, the Paris Declaration on Aid Effectiveness, and Agenda 2063, and aims to help the country address several challenges. These include upgrading infrastructure for sustainable socio-economic development, transforming the education system to integrate science and technology, increasing productivity and innovation, removing barriers to structural economic transformation, and resilience to climate change.

9. POLITICAL CONTEXT

This chapter provides an overview of the political situation in the countries and indications and analysis on the general strategies of the key development sectors that affect and/or are related to the conservation of biodiversity and the fight against climate change, taking into account national policies and legislation and international and regional conventions.

9.1. Historical context

Following several waves of settlement (initially Austronesian, then Bantu, with Arab contributions from the end of the first millennium), political power in Madagascar was organized around numerous small kingdoms. At the end of the 18th century, King Andrianampoinimerina strengthened the Imerina kingdom, whose capital was the present-day Antananarivo, by dominating the neighboring kingdoms. His son Radama I ensured thereafter the domination of the Imerina kingdom on the quasi-totality of the island, creating in fact the first Malagasy State. He and his descendants were recognized by the European powers as the sovereigns of Madagascar. From 1896, Madagascar was colonized by France, from which it obtained its independence in 1960 (Table 46).

The Comoros, initially populated by Bantu people from the African coast, saw the establishment of the first sultanates, set up by Arab-Persian Chanazians around the 15th century, following the arrival of the fleet of Mohammed ben Hassa. Political power was then divided into many small sultanates, in perpetual evolution following the games of alliance, war and marriage. In the 16th century, the Comoros was an important slave trading hub for Arabs and Europeans, and Malagasy raids to recover slaves were frequent. A Malagasy sultanate was established in 1830 on Mohéli and then on Mayotte, and some of the sultans asked for protection from the French king Louis XIII. Mayotte became a French protectorate in 1841, then Anjouan in 1866. Grande Comore, unified by a sultan with the help of the French, became a protectorate in 1886, foreshadowing the creation of the French colony of "Mayotte and Dependencies" in 1892. In 1973, a referendum on self-determination was organized, during which the Comoros voted for independence, except for Mayotte. The Republic of the Comoros was declared unilaterally in 1975. Mayotte remains *de facto* a French overseas department, a situation not recognized by the Comorian state.

Table 46 Historical landmarks of the hotspot countries

Country	Main historical landmarks
Madagascar	1895: French Protectorate 1960: Independence
Mauritius	1598-1710: Dutch occupation 1715-1810: French colony 1810-1968: British colony 1968: Independence
Comoros	1866: The Sultan of Anjouan requests the French protectorate 1912-1946: French colony and attachment to Madagascar 1947: Administrative autonomy from Madagascar 1958-1975: French overseas territory 1975: Independence (except Mayotte)
Seychelles	1756: French takeover 1770: First French settlements 1814: France cedes the Seychelles to Great Britain 1903: British colony 1976: Independence

The other islands of the Indian Ocean were not populated (or at least permanently) before the arrival of European sailors (Portuguese, Dutch, British and French) in the 16th century. Mauritius and the Seychelles (as well as Réunion Island) came under the British crown and French domination according to the wars and agreements. Mauritius and the Seychelles became independent from the United Kingdom in 1968 and 1976 respectively, while Réunion Island became an overseas department of France. Réunion is an outermost region of the European Union and, as such, forms part of the eurozone. The Scattered Islands, not inhabited, were for a time attached to the French colony of Madagascar; they are now French overseas territories, managed by the administration of the French Southern and Antarctic Lands, a situation contested by Madagascar.

9.2. Governance structures, decentralization, political conflicts and security issues

Independent since 1960, Madagascar is a semi-presidential republic with a bicameral legislative system consisting of a National Assembly composed of directly elected representatives and senators partially elected by local legislators and partially appointed by the Head of State, in a multi-party context. The territorial organization is made up of six provinces, 23 regions, 119 districts, 1,579 communes and 17,485 fokontany (the smallest administrative territorial delimitation). Theoretically, the regions and communes benefit from a certain autonomy within the framework of a decentralization policy. The fokontany represent the scale of the village community or of gathered neighborhoods.

In 1972, 1991, 2001-2002 and 2009, Madagascar experienced sociopolitical crises lasting several months each time, blocking all administrative, production and cooperation machinery with foreign partners, thus penalizing economic development and impacting the very identity of the population, whose vision, sense of values and outlook were negatively influenced by the disastrous consequences of the economic blockade experienced by the country. After a long period of transition, Madagascar has experienced a certain stability since 2013. The current regime is the result of elections held in December 2018, based on the new constitution (2010) on which the current Fourth Republic is based.

The Union of the Comoros gained its national independence in a difficult context. The country entered into a cycle of political crises and conflicts marked by political and institutional instability and punctuated by a multitude of coups and attempted coups d'état. In 2001, a new constitution was adopted following the reconciliation agreement known as the Fomboni agreement signed in February 2001, establishing the Union of the Comoros. This constitution granted the islands a large measure of internal autonomy and also established the principle of a rotating presidency among the islands of the country. However, the lack of a clear definition of the competencies of the various institutions established led to new conflicts of competence over the prerogatives of the autonomous entities and the union.

The Fomboni Agreement, however, allowed the country to enter an era of relative institutional and political stability, marked in particular by three democratic changes of head of state. The country took advantage of this lull to focus on economic and social development issues and has regularly adopted national reference strategies in this area since 2001. It should be noted that, following the constitutional reforms in 2018 (which are contested by an opposition that believes they call into question the foundations of the Fomboni Agreement), the country seems to have returned to the major political conflicts of the past. A national inter-Comorian dialogue process has been underway for several months. It aims at national reconciliation and the construction of a lasting peace through a global political consensus shared by the different political actors and civil society with the aim of overcoming the multiform crises in order to build together a prosperous country.

The Republic of Mauritius is based on a democratic parliamentary system, in which the President and Vice-President are elected by the National Assembly. The Prime Minister is the head of government. The legal system is based on the British system, while retaining some influences from French codes, such as the Napoleonic Code for the Civil Code, in force since 1808. Following the adoption of a Statute of Autonomy in 2002, Rodrigues has a Regional Assembly of 18 members, which appoints a Chief Commissioner to act as head of the local government. The scattered islands of Mauritius (including Agaléga and Saint Brandon) are under the responsibility of the Ministry of Local Government and Scattered Islands.

The Seychelles is a republic whose president, elected by universal suffrage for five years, is the head of state and government. The parliament is composed of 34 members. A multiparty system was reinstated in 1991. The inner islands, the most densely populated, are divided into 25 districts (including 22 on Mahé, the capital island), while the outer islands are not part of any district.

9.3. Overview of public policies on conservation and climate change

9.3.1. Madagascar

International commitments

Madagascar is a full party to the three major Rio conventions: the CBD; the United Nations Framework Convention on Climate Change (UNFCCC); and the United Nations Convention to Combat Desertification (UNCCD). It has also ratified most of the international texts resulting from these conventions, relating to the protection of biological diversity, the fight against climate change and the fight against desertification and land degradation.

Policy framework

Madagascar is a pioneer in Africa, having launched its NEAP in 1991, which was implemented in three phases until the mid-2000s and continues to inspire actions in favor of environmental protection. The development of the NEAP was notably motivated by the richness of Madagascar's biodiversity and the importance of its protected areas. A key policy commitment towards protected areas was the "Durban Vision", announced at the World Parks Congress in Durban in 2004, where the government committed to trebling the area of the SAPM (Norris 2006).

Madagascar's policy towards management of its protected area system is set out in the revised Protected Areas Management Code, which was updated in 2015. The country's protected areas are grouped within the SAPM, which in 2021 included 124 terrestrial and marine protected areas, governed according to the IUCN categorization and covering about 12 percent of the national territory, as well as one protected area under temporary protection, and eight protected areas in the process of being created (source: Directeur des Aires Protégées, des Ressources Naturelles renouvelables et des Ecosystèmes (DAPRNE), Ministère de ''Environnement et du Développement Durable (MEDD) 2021).

With regard to ecosystem restoration, the government of Madagascar has made several international commitments to restoring the deforested and degraded lands that cover most of the country, including under the Bonn Challenge and the African Forest Landscape Restoration Initiative (AFR100). Specifically, in 2015, Madagascar committed to restoring 4 million ha of deforested and degraded land by 2030. At the national level, the implementation of this commitment is guided by the National Strategy for Forest and Landscape Restoration and Green Infrastructure, which was developed by the Ministry of Environment and Sustainable Development and adopted in 2017. Support to the strategy's implementation by the government and development partners is coordinated through the National Committee on Forest and Landscape Restoration.

In addition, Madagascar has developed a national strategy and national action plans for biodiversity management (2015-2025) and prepared its Sixth National Report to the CBD on biological diversity (2019). Madagascar also has specific strategies and conservation plans for certain species such as amphibians (including the amphibian conservation program in 2008, and the strategy and conservation plan for golden mantella (*Mantella aurantiaca*) for 2008-2015) and primates (including the lemur conservation strategy for 2013-2016).

With regard to the wider environment sector, the government of Madagascar adopted a new Policy Declaration on Environment and Sustainable Development in 2015, which emphasizes partnership among stakeholders in the environment sector, further decentralization of natural resource management to local communities begun under the GELOSE Law (see below), and synergy between environmental preservation and livelihood development. To achieve the goals set out in this policy declaration, the government developed the Environmental Program for Sustainable Development (2016-2020) (Government of Madagascar 2016).

Institutional framework

From an institutional point of view, based on the principles and provisions of the Charter of the Environment (revised in 2015) and the international conventions relating to the protection of the environment ratified by Madagascar, the Ministry of Environment and Sustainable Development (MEDD) is responsible for the design, coordination, implementation, monitoring and evaluation of the state's environmental policy and sustainable development.

Two organizations attached to MEDD are particularly important for protected areas and climate change adaptation: (i) Madagascar National Parks (MNP), whose mission is to establish, conserve and manage in a sustainable manner a national network of parks and reserves representative of Madagascar's biological diversity and natural heritage; and (ii) the National Office for the Environment, whose mission is to prevent environmental risks in public and private investments and to fight against pollution, while also being a regulatory body ensuring the implementation of the Development Compatible with Environmental Investments decree.

Climate change policies, legislation and institutional framework

It was notable during the third phase of the NEAP that actions and initiatives on the fight against climate change emerged and that Madagascar began to participate in the Conference of the Parties.

Madagascar ratified the UNFCCC through Law n° 98-02029 of 2 December 1998 and its implementing Decree n° 98-16830 of 18 December 1998. In light of Madagascar's obligations under the UNFCCC, the following texts, policies, and reference documents have been adopted in terms of climate change.

Legislation with international scope:

- Law n° 2003-009 of 3 September 2003, authorizing the ratification of the Kyoto Protocol of the UNFCCC.
- Decree No. 2003-009 of 3 September 3, ratifying the said protocol.
- Law 2014-022 of 10 December 2014, authorizing the ratification of the Doha Amendment to the Kyoto Protocol.
- Decree No. 2015-701 of 20 April 2015, ratifying the Doha Amendment.

- Law No. 2016-019 of 30 June 2016, authorizing the ratification of the Paris Agreement of the UNFCCC.

National policy documents:

- The revised National Climate Change Policy (PNLCC) (2022), which led to the development of the National Action Plan to Combat Climate Change.
- The National Determined Contribution (2016), which is currently under revision (2022).
- The National Adaptation Plan (NAP) (2021), which is the main document guiding adaptation policy and strategy, wherein EbA is identified as one of the country's priority strategies.
- The Third National Communication to the UNFCCC (2020).
- Decree 2018-500 on the National REDD+ Strategy for Madagascar.
- Decree No. 2017-757 on the national commitment to land degradation neutrality. In this commitment, Madagascar prioritized the mobilization of financial incentives to promote research on sustainable land management in relation to biodiversity and climate change.
- The consideration of climate change as part of the risks related to the environment in Law No. 2015-003 of 20 February 2015, on the updated Malagasy Environment Charter.
- The integration of risk and disaster management into climate change adaptation, in Law No. 2015-031 of 22 February 2016, on the National Disaster Risk Management Policy.
- Recognition of climate change issues on development sustainability in Decree No. 2015-1308 of 22 September 2015, setting the National Environmental Policy for Sustainable Development.
- The National Appropriate Mitigation Actions, submitted to the UNFCCC in 2010.

At the institutional level, under the supervision of the General Secretariat of MEDD, the National Office of Climate Change and REDD+ (BNCCREDD+) is in charge of the local coordination of strategic initiatives and policies for the fight against climate change. The BNCCREDD+ is the NDA for the GCF in Madagascar. It is responsible for coordinating all initiatives and actions related to climate change and REDD+. Its actions aim to promote a climate change resilient economy, reduce emissions from deforestation and forest degradation, as well as other greenhouse gases that cause climate change, in order to achieve sustainable low-carbon development.

Due to the cross-cutting nature of climate change, the National Climate Change Committee (CNCC) was created in November 2014, by Decree No. 2014-158828. The CNCC was created to strengthen the coordination of the implementation of the PNLCC. It is a multisectoral structure for consultation, information sharing and exchanges in this area. The CNCC is chaired by the Secretary General of MEDD, while the BNCCREDD+ provides the permanent secretariat. Within the framework of the implementation of the NAP, the CNCC plays a major role in the technical aspects of the elaboration of the document and in the validation process by the Secretariat of the UNFCCC. Last but not least, the Inter-ministerial Committee for the Environment (CIME), under the authority of the Prime Minister, is the body that guarantees the integration of environmental actions in the different sectoral policies for sustainable development. Within this framework, CIME assists the Head of Government in the choice of the main orientations of the environmental policy, as well as in the choice of operational strategies for the implementation of this policy. Given that the coordination of the fight against climate change is under the responsibility of MEDD, CIME, which is a high-level body, can therefore be mobilized to effectively ensure the integration of adaptation to climate change into the major political and strategic orientations for sustainable development.

CIME also aims to support all ministries and Decentralized Territorial Collectivities in their initiatives to integrate the environmental dimension and climate change into their development efforts, and to ensure inter-ministerial and cross-cutting coordination around these issues.

Participation of local communities in natural resource management

Public participation in environmental management is defined in the Malagasy Constitution. The first version of the Charter of the Environment adopted in 1990, specifies the forms that public involvement in the management of the environment can take. It is manifested in two variants: (i) in the transfer of competences such as the transfer of natural resources management and the management of protected areas; and (ii) in the contribution to decision making through environmental management instruments, such as Environmental Impact Assessments (EIAs).

The first legal instrument instituting local management of renewable resources is Law 025-1996, known as the GELOSE Law (Secure Local Management or *Gestion Locale Sécurisée*) concerning forest, continental and marine fisheries resources (Bertrand *et al.* 2009), which institutes the principle of Transfer of Management of Renewable Natural Resources. This law resulted in Decree No. 2000-27 of 13 January 2000, relating to local communities in charge of the local management of renewable natural resources, and Decree 2001-122 on Contractualized Forest Management. In addition, the National Reforestation Strategy (MEF 2004) provides for the involvement of actors other than the state in its implementation. In this context, reforestation can be initiated by grassroots communities, peasant associations, families/individuals, local associations and NGOs, as well as by communes, in order to increase forest cover, protect watersheds related to agricultural perimeters or meet energy needs. The transfer of management of pastoral resources is governed by Decree 2005-001.

For marine resources, only pelagic fishes, octopuses and crabs are transferable resources, not shrimp and lobsters which are considered strategic resources. Local communities with the private sector and NGOs are more generally involved in the establishment and management of marine resources through Locally Managed Marine Protected Areas (Le Manach *et al.* 2013), while the Policy for the Sustainable Development of Coastal and Marine Areas (Decree No. 2010-137) promotes sustainable development and the national strategy for the integrated management of Madagascar’s coastal zones.

Promotion of the green and blue economy

In its plan of emergence established in 2019, the government of Madagascar now gives an important place to the development of the green economy and the blue economy. This initiative demonstrates the will to make biodiversity a real pillar of sustainable development and in 2021 a new ministry was established which is dedicated to fisheries and the blue economy, whose responsibilities are complementary to those of MEDD.

9.3.2. Comoros

Since 1994, the Union of the Comoros has had a National Environmental Policy (NEP), an Environmental Action Plan and strategies to implement this policy. These policies and strategies also include the Agricultural Strategy, which aims, among other things, to improve the agri-food balance in order to ensure food security, and the National Tourism Strategy. A revision of the NEP to bring it in line with the Emerging Comoros Plan to 2030 and the commitments of the post-2015 conventions, namely the SDGs, the Sendai framework and the Paris Climate Agreement, is currently being considered.

The NEP focuses on the protection, conservation and restoration of natural heritage. It is oriented preferentially on ecosystems and sensitive habitats sheltering threatened and endemic species of national, sub-regional and/or global importance. It also concerns the protection and restoration of ecosystems, particularly in the terrestrial domain for relict forests and in the marine domain for coral reefs and mangroves. To help preserve the fauna and flora, actions are planned to help set up protected areas and botanical gardens.

Institutional framework

The strategy for the implementation of the NEP in the Comoros is based on the establishment of a genuine partnership among the state, NGOs, the private sector and local authorities and on the strengthening of institutions.

The Comorian institutional framework for environmental protection includes state institutions and bodies. It is supported by the Ministry of Environment and Forests through the National Directorate of Environment and Forests, and the National Institute of Applied Research in Fisheries and Environment (INRAPE). Numerous ministries are also involved in natural resource management and climate change issues, including the Ministries of Public Finance, Budget, Economy and Planning, Transport and Tourism, as well as the Ministries of Land Management, Urban Planning, Housing, Public Health and Population, National Education, and Justice.

The governors and delegations of the autonomous islands resulting from the new Comorian constitution are in charge of the implementation of actions and the application of regulations protecting the natural environment, as are the mayors and the municipalities, at their respective levels.

Policy framework

The development of an NEP has given concrete expression to the Comorian government's commitment to address environmental problems. In particular, it has reinforced the government's objectives of integrating the environmental dimension into the social and economic policy and development of the Comoros.

The Framework Law on the Environment was adopted on 6 October 1994 by the Federal Assembly and promulgated by the President of the Republic (Decree No.94/100/PR). This framework law lays down the general principles that should inspire and guide the regulation of activities that may affect the environment. It also provides for a procedure for assessing the impact of activities likely to affect the environment. Under this law, the protection regime is stricter for endemic, rare or endangered animal and plant species and for animal and plant species whose maintenance is important for the natural balance or whose existence could be compromised by uncontrolled exploitation. The framework law devotes a great deal of space to the creation of parks and nature reserves on the national territory.

The framework law also provides that the state determines the policy for the management of forests, whether public or private, and determines the general regime for the protection and exploitation of forests. Particular emphasis is placed on the promulgation of laws on the modalities of forest and land management. A review process is currently underway to revise the framework law.

Finally, the Comoros subscribes to many major international and regional environmental agreements.

9.3.3. Mauritius

Policy framework

One of the main problems in the Republic of Mauritius is the dispersed roles and responsibilities of the different agencies dealing with environmental issues and biodiversity conservation (NBSAP 2006, MOE 2011, NBSAP 2017). Environmental protection and biodiversity conservation legislation is also broken down into different pieces of legislation. Few officers are able to have a comprehensive view of the legislation and how to better enforce the regulations. Another aspect related to environmental governance concerns public awareness campaigns, which are conducted by different ministries and departments, often with duplication. In addition, land and marine NGOs have also developed education programs.

The Forests and Reserves Act (1983), updated in 2003, contains conservation provisions while the Environmental Protection Act (1991) provides the general framework for environmental protection in Mauritius. The Native Terrestrial Biodiversity and National Parks Act (2015) replaced the Wildlife and National Parks Act (1993) with the aim of strengthening conservation practices and management of native terrestrial biodiversity and to comply with international conventions acceded to by the country.

Institutional framework

The ministry responsible for climate change is the Ministry of Environment, Solid Waste Management and Climate Change. This ministry is directly involved in environmental protection through the administration of EIAs, pollution reduction activities, public awareness and environmental education, as well as the rehabilitation and preservation of natural heritage sites.

The Ministry of Agro-Industry and Food Security is involved in terrestrial biodiversity and is the national focal point for the CBD.

The mission of the Ministry of Blue Economy, Marine Resources, Fisheries and Navigation, is to strengthen governance and harness the marine resources in the exclusive economic zone for fostering sustainable development. Although the ministry is the main regulator of marine life, there are other ministries, authorities and organizations also involved in coastal and marine issues (MOE 2011), such as the Ministry of Tourism; and the Ministry of Local Government and Disaster Risk Management. Legislation has been passed in the National Assembly in 2022 that will be important from an environmental perspective, including the Beach Authority (Amendment) Act 2022 and the National Environment Cleaning Authority Act 2022.

The island of Rodrigues is governed by the Rodrigues Regional Assembly, established under the Rodrigues Regional Assembly Act (2001). An Executive Council is responsible for carrying out the functions of the Regional Assembly and comprises the Chief Commissioner, the Deputy Chief Commissioner and up to five other members. Each is assigned responsibility for different departments. Unlike in Mauritius, the responsibilities for biodiversity conservation are mainly under a single Commission for Environment, Forestry, Tourism, Marine Parks and Fisheries. With the exception of EIAs, all decisions related to these divisions can be made independently of Mauritius.

Regarding formal terrestrial and marine protected areas, these are managed by different stakeholders. The formal protected areas in Mauritius and Rodrigues are all on state land, with their boundaries demarcated and officially proclaimed in the Government Gazette and Acts, while informal private reserves also exist on both islands. Nevertheless, most protected areas in Mauritius and Rodrigues are owned by the government. On the other hand, Agaléga and Saint Brandon do not have protected areas, although there was a proposal to create a marine protected area in the past (1998).

International commitments

Mauritius is a signatory to most of the relevant international agreements related to conservation and climate change, including:

- United Nations Convention on the Law of the Sea (UNCLOS, 1982).
- CBD (1992), which Mauritius was the first country to sign and ratify, in September 1992.
- Convention on International Trade in Endangered Species (CITES, 1973).
- UNFCC (1992) and Kyoto Protocol (1997).
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CPB, 2000).
- UNCCD (1994).
- African Convention on Conservation of Nature and Natural Resources (1968).
- Convention on Fishing and Conservation of Living Resources of the High Seas (1958).
- Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 1971).
- Convention for the Protection of World Cultural and Natural Heritage (1972).
- Vienna Convention for the Protection of the Ozone Layer (1985).
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987) and various amendments.
- Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (2002).
- Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1998).
- Convention on Persistent Organic Pollutants (2001).
- Convention on Migratory Species (1994).
- Convention on the Conservation of Migratory Species of Wild Animals or the Bonn Convention (1983).
- International Convention for the Regulation of Whaling (1946).
- African Eurasian Water Bird Agreement (1999).

9.3.4. Seychelles

Institutional framework

The Ministry of Agriculture, Climate Change and Environment (MACCE) is responsible for environmental management and protection in the Seychelles. Through various mechanisms and tools, it is responsible for taking measures to promote the protection, preservation and improvement of the environment, combat pollution and improve waste management, increase environmental education and awareness and strengthen resilience to climate change. In addition, it promotes positive environmental behavior among the general population through national education and public awareness campaigns.

There are several parastatal agencies concerned with biodiversity management and climate change adaptation issues:

- Seychelles Parks and Gardens Authority (SPGA), which is responsible for the management of most of the protected areas and the two botanical gardens, resulting from the merger of the Seychelles National Parks Authority (SNPA) and the National Botanical Gardens Foundation, formerly manager of the Mont Fleuri Botanical

Gardens and the Barbarons Biodiversity Pole (programs for the propagation of native and endemic plants and the recovery of endangered plants).

- Landscape and Waste Management Agency, which was formerly responsible for the cleanup and beautification of Seychelles.
- National Meteorological Services.
- Public Utilities Corporation, which is responsible for the provision of electricity, water and sanitation services.
- Seychelles Islands Foundation (SIF), which manages the two UNESCO World Heritage Sites in the Seychelles plus Fond Ferdinand Park on Praslin Island.
- Seychelles Fisheries Authority (SFA), which is responsible for fisheries management and research in the field of fisheries and aquaculture.
- Islands Development Company (IDC), which is responsible for the management of the outer islands and Silhouette Island.

NGOs also play an important role in environmental governance in the Seychelles, especially since some of them own, manage or co-manage nature reserves or islands with high biodiversity value, and/or are very active at the national level (by conducting conservation programs, educational programs targeting school children and the general public) and as partners of many government institutions.

Policy framework

The main piece of legislation under which nature conservation and protected areas are regulated in the Seychelles is the Reserves and Nature Conservation Act (2022), which repealed and replaced the National Parks and Nature Conservation Act (1969). It establishes a national advisory committee, provides for a large number of clarifications regarding access and restrictions to different protected areas, the designation of authorized officers and their powers, and introduces six new categories of protection in line with the protected areas policy. There is also a Protected Areas Act (1967).

The only official national policy specific to protected areas is the Seychelles Conservation Policy (1971) derived from the Seychelles Tourism Policy (1969) and the National Parks and Nature Conservation Ordinance (1969). The different types of protected areas under this revised policy were redefined and harmonized with the IUCN protected area categories in 2014.

The Environmental Protection Act (2016) designates a department in charge of the environment that will be responsible for issuing norms to ensure the protection of biodiversity, whether terrestrial, freshwater or marine.

The Environmental Impact Assessment Act (1996) and EIA Regulations, provide for a mandatory EIA for any activity or project that has a significant impact on biodiversity.

The Wild Animals and Birds Protection Act (1966) and associated regulations, updated in 2021, enable the Seychellois authorities to better protect the country's wildlife, including marine species.

The Forest Reserves Act (1955) designates the power to create forest reserves to a ministry and determines the laws to be applied within these reserves. Trees may not be cut down without prior authorization from the head of the forestry section.

The Fisheries Act (2014) incorporates the idea of sustainable development and management of fisheries in Seychelles' waters, and includes measures related to aquaculture as well as measures to protect fisheries resources. This law takes into account the application of the conventions to which the Seychelles is a signatory, and also integrates the fact that the Seychelles is a member of the Indian Ocean Tuna Commission.

The Land Use Planning Act (1972), consolidated in 2012, stipulates and controls land-use planning. The law provides for the production of a land-use plan based on knowledge of the land.

Climate change policies and international commitments

At the international level, the Seychelles is party to the following agreements relevant to climate change:

- UNFCCC (1992).
- Kyoto Protocol (1995).
- Paris Agreement (2015).
- Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer, adopted in 1985).
- 2030 Agenda for Sustainable Development (2015).

At the national level, the policy framework for climate change is established by the following:

- Seychelles National Climate Change Strategy (2009) (update in progress).
- Seychelles Sustainable Development Strategy for 2012-2020.
- Seychelles Energy Policy for 2010-2030.
- Coastal Management Plan for 2019-2024.
- Wetlands Policy and Action Plan for 2019-2022.
- Water Policy (2017).
- NBSAP for 2015-2020.
- Blue Economy Strategic Framework and Roadmap for 2018-2030.
- NDC (2021).
- National Development Strategy for 2019-2023 and Vision for 2033.

Furthermore, the integration of biodiversity considerations into these policies is also an important point to analyze. The need to conserve critical species and ecosystems is indicated in policies, especially the most recent ones, and particularly if these ecosystems are critical to climate resilience, such as coral reefs or coastal vegetation (Seychelles National Climate Change Policy 2020, Coastal Management Plan for 2019-2024).

Nevertheless, according to the Seychelles Climate Change Policy Report 2020, there is still work to be done to develop more actions and policies related to climate change mitigation and adaptation. Furthermore, these various national reports highlight some potential needs for climate change adaptation and mitigation measures in the future (Seychelles National Climate Change Policy Report 2020):

- Integration of climate change considerations in society, including in the private sector and at all levels of government.
- Improved (long-term) research and monitoring of climate change stressors and their impacts in the Seychelles (granite and coral islands).
- Capacity building and understanding of the issue, as well as engagement at all levels of society (government, youth, civil society, private sector) to be able to respond to and implement adaptation and mitigation measures.
- Transition to an ambitious and sustainable low-carbon economy.
- Transition to a climate-change resilient society.

International commitments for biodiversity conservation

Like Madagascar and Mauritius, the Seychelles is a signatory to several major global agreements related to biodiversity conservation:

- UNCLOS (1982), which defines the different types of maritime zones (territorial sea, EEZ, continental shelf, high seas, etc.) and associated rights.
- CBD (1992), ratified in 1992, which has as its objectives the conservation of biodiversity, the sustainable use of resources, and the fair and equitable sharing of the benefits derived from genetic resources.
- CITES (1973), which regulates the transport and international trade of endangered species of wild fauna and flora.
- UNFCCC (1992), which seeks to limit the impact of human activities on climate change.
- Kyoto Protocol (1997), ratified in 2002, which set binding and quantified targets for limiting and reducing greenhouse gases.
- Cartagena Protocol on Biosafety (CPB, 2000), ratified in 2004, which aims to provide legally enforceable means to prevent actual or potential "biotechnological risks" induced by biotechnology or its products.
- UNCCD (1994), ratified in 1997, which aims to combat land degradation and desertification.
- UNESCO World Heritage Convention (1972), which defines natural areas of outstanding universal value in order to ensure that these areas are strongly protected.
- CMS (Bonn Convention, 1979), which ensures the conservation of terrestrial, aquatic and aerial migratory species throughout their range.
- The International Coral Reef Initiative (ICRI), which works to preserve coral reefs and related ecosystems round the world.
- RAMSAR convention (1971), under which the Seychelles has nominated three Ramsar sites.

9.4. International conventions and regional agreements

9.4.1. International and regional environmental agreements

Table 47 lists the main international and regional environmental agreements in which the hotspot countries participate. Although the rate of ratification of these agreements is particularly high, active participation is sometimes limited by the human resources allocated by the governments. Effective implementation may also be limited by the financial means available to the governments, particularly those of Madagascar and the Comoros.

9.4.1. Regional organizations

Because of their colonial history, subsequent waves of settlement, and more recent political history, the hotspot countries are members of various regional organizations, which influence their economic and environmental decisions (Table 48).

The Indian Ocean Rim Association brings together states around the Indian Ocean, from Australia, Indonesia and India to coastal African states. Its areas of intervention are organized around six main themes: (i) maritime safety; (ii) fisheries management; (iii) trade and investment; (iv) tourism; (v) scientific cooperation; and (vi) disaster management.

The Common Market for Eastern and Southern Africa (COMESA) is an international organization with a regional focus in East Africa that aims to create a customs union among its 20 member countries.

Table 47 Participation of hotspot countries in international and regional environmental agreements

Agreement	Madagascar	Comoros	Mauritius	Seychelles
CBD	X	X	X	X
CITES	X	X	X	X
UNFCCC	X	X	X	X
UNCCD	X	X	X	X
CMS	X		X	X
RAMSAR	X	X	X	X
UNESCO World Heritage Convention	X	X	X	X
CPB	X	X	X	X
International Treaty on Plant Genetic Resources for Food and Agriculture	X		X	X
UNCLOS	X	X	X	X
United Nations Program of Action on the Sustainable Development of Small Island Developing States (Barbados Program of Action)		X	X	X
ICRI	X			X
Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean Region (Nairobi Convention)	X	X	X	X
African Convention on the Conservation of Nature and Natural Resources (Algiers Convention)	X		X	
African Conference of Ministers of the Environment	X	X	X	X
Libreville Declaration on Health and Environment	X			
Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats in the Indian Ocean and South East Asia	X	X	X	X

Sources: Convention websites and NBSAPs.

Table 48 Regional organizations to which the hotspot countries belong

Organization	Madagascar	Comoros	Mauritius	Seychelles
Indian Ocean Rim Association	1996	2012	1995	2011
COMESA	1981	1981	1981	2001
SADC	2005	2018	1995	1997
IOC	1984	1986	1984	1984
Commonwealth of Nations			1968	1976
International Organization of the Francophonie	1970	1977	1970	1976

Sources: Organizations' websites.

The Southern African Development Community (SADC) has a program on natural resource management, including fisheries, forestry, wildlife management and transboundary protected areas.

The Indian Ocean Commission (IOC), an intergovernmental organization created in 1982, brings together all the hotspot countries. Its main mission is to strengthen the bonds of friendship and solidarity among the Indian Ocean populations, and to build regional projects for sustainable development, aimed at protecting them, improving their living conditions and preserving the natural resources on which they heavily depend (IOC 2013).

9.5. Policies and regulations related to conservation funding

This section considers taxes, protected area revenue streams, resource licenses, payments for ecosystem services, carbon credits and environmental trust funds.

In Madagascar, given the weakness of public resources, the state cannot fully finance the conservation and management of protected areas, as well as actions to combat climate change. Moreover, the state does not have a mechanism for mobilizing specific fiscal resources for the financing of the environment and the fight against climate change (unlike some sectors that benefit from tax/royalty projects, including gaming, fuel, roads, beverages, tobacco, mining and oil).

Nevertheless, some funding sources have been developed, including revenues from protected areas. According to the Code of Protected Areas (2015), the manager of a protected area is authorized to collect fees, including entry fees (via ecotourism), research rights, intellectual property rights, and filming rights whose collection, use and distribution modalities are set by regulation.

Another funding source is payments for Reducing Emissions from Deforestation and forest Degradation (REDD+). As an example and as a pioneering project, in February 2021, the payment agreement for the *Atiala Atsinanana* (Eastern Forests) emission reduction program was signed between the government of Madagascar and the World Bank's Forest Carbon Partnership Facility (FCPF), for an amount of US$50 million over a period of five years. According to the country's REDD+ strategy, decentralized authorities, private operators, NGOs, local grassroots communities, any civil society organization or other stakeholders can develop projects that will contribute to Madagascar's emission reduction objective and become beneficiaries of carbon credits.

In Madagascar, Payment for Ecosystem Services (PES) schemes began between 2000 and 2010 (Bidaud *et al.*, 2013). There have been several pilot initiatives to test the PES concept in Madagascar, which have the potential for amplification.

These include:

- Rural hydro-electrification in the Andasy watershed in the rural commune of Tolongoina (NGO GRET/ European Union, 2013-2016). The PES consisted of assisting land user households upstream to adopt and respect certain practices (e.g., no tilling on steep slopes or near streams, anti-erosion farming methods, stopping fires and new clearings). In return for their efforts, these land users, considered as environmental service providers, were to receive compensation in the form of support in agroforestry, anti-erosion techniques and micro-projects of their own initiative (small-scale livestock farming, and plant materials).
- A PES for water services initiated at the end of 2009 in Andapa (North-East) by the World Mountain Farmers Association in collaboration with World Wide Fund for Nature (WWF). This project aimed to reduce land clearing in a 42 ha area located upstream of the Sahamazava watershed, where the main springs feeding the watercourses are located and which, downstream, are used by the drinking water

supply network of the urban commune of Andapa. This contract was signed for a renewable period of four years and established the principle of direct compensation to households providing environmental services, to be distributed according to the area of annual crops abandoned.

- A private beverage company (Star Brewery) in collaboration with local communities is seeking to preserve water resources through the protection of watersheds. In exchange, the population benefits from agricultural infrastructure (development of water supply canals and rehabilitation of dams) and social infrastructure (health center and schools).

Other prospects are under study or in the development phase, in other areas such as fisheries and energy. These include:

- Private-Partnerships, such as that between the managers of some protected areas of mining companies such as Qit Madagascar Minerals (QMM) and the Ambatovy Mining Company. The companies' activities do not encroach on the protected areas but as part of their commitment to no net loss of biodiversity, they contribute to conservation and development activities.
- Trust funds through FAPBM, which is a funding agency, created in 2005 at the initiative of the Malagasy State, CI and WWF. According to its statutes, FAPBM is a mechanism for sustainably funding the protected areas of the SAPM through the management of different types of funds.

9.6. Opportunities for integration of EbA into public policies

Since its ratification of the UNFCCC, Madagascar has developed different strategies that have evolved according to international advances and national situations (political, and socio-economic). With a certain continuity, the strategic documents that have succeeded one another have built on the achievements of the previous ones, while integrating the necessary updates in relation to international and national circumstances, in particular the orientations of the public development policy. Today, national adaptation planning is linked to the strategic vision of the government through MEDD, which refers to Commitment 10 (or Velirano), on the Sustainable Management of Natural Resources of the national project Initiative Emergence Madagascar (IEM 2019), from which the Plan Emergence derives. This vision is itself articulated on six strategic axes, including actions related to climate change and energy transition.

In addition, the fundamental references (such as Constitution, Plan Emergence, and the General Policy of the Government), which recognize the capital importance of the country's biodiversity and its place in sustainable development, as well as its link with the problems of climate change and the general context of the country (geography, environment and socio-economic situation), demonstrate that adaptation to climate change is not an option but an imperative. The biodiversity of the country offers a natural capital to exploit in a reasoned way. Therefore, it turns out that EbA is an opportunity, not a constraint for a vision of sustainable development.

Madagascar has a national policy to fight climate change that has just been updated, as well as its NAP (2021). The basic tools are, therefore, available for each sector to develop its own adaptation policies and strategies, taking into account the context mentioned above.

10. CIVIL SOCIETY CONTEXT

The purpose of this chapter is to provide an overview of the status of civil society and its capacity throughout the hotspot. The focus is on associative structures (NGOs, CBOs, etc.) but information is also provided on research organizations and the private sector, which are considered by CEPF as part of civil society. Because of the difference in size and availability of information between Madagascar and other countries and territories in the hotspot, the first section focuses specifically on Madagascar. The second section sheds light on the situation on the other hotspot countries and deals very briefly with the French departments, in which CEPF does not have a funding mandate. A third section examines regional collaboration within the hotspot, while the last section presents a synthesis and regional conclusions.

10.1. Madagascar

The National Platform of Civil Society Organizations in Madagascar has 3,000 associations throughout the country, many of which are partially or wholly involved in environmental issues.

According to a study initiated in 2011 by CIVICUS, the main weaknesses of the legal framework are the obsolescence and inadequacy of texts governing CSOs. The audit also noted a low level of knowledge or even ignorance, on the part of CSOs themselves, of the regulatory texts and fundamental values of civil society. As a result, there is frequently a lack of respect for: (i) the non-political nature of associations; and (ii) obligations related to legal forms, with associations acting as cooperatives or economic interest groups (CIVICUS *et al.* 2011b).

According to the CIVICUS study, it appears that civil society enjoys a good reputation in Madagascar, with 84 percent of the population trusting them. In terms of self-assessment of their impact, only 29 percent of CSOs reported that civil society in general has had a tangible impact on local/national policies in the country, while 40 percent of CSOs had advocated for the adoption of a policy (CIVICUS *et al.* 2011c).

Although it is difficult to put an exact figure on the number of national NGOs working in the environment in Madagascar to date, they are quite numerous at the level of the 23 regions and at the central level. Being relay structures between the state and the population, they constitute important stakeholders and have a crucial role to play in this sense.

Despite the confidence of the population, almost half of CSOs find the social impact of CSO interventions in general to be mixed (54 percent). The areas where these impacts are perceived to be notable are social development, education and health. The study also highlighted the weakness of collaboration between the state, CSOs, and other actors, as well as the weakness of citizen mobilization and civic engagement at the country level (CIVICUS *et al.* 2011c).

The majority of national CSOs (associations and NGOs at all levels - local, regional, and national) face a funding challenge. CSOs rely heavily on international funding partners to carry out their missions (CIVICUS *et al.* 2011d) and this is still the case today. The financial situation of many organizations was worsened by the political situation between 2009 and 2013, which saw the suspension of several cooperation programs.

10.1.1. International NGOs working on biodiversity and climate change

International NGOs in Madagascar operate at different levels through the presence of national, regional and local branches and the development of partnerships with national CSOs or other small international NGOs/associations (Table 49).

Table 49 Main international organizations active in conservation and contributing to the fight against climate change in Madagascar

Organization	Actions
CI	Collection and analysis of data on biodiversity and environmental services. Support for the creation and management of protected areas. Training of conservation experts. Capacity building of partner organizations (associations and local communities to national and international organizations). Support for the definition and implementation of the country's environmental policy.
Blue Ventures	Focus on marine biodiversity. Scientific and monitoring expeditions with the support of international volunteers. Support to local projects of fisheries resources management, marine protected areas with local management.
BirdLife International	No in-country presence, but support to national partner organization ASITY Madagascar. Identification of IBAs.
Durrell Wildlife Conservation Trust	Support for community management of sites, strengthening of local organizations. Focus on critically endangered species (birds, turtles).
IUCN	No presence in the country (regional office in Nairobi). Support to the definition of prioritization tools (Red Lists, KBA). Participation and information on regional issues (invasive species and PES).
MBG	Focus on plant conservation. Identification of IPAs. Collection, analysis and dissemination of botanical data. Support to site management and capacity building.
MNHN	Scientific expeditions (Atimo Vatae, 2010, radeau des cimes, 2001), collection and analysis of data on biodiversity (fauna, flora and marine environments). Training in partnership with the Universities of Antananarivo, Toliara and Mahajanga. Site management: Antrema bio-cultural pilot project.
The Peregrine Fund	Focus on raptors. Support to community conservation, species safeguard programs. Training and research.
Royal Botanical Garden, Kew	Support to the implementation of the Durban Vision and the Global Strategy for Plant Conservation. The work covers: taxonomic and systematic research in botany, conservation of species and habitats with a focus on plant species.
Wildlife Conservation Society (WCS)	Support for the conservation of the unique flora and fauna of Madagascar. Training of protected area managers, education of local communities on the protection of forests and marine ecosystems.
WWF	Preservation of biodiversity on priority landscapes and seascapes by supporting the SAPM and rational management of natural resources.

These organizations also intervene in the areas of professionalization of conservation (individuals or national structures) and capacity building with different training and capacity building initiatives, including: WIO-COMPAS, supported by WCS and WWF; Conservation Educators and Professionals Network Program, supported by the American Museum of Natural History, Durrell Wildlife Conservation Trust, CI and WCS.

In general, the major international NGOs work and collaborate with national and local organizations and communities. These organizations are managers and/or partners in conservation or sustainable natural resource management programs and projects, and they are all involved in protected area projects.

10.1.2. National NGOs and associations

National NGOs and associations fulfill crucial functions in the civil society sector (Table 50). They are involved in the creation and management of protected areas, inventories, monitoring and ecological assessments, research, alternative activities to deforestation, awareness raising and training, natural resource development, capacity building, transfer of natural resource management, as well as social mobilization and structuring. These national organizations usually act as implementing agencies for the various projects of technical and financial partners (government, international NGOs, bilateral or multilateral donors or foundations). The proximity of the national NGOs to the local population has allowed the weaving of links between these two actors and a better knowledge of environmental and social problems leading to innovative approaches or projects.

Table 50 Main national NGOs and associations working in the environmental field in Madagascar

Organization	Actions
Applied Research Laboratory (LRA)	Research related to forestry, development and environment.
Arongampanihy Communication Culture Environment (ACCE)	Conservation of Madagascar's fruit bats and other wild endemic species through research, education and communication .
ASITY Madagascar	Promotion of action for the better knowledge of the biodiversity of Madagascar, its conservation, in its natural ecosystem and its scientific, social, economic, cultural and ecological valorization within the Malagasy and international society.
Association of Environmental Journalists (AJE)	Intensification of communication, lobbying and sensitization of the population of Madagascar on actions related to the environment.
Association of Fishermen and Fry Producers of Andapa (APPA)	Protection of the environment, especially the continental waters and enrichment of endemic fish.
Association of Forest Engineers of Madagascar (IAMF)	Sustainability, protection and enhancement of the forest heritage and its attributes.
Association of Mountain People of the World or Tambohitravo Malagasy (WMPA)	Improving the living conditions of mountain populations by recognizing their rights in the local governance of their territories, promoting equitable access to social goods and demanding respect and development of the identities, cultures and specificities of the mountains.
Association of Students in Didactics in Action (AED Action)	Multidisciplinary but focused on the environment and sustainable development through research, information, education and communication.
Association for the Protection of Marine Mammals and their Habitats in Madagascar (CETAMADA)	Protection of marine mammals in the Indian Ocean, studies and promotion of ecotourism.
Association for the Protection of Nature (Ankoay)	Improving the standard of living of members, to contribute to rural development and promote environmental protection.
Biodiversity Conservation Madagascar (BCM)	Biodiversity conservation in specific sites in Madagascar.
Community-Centered Conservation Madagascar (C3 Madagascar)	Information, education and communication, especially in relation to marine ecosystems, capacity building, protected area management, ecotourism, and waste management.
Development and Environmental Law Center or Mizana Maitso (DELC)	Establishment of a viable legal framework for the balance between the conservation of natural resources and sustainable economic and human development for development actors as well as populations, NGOs and associations.
Environmental Information System Network Association (ARSIE)	Production of metadata, establishment of information sharing policies and capacity building on database management.
Fanamby Association	Biodiversity conservation and sustainable human development based on a regional approach to environmental problems in regions identified as national priorities.

Organization	**Actions**
Foniala	Protection of the environment and better management of renewable natural resources in a process of sustainable development.
Group of Plant Specialists of Madagascar (GSPM)	Revision of plant conservation status and promotion of their preservation.
Group of Study and Research on the Primates of Madagascar (GERP)	Research on lemurs and their surrounding habitats in the country's economic development strategy.
IMPACT	Protection and conservation of Madagascar's biodiversity while improving the lives of its inhabitants, implementing permanent change through collaboration with local people.
Initiative for Development, Ecological Restoration and Innovation(INDRI): *think-and-do-tank*	Mobilization of Malagasy actors (authorities, civil society, NGOs, private sector, donors) to develop approaches that bring about visible and sustainable changes in urban, land and coastal landscapes in order to produce a positive psychological effect and overcome structural obstacles to development.
Intercooperation Association of Madagascar (AIM)	Giving the rural population control over their economic and social development in order to amplify their role as partners in the development of the country.
Koloharena farmers' associations	Efficient agricultural practice with improved breeding techniques consistent with the environment.
Libanona Ecological Center (CEL)	Specific training on environment and biodiversity conservation.
Madagascar Biodiversity Partnership (MBP)	Protection of local forests and lemurs in particular, while sustainably increasing the standard of living of the thousands of people who depend on natural resources.
Madagascar Institute for the Conservation of Tropical Ecosystems (MICET)	Delivery of an environmental program at Ranomafana and also at sites based in the regions of Vatovavy and Fitovinany, Haute Matsiatra, Amoron'i Mania and Atsimo Atsinanana.
Madagasikara Voakajy (Ma-Voa)	Provision of services and support related to the conservation of endemic vertebrates in line with the National Environmental Policy.
Man and the Environment (MATE)	Sustainable development and preservation of biodiversity through the involvement of disadvantaged local populations.
Mitantana Harena and-Ranomasina avy eny Ifotony (MIHARI)	Support to the networking of communities for Locally-Managed Marine Areas, aiming at the long-term management of marine areas through capacity building, improvement of their welfare, advocacy and effective sharing of their experience.
Mitsinjo	Nature-based tourism, conservation and research in Andasibe.
National Association for Environmental Action (ANAE)	Promotion of natural resource management by the population as well as land use and development techniques.
Orimbaton'ny Tontolo Iainana TSARArindra (Otitsara)	Protection of the environment and sustainable development integrating the better education that each citizen in general and each woman in particular receives.
Reniala	Protection of the environment, especially plants.
Sampan'Asa momban'ny Fampandrosoana FJKM (SAF FJKM)	Promotion of social and economic development of the country, including the environment.
Service d'Appui à la Gestion de l'Environnement - Fampandrosoana Maharitra (SAGE- Fampandrosoana Maharitra)	Promotion of sustainable development through good governance and rational management of natural resources.

Organization	Actions
Tandavanala	Promotion of sustainable development and maintenance of the ecological function of Madagascar's forest ecosystems in general and of the COFAV corridor in particular.
THINK	Strengthening of the public and community health system, including environmental protection.
Vahatra	Research on biodiversity and ecosystems and training in Madagascar.
Velondriake	Sustainable management of natural resources through education of the population on the marine ecosystem and non-fishing livelihoods.
Voahary Gasy Association (AVG)	Platform for advocacy, information sharing, capacity building and social innovation, and for good governance of natural resources.
Voahary Salama	Promotion of health-population-environment integration so that the Malagasy population is responsible, healthy, happy and lives in perfect harmony with its environment.
Voarisoa	Increasing awareness at all levels to mitigate the adverse effects and risks to the environment posed by inadequate management of chemicals.
Vondrona Ivon'ny Fampandrosoana (VIF)	Environmental protection and community development through local management and capacity building.

Madagascar National Park (MNP) represents a special type of association, as it remains under the supervision of MEDD. It is best considered as a parastatal organization rather than an NGO.

10.1.3. Community-based organizations

Since 1996, local communities have been involved in the management of natural resources within the framework of the Natural Resource Management Transfer (NRMT) policy. More than a thousand management transfer contracts (all resources combined) have been signed. Local communities participate in the management of protected areas and their buffer zones. This phenomenon has increased with the expansion of the SAPM. The involvement of local communities has been done through government projects under the NEAP but especially thanks to the initiatives of international and national NGOs, for the mobilization and social structuring, and support in the implementation.

The effectiveness of these community-based management systems is hampered by insufficient capacities, means and resources at the administrative level (for evaluation, control and supervision) and at the commune level (for conflict resolution), at the level of the support organizations (continuous support for these grassroots communities for at least the first three years before contract renewal) as well as at the level of the communities themselves (implementation of the development plan and simplified management).

In the case of marine and fisheries resources, locally managed marine protected areas are managed by community associations. For the specific case of Antongil Bay, thanks to the support of the Conservation Platform for the Development of Antongil Bay, an agreement on fishing zones and timing between artisanal and industrial fishermen was reached (Le Manach *et al.* 2013).

10.1.4. Gender approach/women's groups

In general, policies, strategies and programs for development and sustainable management of natural resources (forest management, water catchment and irrigation, preparation of the REDD+ strategy, climate change, food security, risk management/disaster risk reduction, land management, etc.) take into account the gender dimension. Despite blockages, women are playing an increasingly important role in the environment sector.

After the national policies and commitments, the gender approach has been widely integrated into the environmental field. During the implementation of the third phase of the NEAP, activities supported by UNDP (financed by GEF), the World Bank, NGOs and other actors in and around protected areas included support to women's groups for the implementation of income-generating activities, such as embroidery, sewing, basketry or fruit processing. Initiatives to involve women in the implementation of reforestation activities, promotion of improved stoves, community tourism or improved agricultural practices are growing. Mining companies (QMM and Ambatovy) also support women's organizations or vulnerable households in environmentally friendly income-generating activities (sustainable management of "*mahampy*" lianas, embroidery and sewing, beekeeping, etc.). Among the more interesting initiatives, Blue Ventures has adopted an integrated "population-health-environment" approach, recognizing the links between health, gender inequality, unmet family planning needs, and environmental degradation. This organization has established family planning centers and implements outreach on women's reproductive health at the community level (Blue Ventures 2014).

Some CSOs specialized in gender are also involved in the promotion of biodiversity conservation and sustainable management of natural resources, such as the Gender and Development Network of Madagascar (awareness raising on climate change, sustainable agriculture) and the National Platform of Women for Sustainable Development and Food Security, which supports women entrepreneurs in the field of agroecology and sustainable agriculture in Madagascar and Comoros, with the support of the IOC.

10.1.5. Research institutes and universities

Madagascar has various institutions that are partially or totally involved in training or research activities related to biodiversity conservation. These include: the Faculty of Sciences with its departments of animal biology, and plant biology and ecology (at the Universities of Antananarivo, Mahajanga and Toliara); the Fisheries and Marine Science Institute, which provides training and research in fisheries, aquaculture and marine and coastal environment; the Department of Water and Forests and the Applied Research Laboratory (both within the School of Agricultural Sciences, ESSA), which intervene in the fields of forestry and hydrological resources, particularly in the areas of forestry and management, studies on ecology and biodiversity, water and soil management, economics and natural resource management policy,; and the National Centre for Environmental Research (CNRE) under the direct supervision of the ministry in charge of higher education and research, which has as its mission to carry out research in the knowledge and preservation of biodiversity for the improvement of the quality of life of rural and urban communities.

Other research institutes worth mentioning include: the Radioisotopes Laboratory (also within ESSA), which is a training, research and public service center using nuclear techniques in the fields of health, agronomy and the environment; the Geophysical Institute and Observatory of Antananarivo at the University of Antananarivo; and the National Center for Agricultural Research Applied to Rural Development (FOFIFA) affiliated with the ministry in charge of agriculture and livestock. In addition, several NGOs and national and international associations initiate research both at their project sites and with respect to certain species.

Two important French institutions with programs in Madagascar are the Institute of Research for Development (IRD), which intervenes in the areas of climate change, biodiversity and soil functioning in agro-systems, population, and the Agricultural Research

Centre for International Development (CIRAD), which intervenes in the areas of forests and biodiversity, sustainable cultivation and rice-growing systems such as semi-direct on plant cover or agroecology.

10.1.6. Foundations

There are two national foundations working specifically on biodiversity conservation in Madagascar.

Tany Meva Foundation, created in 1996, has a community vocation and is involved in the sustainable management of natural resources, the mitigation and adaptation to climate change, the fight against desertification and the development of the environmental reflex. Tany Meva was the Regional Implementation Team (RIT) for the CEPF investment in the MADIO Hotspot between 2016 and 2022.

FAPBM, created in 2005, aims to provide sustainable funding for the management of protected areas and also provides support for activities or projects related to protected areas and the conservation of species and ecological habitats.

10.1.7. Private sector

In recent years, private sector organizations have become more involved in environmental issues in Madagascar. The mining sector has been a pioneer in this regard, through the large-scale operations of the Ambatovy nickel-cobalt mining operation in the central-eastern part of the country, as well as the QMM ilmenite mining operation in the southeast. The companies investing in these operations focus their environmental activities on collaboration with local communities and through environmental education, reforestation and ecosystem restoration activities.

The last five years have also seen the emergence of a certain interest in Corporate Social Responsibility (CSR) on the part of private companies, such as Société Orange and the STAR brewery, for example. The concept remains poorly perceived, however, and understanding is relatively limited. Some companies seem to think that doing annual tree planting activities and conducting humanitarian actions, for example, are enough. Nevertheless, there is a willingness to understand and participate in various fairs and meetings (such as the Natural Capital Forum in 2021, and annual industry fairs).

The Axian Foundation was mobilized to strengthen the resilience of communities facing climate disasters by supporting the construction of anti-cyclone infrastructure.

In addition, MCB Madagascar, in partnership with AFD and the EU, became the first bank to sign a green credit line that consists of financing sustainable development projects, targeting small and medium enterprises as well as large companies, through subsidized loans.

10.1.8. Civil society and protected areas

One of the peculiarities of Madagascar is that the management of almost all protected areas in the country is (or will be) led by civil society. MNP manages a network of 43 IUCN category I, II and IV protected areas. Other national and international CSOs are involved as promoters or managers of protected areas. Among the most important promoters are CI, MBG, WCS and WWF, as well as the local organizations FANAMBY and ASITY Madagascar.

The majority of these national and international organizations also intervene in local communities around protected areas through awareness raising, promoting alternative practices to deforestation, establishing income-generating activities and/or promoting sustainable fishing techniques.

10.2. Comoros

Biodiversity conservation and environmental protection in the Comoros are part of a broader framework that involves both government institutions and CSOs. CSOs are key actors in the development of conservation and sustainable development activities in Comoros. There are multiple associations for the defense and protection of nature that play a key role in mobilizing communities, particularly youth, towards the environmental cause.

CSOs play an important role in the implementation of several projects and programs targeting vulnerable groups. They are an interface between the population and the public programs that are supposed to respond to their needs. They often act through the implementation of actions against the destruction of forests, the extraction of marine sand and corals, the protection of water sources, the proliferation of illegal garbage dumps in urban areas, and the killing of threatened animal species, such as marine turtles and coelacanths. In particular, they compensate for the gaps and weaknesses of public authorities to protect, conserve and enhance ecosystems and their resources.

10.2.1. Community-based organizations

Local communities play an important role in sustainable development. They are at the root of many initiatives to facilitate access to water and energy in their localities. They are also key actors in reducing the pressure on ecosystems and natural resources. Communities participate materially and financially in interventions that promote the opening up and accessibility of the population to various services. They are a powerful support to reduce the pressures on natural resources and the rational exploitation of biodiversity.

10.2.2. NGOs and networks

Many NGOs specialized in environmental management are currently working in the field of environment and biodiversity conservation. These include Dahari, the Association of Intervention for Development and the Environment, Action for Sustainable Development and the Environment, SIDS YOUTH AIMS Hub-Seychelles, the National Women and Development Network, and the Ulanga Network.

10.2.3. Private sector actors

The Comorian private sector is organized around two employers' organizations, namely the New Employers' Organization of the Comoros and the Comorian Business Movement, which are involved in the trade and industry sectors. However, more and more companies are being created in the agricultural, fishing and cash crop sectors and are, thus, interested in the management and development of natural resources. They are sensitive to the growing threats related to the non-rational use of environmental resources and can thus contribute to addressing the vulnerabilities that the country is facing.

10.2.4. Research institutes and universities

The University of Comoros has faculties and institutes working in the field of environmental studies and biodiversity. These include the Life Sciences and the Earth and Environmental Sciences Departments of the Faculty of Science and Technology, the Geography Department of the Faculty of Letters and Humanities and the University Institute of Technology, particularly the Tourism Department. Research studies in partnership with international universities are currently being undertaken.

The university offers a bachelor's degree in marine biology, and, in recent years, has set up a master's degree courses in Sustainable Development and Biodiversity Conservation, Risk Management and Disaster Reduction in the Face of Climate Change, and Fisheries Resources and Sustainable Fisheries Management.

These degree courses aim to initiate and perfect students in the study of natural resources, the impacts of human activities and the effects of climate change. They aim to provide the theoretical and methodological bases necessary for the understanding and study of the dynamics of natural resources as well as ecosystems and their exploitation. They aim to ensure the training of technical staff who can contribute to the management of natural resources and/or advise decision makers.

10.3. Mauritius

There are nearly 11,000 voluntary organizations listed in the States-Registry of associations. Of these, there are several hundred organizations that fit the characteristics of NGOs. Although there are a large number of NGOs, very few are involved with biodiversity conservation or environmental sustainability. There is no tax deduction for individual donations in the country, so the main local source of monetary support for NGOs in Mauritius is the CSR Fund. Under the CSR Fund, all profitable companies are required to build up their CSR Fund within a year in an amount equivalent to two percent of their actual revenue of the previous revenue year. Fifty to seventy-five percent will be remitted to the Mauritius Revenue Authority (depending on the date of establishment of the company). The remainder will be used by the company either to implement a CSR program in accordance with its own CSR framework or to fund an NGO implementing a CSR program in the priority areas of focus, including social and environmental development of the country. There is a list of about 440 approved NGOs that can receive CSR funds[20], of which about 10 are environmental organizations and only three are conservation focused (one on terrestrial and two on marine).

Some of these associations are involved in the fight against climate change. For example, the Environmental Protection and Conservation Organization (EPCO) is involved in public awareness actions to anticipate and adapt to climate changes, including issues related to rising temperatures and natural disasters. In 2018, for example, an effort was made to improve the domestic water supply system by providing drinking water tanks to poor villages in coastal communities in Mauritius. The objectives of the association are to conduct public awareness campaigns on climate change, to organize workshops on this subject in particular, and to conduct research and observation activities. Other associations include Friends of the Environment, which is setting up a concrete example of action in favor of carbon sequestration, thus mitigating climate change.

The main active NGO dealing with terrestrial biodiversity in the country is the Mauritian Wildlife Foundation (MWF), which was established in 1984 with support from the Durrell Wildlife Conservation Trust and other international partners. MWF focuses primarily on threatened vertebrate and plant species, and works closely with the government on a bird recovery program and the management of certain islets (e.g., Round Island, Ile aux Aigrettes). This cooperation is regulated by a memorandum of understanding. In August 2013, MWF took over full management of a private reserve (Mondrain), which had been entrusted to the Royal Society of Arts and Science of Mauritius for 30 years. Other NGOs that have been established in recent years include Ecosystems Restoration Alliance, which focuses on bats.

There are also other CSOs active in the environmental sector, such as Ebony Forest, and private landowners who are beginning to take an interest in planting forests for carbon sequestration and to support biodiversity. The Tiny Forest movement has also emerged and is in contact with Earth Watch Europe.

[20] https://www.nsif.mu/organizations/

With regard to marine biodiversity, several NGOs are active. The most important of which include Mauritius Marine Conservation Society (MMCS), which produces awareness campaigns and materials (including the Diodon newsletter) and is involved in marine conservation and research (e.g., dolphin, whale and turtle monitoring and the creation of artificial coral reefs), as well as the protection of marine archaeological sites. MMCS also runs volunteer programs to generate funds for research projects.

Reef Conservation Mauritius has similar activities (education, monitoring, research and training) and has been very active on the marine NGO scene in recent years, particularly in the north of Mauritius island, by establishing "Voluntary Marine Conservation Areas" and deploying mooring buoys. Equally active is the Marine Megafauna Conservation Organization, with a strong interest in marine mammal conservation in northern Mauritius island and elsewhere.

Other marine NGOs focusing on awareness and education campaigns and rehabilitation of specific sites include: Lagon Bleu, which is active in southeast Mauritius (e.g., Blue Bay Marine Park and Mahébourg Bay) on mangrove conservation and coral farming; EcoMode Society, which is mainly involved in coral farming, marine studies, and oil spill mitigation; the Mauritius Scuba Diving Association; and the Mauritius Underwater Group.

On Rodrigues, a platform has been created to bring together all the NGOs and associations, grouped under the Rodrigues Council of Social Services on the island. MWF, which has been operating on the island since 1985, is the only NGO that deals with terrestrial biodiversity. As on Mauritius, MWF has a memorandum of understanding with the government to carry out collaborative projects on biodiversity conservation, which focus on the Grande Montagne, Anse Quitor and Ile aux Cocos Nature Reserves.

In the marine realm, the main NGO is Shoals of Rodrigues, which was founded in 2001. Collaboration with partners in the UK is ongoing and local staff are involved in research, monitoring, training and awareness raising of local fishermen. The NGO has been instrumental in determining the baseline status of biodiversity and continuous monitoring, especially of fish catches. The Rodrigues Underwater Group, a diving association, supports Shoals of Rodrigues in carrying out conservation work. Shoals of Rodrigues also works in close collaboration with MWF. In recent years, a new NGO has been created in Rodrigues, Ter-Mer Rodriguez Association, which is active in octopus conservation, habitat restoration and conservation.

The above NGOs work closely with the Mauritian government. For example, MWF works with the National Parks and Conservation Service and the Forestry Service on Mauritius island, and the RRA on Rodrigues. Marine conservation organizations work with the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, and departments such as the Albion Fisheries Research Centre and the Mauritius Oceanography Institute, as well as with the RRA on Rodrigues. There are also links with local companies and international funding and research organizations and universities.

There is also a small, growing and increasingly effective grassroots movement for environmental protection and against unsustainable development, one of the most important actors in which is Aret Kokin Nu Laplaz (www.facebook.com/aretkokinnulaplaz).

There are also opportunities for collaboration between NGOs, communities, grassroots organizations, government, and private companies and society, as was the case during the Wakashio oil spill (De Rosnay *et al.* 2021).

10.4. Seychelles

CSOs play a key role in biodiversity conservation in the Seychelles, where civil society engagement with environmental issues has been in place for over four decades and has increased significantly over recent decades (see Figure 46). The increase in public awareness of environmental issues and climate change can be seen through this growing civil society engagement, and in particular through the increase in national campaigns on issues such as plastic pollution or tourism development (Seychelles Sixth National Report to the CBD 2020). Most importantly, the actors in environmental conservation are diverse and include civil society, private companies and government agencies (etc.), and have complementary roles.

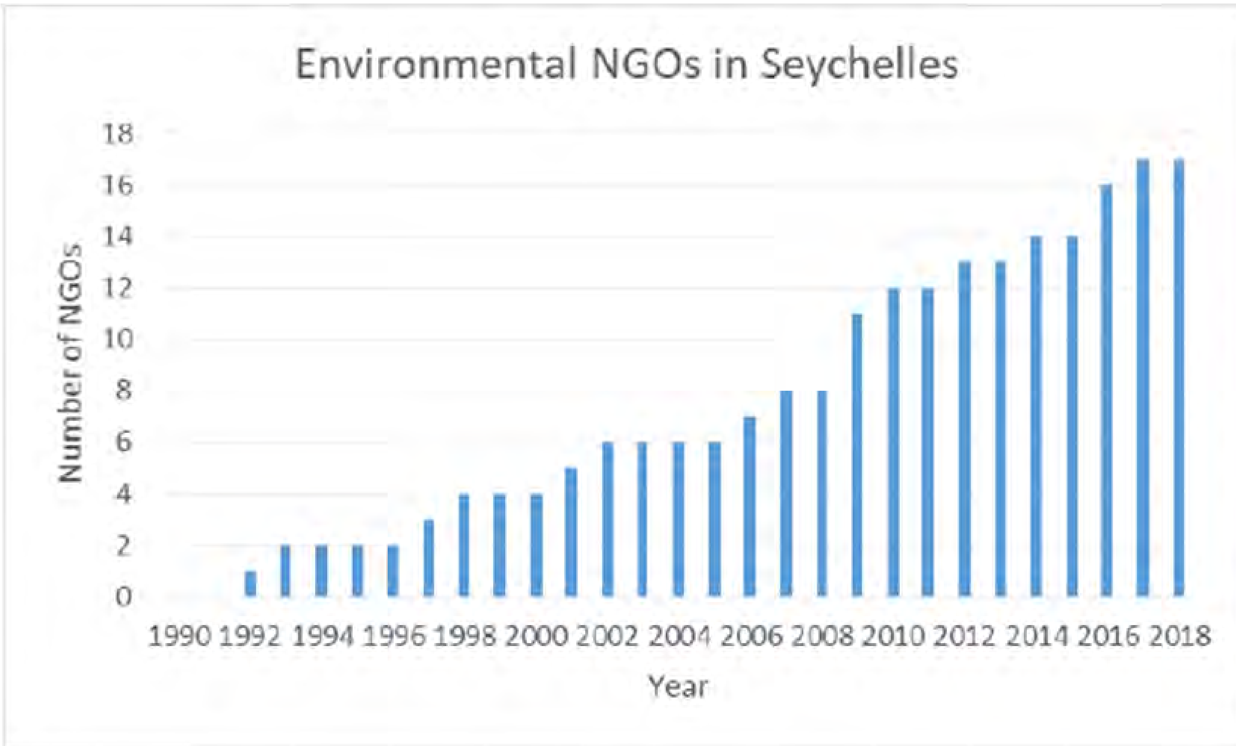

Figure 46 Growth in number of environmental NGOs in the Seychelles

Many of these environmental NGOs are part of the Citizens Engagement Platform Seychelles (formerly LUNGOS), a national platform that seeks to represent civil society in the country and promote their involvement in national policy formulation.

10.4.1. Research institutes

Many of the research institutions present in the Seychelles are foreign. However, in 2015, the Blue Economy Research Institute at the University of Seychelles (UNISEY) was established, followed later by the Island Biodiversity and Conservation Center (IBC), a joint venture between UNISEY and a local NGO (Island Biodiversity Conservation) bringing together both resident and visiting experts affiliated with the university.

It is also important to mention the presence in the Seychelles of individual experts, most of whom are active in NGOs, sometimes affiliated with scientific institutions and also serve as advisors to government organizations. They also play an important role in the conservation of biodiversity in the Seychelles.

Parastatal agencies (or those considered as such), such as SIF, SPGA, SFA and IDC, have a central role in biodiversity management and work closely with NGOs and other CSOs. Some of these, such as SPGA and SIF, play similar roles to NGOs in protected area management, monitoring and research work, and public education. These entities are eligible to receive public funds, as well as international donor grants and corporate funding.

10.4.2. Private sector actors

The private sector, including resorts and private islands, also plays an important role in biodiversity conservation, thanks to the revenues generated by nature-based tourism but also through their involvement in island ecosystem restoration projects. Examples include: Bird Island (private owner); Blue Safaris (Alphonse/Cosmoledo private operator); Resort Club Med Seychelles Sainte Anne (private operator); Cousine Island (private owner); D'Arros (private owner); Denis Island (Mason Trip); Ephelia and Lemuria Constance Resorts (Mahé and Praslin); Frégate Island (private owner); Hilton Resorts (Labriz Silhouette and Mahé); North Island (private owner); Sisters (Big Sister and Little Sister; private owner); Château-de-feuilles (Relais et Châteaux, private owner); Four Seasons (Mahé and Desroches); and Six Senses (Felicity).

A number of island foundations linked to IDC and the Island Conservation Society (which holds their secretariat), and that involve other key socio-economic partners on particular islands, are also engaged in biodiversity conservation work. Five are currently active: (i) Desroches Island Foundation; (ii) Foundation of the Alphonse group; (iii) Silhouette Island Foundation; (iv) Foundation of the Farquhar-Providence group; and (v) Foundation of Cosmoledo and Astove.

Other island foundations of this type have been registered for islands such as Poivre, Marie-Louise, and Desnoeufs, and are expected to become active when economic activities (usually based on tourism) that generate income are developed on these islands. Another type of local foundation, Middle Island Foundation, manages Middle Island National Park.

Locally established yacht companies such as Silhouette Cruises, Sunsail, Dreamyacht Seychelles and many others operate in the Seychelles, where the yachting industry has developed over the past 20 years. There are also medium to large boats owned by foreign companies that have been active in the country's cruise industry for many years. Nevertheless, this presence was abruptly reduced after 2008 due to the Somali piracy crisis. Ships that used to operate in the outer islands, such as the French cruise ship *Le Ponant* or the *Indian Ocean Explorer* (both of which were captured by Somali pirates in 2008-2009), could, for example, offer important logistical opportunities in terms of access, surveillance and monitoring of wildlife in the outer islands. The Compagnie du Ponant has recently returned with several vessels from its fleet to Seychellois waters.

10.4.3. Community-based organizations

Community-based organizations (CBOs) have been around for a long time in the Seychelles, made up of volunteers who want to solve problems in their communities, including environmental problems. Their activities adapt to the needs of the community but also to emerging environmental issues, such as climate change adaptation or plastic pollution. These include: Bel Ombre Action Team (Mahé); Bel Ombre Fishermen's Association (Mahé); Grand Police Citizens Initiative (Mahé); Port Glaud Environment Club (Mahé); Roche Caiman Environmental Action Team (Mahé); Association for the Promotion of Tranquility and Respect based in the district of St Louis (Mahé); Plaisance District Community Outreach Association (Mahé); Les Mamelles District Heritage Association (Mahé); Praslin Environmental Group (Praslin); and Fresh Focus (Praslin).

CBOs are encouraged to play an increasing role in nature conservation and natural resource sustainability. All CBOs (like most NGOs) are based and active in the inner islands, where most of the population of the Seychelles lives.

10.4.4. NGOs

International NGOs are not very well established in the Seychelles, although it is possible to find examples, such as the Save Our Seas Foundation, which manages the private island of

Arros and the atoll of St Joseph in the Amirantes. Nevertheless, some international NGOs (including BirdLife International, IUCN, WWF and CI) fund or support some national or regional conservation projects and have MOUs with local NGOs. Some of these local NGOs (Nature Seychelles, ICS and also SIF) are members of IUCN, as is the government of the Seychelles.

In the past, two British NGOs played a major role in the conservation of biodiversity in the Seychelles in the 1970s by purchasing the Aride and Cousin islands and turning them into nature reserves and gradually restoring them. This helped expand and promote the development of habitat and species recovery programs on private islands and properties to protect critically endangered birds and seabird colonies. The Royal Society for Nature Conservation (RSNC) (later called the Royal Society for Wildlife Trusts) was one of these NGOs, through which its president Christopher Cadbury purchased Aride Island and helped to purchase Cousin Island and La Veuve Reserve on La Digue Island. The second was the International Council for Bird Preservation, now BirdLife International, which purchased Cousin Island with the help of RSNC.

There are more than 20 local NGOs, parastatals and public trusts working on environmental issues in the Seychelles. The most prominent are listed in Table 51. Nature Seychelles is now BirdLife International's partner for the Seychelles, and Island Conservation Society (ICS) is the successor to RSNC/RSWT in the Seychelles via ICS UK, which continues to receive support from the Cadbury family.

Table 51 Main local NGOs, parastatals and public trusts involved in environmental issues and biodiversity conservation in the Seychelles

Organization	Website
Seychelles Parks and Gardens Authority (SPGA)	https://www.snpa.gov.sc/index.php
Nature Seychelles	http://natureseychelles.org/
Seychelles Islands Foundation (SIF)	http://www.sif.sc/
WildLife Clubs of Seychelles (WCS)	https://www.wildlifeclubsofseychelles.org
Marine Conservation Society, Seychelles (MCSS)	http://www.mcss.sc
Island Conservation Society (ICS)	http://www.islandconservationseychelles.com
Plant Conservation Action Group (PCA)	http://www.pcaseychelles.org
Save Our Seas Foundation - D'Arros Research Center	https://saveourseas.com/sosf-darros-research-centre/
Green Islands Foundation (GIF)	https://greenislandsfoundation.blogspot.com/
Environment Education Association Seychelles (EEAS)	https://www.facebook.com/Environment-Education-Association-Seychelles-500012833506101/
Seychelles Sustainable Tourism Foundation (SSTF)	http://seychellessustainable.org/
Sustainability for Seychelles (S4S)	http://www.s4seychelles.com/
Terrestrial Restoration Action Society of Seychelles (TRASS)	https://www.facebook.com/TerrestrialRestorationActionSocietyofSeychelles/
Global Shapers - Victoria Hub	https://www.facebook.com/globalshapersvictoria
SYAH (SIDS Youth Aims Hub - Seychelles)	http://syah-seychelles.weebly.com/
Seychelles Conservation and Climate Adaptation Trust (SeyCCAT)	https://seyccat.org/
The Ocean Project, Seychelles (TOP)	http://www.theoceanprojectseychelles.com/
The Blue Economy Research Institute (BERI), University of Seychelles	https://beri.unisey.ac.sc/

Organization	Website
Island Biodiversity Conservation Center (IBC), University of Seychelles	https://unisey.ac.sc/island-biodiversity-conservation-centre/
Indian Ocean Tortoise Alliance (IOTA)	https://www.iotaseychelles.org/
SeyNoPlastic	https://seynoplastic.com/
Wise Oceans Seychelles	https://www.wiseoceans.com/
Danny Faure Foundation	https://www.dannyfaurefoundation.org/

10.5. Capacity and needs of civil society organizations

10.5.1. Madagascar

Civil society in the field of conservation in Madagascar is relatively powerful in terms of its capacity to intervene effectively in many areas. There is a diversity of structures in the country that intervene at multiple levels in the fields of sustainable natural resource management, biodiversity conservation, sustainable resource development, ecosystem services, research, education, advocacy and lobbying. Training programs, set up by international organizations and then progressively by national organizations such as Vahatra, have allowed the emergence of a dynamic and well-trained generation of conservation professionals, even if it is still insufficient compared to the needs.

The conservation community in Madagascar, however, remains organized around large international organizations, which represent the backbone of environmental action. With easier access to international funding, supported by their respective headquarters, and mobilizing national and international expertise, these organizations play a major and effective role, not only in the implementation of field activities, but also in relations with government authorities and the private sector.

The weak capacity of national and regional structures and NGOs to mobilize funds means that they have difficulty accessing available funding and implementing their activities in the field in a sustainable manner. If these local organizations benefit from funding, the share that they are responsible for managing is low, the majority being destined for the international organization that is responsible for them.

As a result, local structures lack funds for their expenses and operations, pay their employees relatively little, and even their technical activities in the field are limited, rarely allowing for flexibility. It is well known that resources must be sufficient for community-based approaches, conservation and monitoring activities.

10.5.2. Comoros

In general, CSOs in the Comoros face two problems: weak governance; and lack of funding. In terms of governance, the least common reality is accountability. Only a small proportion of CSOs produce activity and financial reports. Several reasons are put forward by CSOs to explain the absence of activity and financial reports, including the lack of know-how of CSOs, the negligence of leaders, the deliberate desire of some association leaders who do not want transparency in the management of the association for fear of being ousted, the poor management of the association's resources, the absence of an action plan for the majority of CSOs, and the practice in many associations of waiting for activity and financial reports not at the end of each year but at the end of the mandate.

There are various reasons why CSOs suffer from a lack of funding. On the whole, the first source of funding for CSOs comes from the various dues and fees paid by their members, the second source comes from international donors, the third source of funds is the various donations made to the associations, in fourth place, support from the communities (island, communes and village), and, in last place, contributions that are supposed to be from the state but which are, in reality, almost non-existent.

10.5.3. Mauritius

The main challenge in Mauritius regarding CSOs in biodiversity conservation and environmental protection is their small number. As a result, few local actors are directly involved in the outreach approaches that are needed with communities on the ground.

Conservation efforts in the country began in earnest in the 1970s, dominated by a local elite and led from the outside by western conservation organizations (WWF, International Council for Bird Preservation, Durrell Wildlife Conservation Trust, TPF, Kew Gardens, etc.). The creation of MWF in 1984 made it possible to respond to the emergencies of the time (Mauritius kestrel, pink pigeon, Round Island, reptiles, etc.). The organization was well managed, professionally run, professionally staffed, successful in fundraising and became a reference. There was a high turnover of volunteers, mainly expatriates. This meant that few staff stayed in Mauritius or that few Mauritians stayed long enough to make their mark. The organization became more "Mauritianized" in the late 1990s, with key positions held by Mauritians or foreigners who had made Mauritius their home for decades. Today, the board of directors is predominantly Mauritian.

MWF covered the ground well in Mauritius and Rodrigues, but there was little interest in conservation beyond MWF. This is now changing, with former MWF staff leaving the organization to create or work in other CSOs (e.g., Ebony Forest, Ecosystems Restoration Alliance), replicating the MWF model. MWF is also in partnership with Ferney Valley.

Even today, there are no more than four active terrestrial conservation organizations in Mauritius, and their programs overlap. MWF is still the main actor in conservation. However, the work cannot be done by a single organization, and there is room for other civil society actors. Some private initiatives are on the horizon as well, around the concept of CSR.

10.5.4. Seychelles

In terms of funding, recently there has been a setback in the funding mechanism for NGOs and CBOs in the Seychelles that rely on donations, private funding, and grants. The CSR tax, which was created in 2013 and had long been an additional funding mechanism for NGOs and foundations, was abolished in early 2021 following a change in government. For many, this removal was seen as a significant loss to NGO revenues. This tax and its removal were also raised during the stakeholder consultation process, in response to a question about the existence of gaps in conservation funding in the Seychelles. It was also argued by local stakeholders that, while many KBAs managed by NGOs benefit from ecotourism activities, the revenue stream from these activities is not guaranteed (a reality revealed by the impact of COVID-19 on tourism) and is not sufficient to support conservation efforts at these sites.

In addition, as the Seychelles has been considered a high income country since 2018, problems of finding sufficient funding for conservation in the country have arisen. Indeed, this new consideration has meant, for example, that the Seychelles have not been, and still are not, eligible for certain grants that were available in the past. Stakeholders explained that this has resulted in a loss of revenue for conservation projects, inputs that have not really been replaced due to lack of local funds, and particularly in the last two years with the COVID-19 pandemic, which has seen government strategies being more geared towards economic recovery. Comments were also made about the Environment Trust Fund (ETF), which used to be a source of funding but is not as important today. In the last two years, it has been announced that it will disappear, despite the fact that, in June 2022, the Seychelles Ministry of Agriculture, Climate Change and Environment announced that the ETF had in the past two years received over SCR 10 million in donations. This was achieved through the Seychelles Islands Travel Authorization Platform, which has been managing entries into the country since the COVID-19 pandemic and which gives the opportunity to make a donation to the protection of the Seychelles environment at the end of its online form (mandatory for anyone traveling to Seychelles, residents and Seychellois included). The question remains whether this form of fundraising for the ETF is sustainable in the long term and whether other types of donations are planned for the ETF. Finally, the proposal that the Seychelles government set up a green economy fund similar to the blue economy fund was also made, as terrestrial conservation is also essential to the economic and social well-being of the country.

11. CLIMATE CHANGE ASSESSMENT

11.1. Overview

The Indian Ocean is the third most affected region in the world by extreme weather events. In the populated islands of the southwest, these phenomena are expected to increase in frequency and intensity under the effect of climate change. The islands of the southwestern Indian Ocean basin have, over the last 50 years, observed an average warming of the air temperature of the lower layers of nearly 1°C. This warming has accelerated over the past decade, resulting in episodes of sudden and intense rainfall regularly affecting islands with steep relief. These rains are brought by storms and cyclones that cross the basin every year. At the global level, the IPCC (2021) predicts a rise in sea level but highlights in its reports an average rise by ocean basin, including the Indian Ocean.

The most pronounced and visible impact of climate change in the region is undoubtedly coral bleaching. According to studies, the probability that these bleaching episodes will multiply with the projected sustained increase in sea surface temperature is very high, as is the confidence level of these probabilities. Indeed, some studies predict that coral reefs in the Indian Ocean may disappear completely within 20 to 50 years as a result of increasingly frequent bleaching events (Sheppard 2003). The degradation of coral reefs will affect the whole marine ecosystem. Furthermore, the rise in sea level and the intensification of extreme climatic events will continue to cause the erosion of beaches and coastal ecosystems. Erosion is a phenomenon that is already present on the Indian Ocean islands but has been little studied compared to other subjects, although it is equally important.

These three phenomena, combined with the degradation of beaches and coastal areas that they will cause, will have an adverse effect on marine turtle populations that inhabit the western Indian Ocean. Moreover, these populations are also threatened by the rise in the temperature of the surface of the soil due to the global rise in temperature caused by climate change. Indeed, this increase in sand temperature induces an imbalance in the sex ratio of marine turtle populations, with serious consequences for the reproductive capacity and survival of these species; a relatively small increase in temperature could have direct consequences for their survival (Griessinger 2021). In addition, migratory marine mammal populations in the Indian Ocean are likely to be affected by climate change during their feeding season in polar regions.

For terrestrial ecosystems, the impacts of climate change are more difficult to measure. Indeed, there are no observational data on such impacts for the entire region.

11.1.1. Madagascar

In Madagascar, a report released by the Directorate General of Meteorology in 2019 presents some adjustments taking into account the changing climate context. The four main climatic zones (the humid east coast, the central highlands, the northwest, and the semi-arid southwest) have not changed, nor has the subdivision into two seasons: a hot and rainy season from November to April; and a cool and dry season between May and October. The hot season is characterized by the formation of cyclonic disturbances in the southwestern basin of the Indian Ocean, affecting the country on average three to five times a year. In the context of climate change, the rise in temperature is manifested by an increase of 0.27°C of the national average every 10 years and the change in the rainfall pattern is manifested as a lengthening of the dry season, an intensification of torrential rains and a decrease in rainfall of 8 percent since 1990. Between 1990 and the first quarter of 2022, Madagascar has recorded about 75 major climatic disasters, including at least 65 cyclonic disturbances and six episodes of severe drought. Sea level rise reached 6 mm per year between 1994 and 2008.

In terms of precipitation, annual rainfall is decreasing at most stations in Madagascar, particularly in the eastern and southeastern parts of the island. This decreasing trend is small compared to the very high annual variation in rainfall. Comparing seasons, rainfall in the hot season (summer) shows a decline compared to winter rainfall. The number of days with extreme rainfall is generally decreasing.

In terms of temperature, maximum and minimum temperatures in Madagascar have increased by 0.04°C/year and 0.05°C/year, respectively. The maximum of the maximum temperatures and the minimum of the minimum temperatures are both increasing. This is likely to result in hot days and warm nights. The maximum temperatures show an increasing trend of +0.23°C/decade on an annual basis, the hot and humid season shows an increase of +0.20°C/decade. In winter, the maximum temperature trend is +0.25°C/decade.

The sea surface temperature in the western Indian Ocean (Kenya, Mozambique, Tanzania, Madagascar, Réunion, Mayotte, Comoros, Mauritius and the Seychelles) has increased by 0.60°C between 1950 and 2009. Sea-level rise in Madagascar has been recorded at 1.57 mm/year between 1993 and 2017, which is less than the global average rate of 2.87 mm/year.

No trend has yet been observed in the frequency or intensity of tropical cyclones in the southern Indian Ocean region of interest to Madagascar, according to existing studies.

In terms of projections of future climate change in Madagascar, two scenarios of greenhouse gas emissions are considered: moderate (RCP 4.5) and high (RCP 8.5). The projected changes are uncertain for precipitation. However, precipitation is expected to be significantly altered during the winter season, from May to October, with a 9.6-16 percent decrease in precipitation by 2080.

By 2100, the frequency of tropical cyclones is not expected to change significantly, however, the intensity of cyclones is expected to increase by 46 percent and they are projected to move northwards. It is also expected that mean sea level will probably rise by 0.28 to 0.48 m by 2100. Future climate projections show regional disparities in the evolution of climate parameters. The southern part, the west coast and the center of Madagascar are expected to experience an increased rise in temperatures.

11.1.2. Comoros

Observed temperatures over the period 1960-2006 show that the mean annual temperature has increased by 0.9°C since 1960: an average increase of 0.19°C every 10 years (McSweeney *et al.* 2008). This average increase is greater for the March-April-May period, at 0.22°C per decade, than the other months of the year. However, the lack of available daily temperature data did not allow the identification of trends in daily temperature extremes.

In terms of precipitation, studies note a decrease in average annual precipitation, more pronounced over the period 2000-2006 for all seasons. The decreases in rainfall are more significant in the northern part of the Comoros islands. The lack of available daily rainfall data does not allow the identification of trends in extreme daily rainfall. Climate models projected increase variability in rainfall by the middle of the century, especially during the period November to May (Figure 47).

Data from the Moroni weather station over the period 1971-2000 also confirms the increase in temperature and the downward trend in rainfall. Moreover, the analysis of daily data collected at the Moroni station over the same period shows an increase in dry years compared to wet years. The percentage of dry years increased from 20 percent in the 1970s decade to 80 percent in the 1990s. The north of Grande Comore and the regions of Anjouan

(Nioumakélé and Sima, in the northern peninsula) and Mohéli (Djandro), are the most hot and arid during the dry season. These regions are also the most affected by the decrease in rainfall.

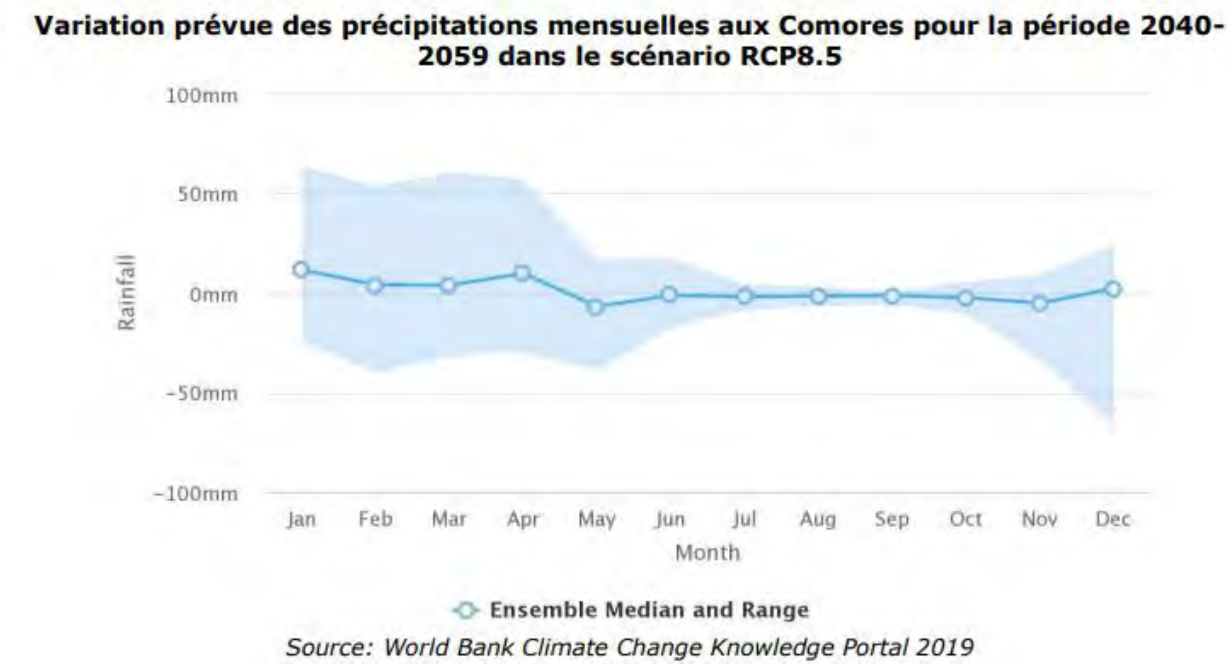

Figure 47 Projected variation in rainfall in the Comoros

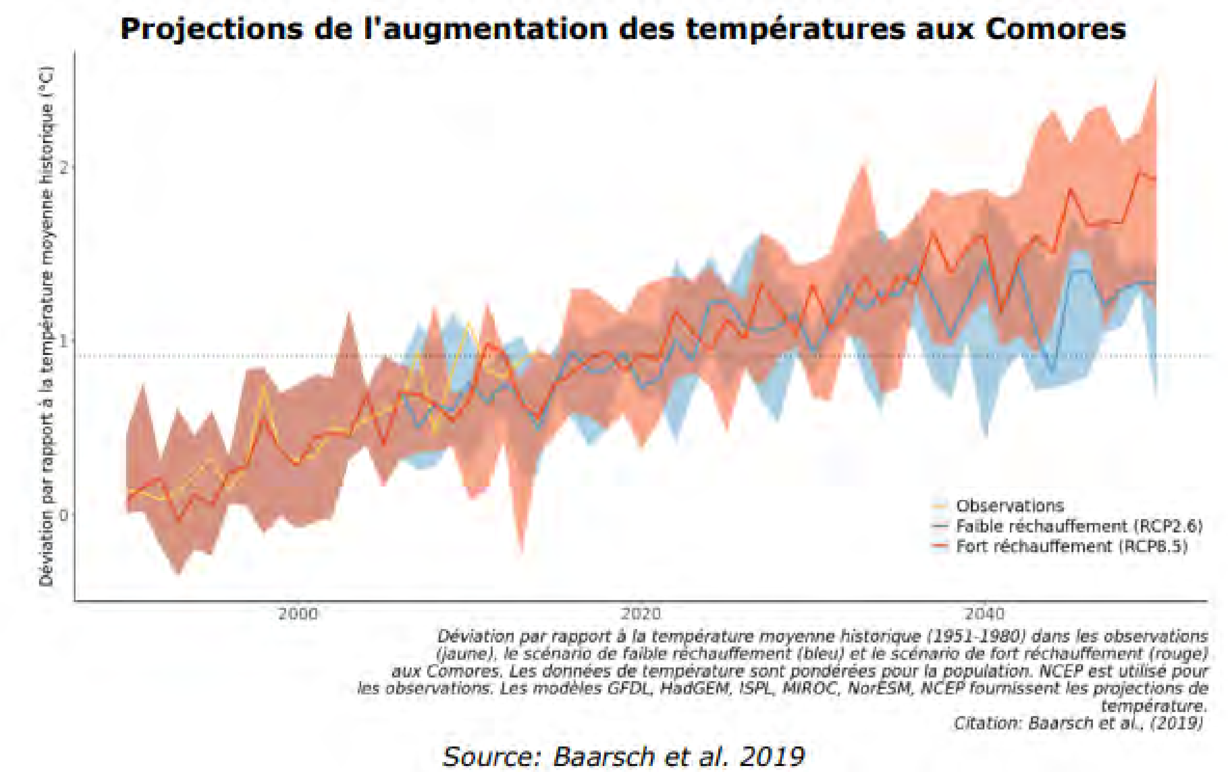

Figure 48 Projected temperature increase in the Comoros

In terms of forecasting and projection, in the high volcanic islands, such as the islands of the Comoros archipelago, the projected rise in temperature will probably lead to a shift inf the distribution of plant and animal species to higher altitudes and to the complete disappearance of vegetation formations found on ridges or mountaintops. This altering of habitats will be to the detriment of native species and will likely accelerate the spread of invasive alien species, which are already exerting strong pressure on the native habitats of the islands.

Between 1990 and 2050, the average temperature compared to the historical average (1951-1980) in Comoros could increase by 0.1°C to 1.7°C in the high warming scenario (Figure 48). The maximum increase expected under this scenario is about 2.5°C by 2050.

11.1.3. Mauritius

As a SID, Mauritius is highly vulnerable to the impacts of climate change. In 2020, the World Risk Report ranked Mauritius as the 51st country in terms of natural disaster risk. Key economic sectors such as agriculture, fisheries, tourism and water are all affected. The figures showing trends in recent years are alarming.

For example, over the last 70 years, the average annual temperature on the island of Mauritius has increased by 1.39°C compared to the 1961-1990 baseline (Figure 49). For Rodrigues, the average annual temperature has increased by 1.41°C over the last 60 years (1961-2020) compared to the baseline period between 1961 and 1990[21].

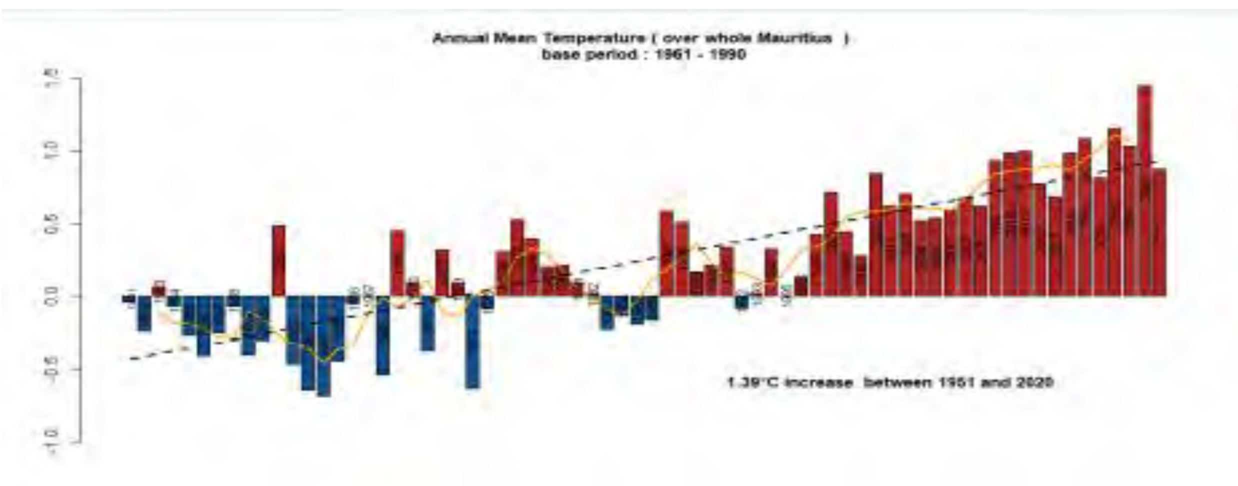

Figure 49 Annual mean temperature in Mauritius between 1961 and 1990

Source: Mauritius Meteorological Services (MMS, 2021).

According to Mauritius Meteorological Services (MMS), the average annual rainfall on the island of Mauritius has decreased by 104 mm over the last 70 years (1951-2020) compared to the baseline period of 1961-1990. An analysis by MMS shows a 7.7 percent decrease in rainfall over the last decade (2011-2020) compared to the decade of 1951-1960 (Figure 50). On Rodrigues, average annual rainfall has decreased by 234 mm over the last 60 years (1961-2020) compared to the baseline period of 1961-1990. This is an even greater decrease than for Mauritius island.

[21] Ministry of Environment, Solid Waste Management and Climate Change, First Biennial Update Report (BUR1) to the United Nations Framework Convention on Climate Change, 2021.

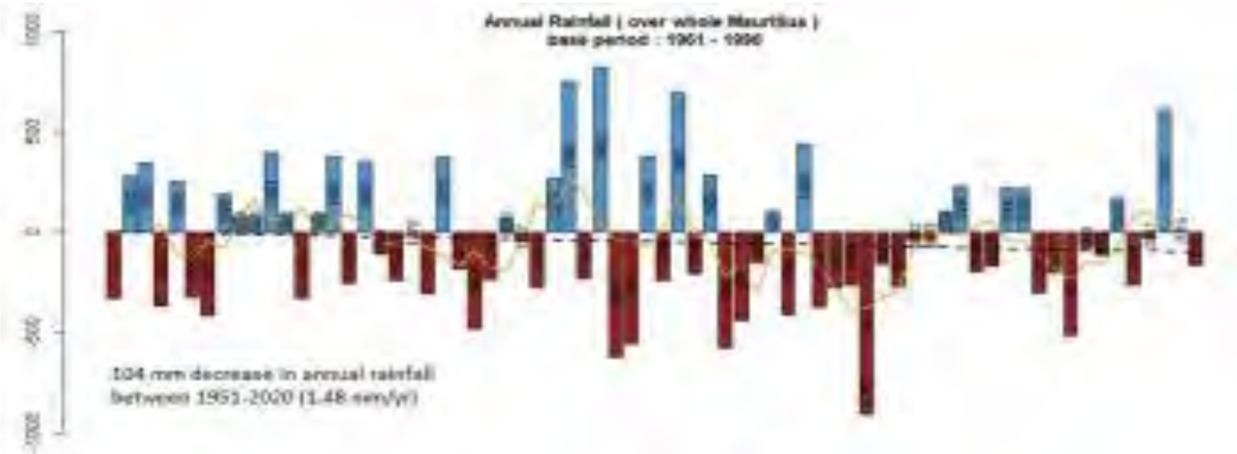

Figure 50 Average annual precipitation in Mauritius

Source: Mauritius Meteorological Services (MMS, 2021).

Analysis of data from the Port Louis tidal gauge on Mauritius island shows an average sea level rise of 4.7 mm per year over the past 33 years (1987-2020; Figure 51). In Port Louis, over the last decade (2011-2020), sea level has risen by 119 mm compared to the 1991-2000 period. Analysis of data from the Port Mathurin tidal gauge on Rodrigues show an average sea level rise of 6.4 mm per year over the last 32 years (1988-2020). During the last decade (2011-2020), sea level rose by 144 mm, compared to the 1991-2000 decade.

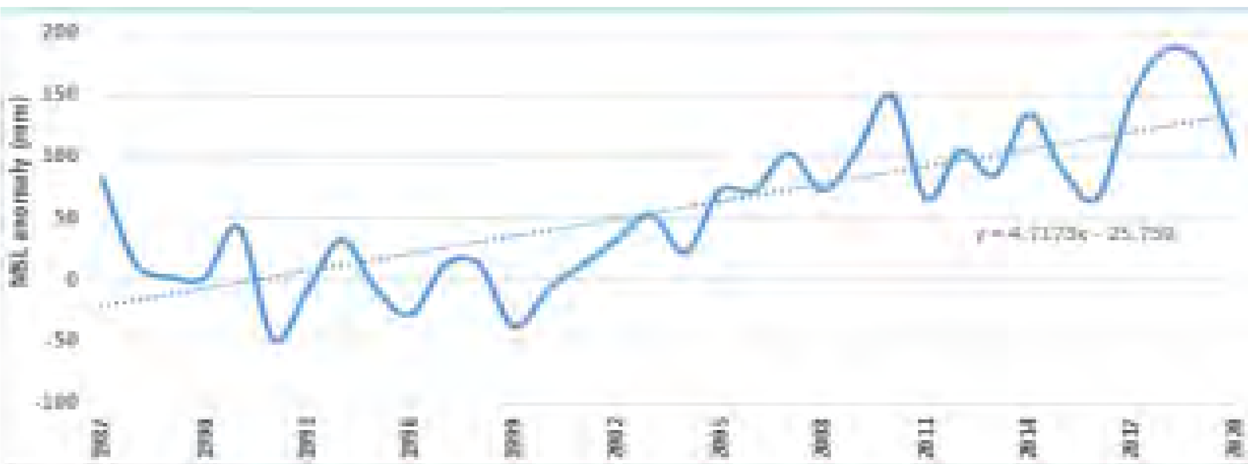

Figure 51 Sea level rise trend in Mauritius

Source: Mauritius Meteorological Services (MMS, 2021).

In terms of climate projections, according to the World Bank Knowledge Portal, over the period 2020 to 2039, under an SSP5-8.5 scenario, the average annual temperature could vary by 0.57°C (Figure 52), while precipitation variability could reach 20 mm differential for the month of March and -20 mm for the month of January, on average (Figure 53).

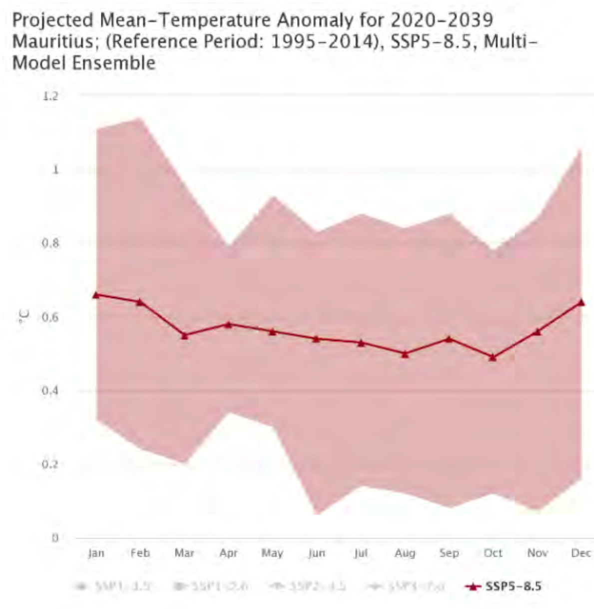

Figure 52 Projection of annual temperature variability for 2020-2039, under a SSP5-8.5 scenario

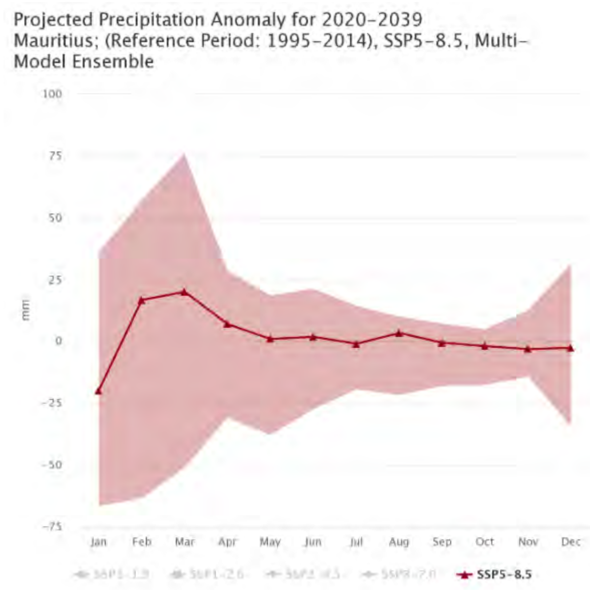

Figure 53 Projection of annual precipitation variability for 2020-2039 under a SSP5-8.5 scenario

Source: World Bank Climate Knowledge Portal (2022).

11.1.4. Seychelles

The Seychelles, due to its geographical and climatic characteristics, is a country very vulnerable to climate change (Etongo *et al.* 2020). Indeed, the country has been affected several times in the past by heavy rainfall, landslides and floods, and coastal erosion is also present. Massive episodes of coral bleaching have also occurred since 1998, the latest occurring in 2016. Periods of drought are also present, and water shortages are a common occurrence on the country's main islands.

In terms of temperature, according to the Seychelles Meteorological Authority, the average annual temperature in the country was estimated at 30°C from 1989 to 2018, while the minimum temperature was 25°C. Although average temperatures have not varied much from year to year over the past three decades, the differences between maximum and minimum temperatures have varied. In fact, minimum temperatures have moved closer to maximum temperatures, indicating an increasing warming of the environment over the years (Etongo *et al*. 2020).

In terms of precipitation, studies have predicted that precipitation during the rainy season will become heavier and the dry season will become drier. Average precipitation will not be affected *per se* but the intensity of the seasons in the Seychelles will be affected, which could have negative impacts on biodiversity and human wellbeing.

Four major climate change trends have been identified in the Seychelles over the years: (i) increased extreme weather events; (ii) sea-level rise; (iii) coastal flooding; and (iv) changing precipitation patterns. These trends, together with a rise in sea surface temperature and ocean acidification, will have direct and indirect impacts on biodiversity and the human population, depending on the climate scenario the world finds itself in, as well as the adaptation measures the country takes.

11.2. Overview of projected climate change impacts on human wellbeing and biodiversity

At present, there is unfortunately not enough data on the observed or potential socio-economic implications of climate change on communities in the Indian Ocean region. Only a few hypotheses have been proposed. As noted earlier, the Hotspot countries have very high population densities in the low-lying areas of their coastlines. A combination of sea-level rise, degradation of the natural protection provided by coral reefs, and increase in the number and intensity of cyclones could have dramatic consequences for the safety and livelihoods of a large number of people living in coastal areas. The displacement of coastal populations inland would constitute a new increase in land pressure, which could generate numerous social problems and jeopardize the last uninhabited natural areas.

11.2.1. Madagascar

In Madagascar, the sectoral risks related to climate change are summarized in Table 52, which is adapted from the National Adaptation Plan (2021).

11.2.2. Comoros

In the Comoros, the impact chains defined for the different sectors assessed show that the high poverty rate, insufficient implementation and enforcement of the regulatory framework, and weak management of natural resources are factors that appear in all sectors and contribute to the low level of adaptive capacity. Thus, improving (and strengthening) the governance framework and reducing poverty could lead to improved adaptive capacity in any sector. The sectoral risks related to climate change are detailed below and summarized in Table 53.

Agriculture

The influence of climate change and climate variability on the agricultural sector is visible in the following phenomena:

- Delayed fruit ripening due to prolonged drought and high temperatures.
- Maize production suffering from drought conditions. The leading maize-producing region is also the most exposed to declines in rainfall.
- The reproduction cycle of crop pests coincides with the harvest period. This leads to the destruction of crops. Appearance of new diseases, such as coconut whitefly (*Aleurotrachelus atratus*), are leading to decreased production and income.
- Coconut whitefly also deposits fumagine on associated crops (vanilla and bananas), thus compromising photosynthesis.
- Development of cercosporiosis (*Cercorporella fujiensis)* on bananas, leading to significant crop losses, reduced income and increased food insecurity.

As almost all of the village lands are already exploited or degraded, village communities compete for the remaining spaces, which generates inter-community conflicts over the ownership of lands and natural resources. The village communities encroach on the state’s domain and tend to challenge the public ownership of the land they occupy.

The vulnerability of the agricultural sector to climate change is very high at the national level and for each of the three islands. This is largely due to extensive deforestation on all three islands and the degradation of more than half the land.

Adaptive capacity at the national level is very low. Indeed, in addition to poverty (low incomes), there is a lack of farmer support (access to extension, access to credit, enforcement of laws) on all three islands. This is compounded by weak enforcement of the regulatory framework.

Table 52 Potential climate change risks in Madagascar

Sector	Climate hazard			
	Increase in temperature	**Decrease in precipitation**	**Tropical cyclones possibly more intense**	**Sea-level rise**
Agriculture	Direct risk of increased temperatures reducing crop yields. Increased risk of nighttime temperature increases. Risk of increased evapotranspiration, reducing soil moisture and increasing soil degradation. Risk of increased livestock mortality (especially cattle).	Risk of increased irrigation water needs, especially for rice cultivation.	Risk of damage to crops (especially plantations sensitive to such events such as bananas) and supply chains.	Risk of marine intrusion and water salinization in low-lying coastal agricultural areas with negative impacts on agricultural yields.
Public health	Increased risk of acute respiratory illness. Risk of vector-borne diseases, such as malaria. Increased risk of heat stress to individuals, leading to acclimatization problems and aggravating pre-existing medical conditions such as cardiovascular problems.	Risk of lack of availability of drinking water resources. Risk of water shortage with consequences on sanitation and hygiene. Risk of evolution of transmissible vector-borne diseases due to a change in rainfall distribution between dry and wet periods.	Risk to public health due to degradation of water and sanitation quality.	Health risks related to water drilling in coastal areas (salinization of groundwater).
Water resources	Risk of increased evapotranspiration rate, reducing soil moisture and depleting groundwater replenishment. Risk of reduced runoff and surface water.	Risk of increased water stress and risk of reduced drinking water resources due to lack of groundwater replenishment.	Risk of damage to water infrastructure due to cyclones.	Risk of marine intrusion and salinization of surface and groundwater in coastal areas.
Disaster risk management	Increased risk of heat stress to individuals, leading to acclimatization problems and aggravating pre-existing medical conditions, such as cardiovascular problems.	Risk of drought leading to crop damage, water shortage and other socio-economic impacts.	Risk of damage to crops, infrastructure, supply chains, services, etc.	Risk of marine intrusion and salinization of surface and groundwater in coastal areas.

Sector	Climate hazard			
	Increase in temperature	**Decrease in precipitation**	**Tropical cyclones possibly more intense**	**Sea-level rise**
Infrastructure	Risk of weakening of built structures due to expansion during extreme heat events.		Risk of infrastructure degradation. Risk of destruction of infrastructure.	Risk of degradation of coastal infrastructure. Risk of destruction of infrastructure.
Energy	Risk of loss of flow resulting in reduced energy production.	Risk of loss of flow resulting in reduced energy production.	Risk of degradation of energy sector infrastructure.	
Coastal zone management, biodiversity and forestry	Risk of degradation of biodiversity and ecosystems, particularly increased by deforestation.	Risk of degradation of biodiversity and ecosystems, particularly increased by deforestation.	Risk of degradation of coral reefs and underwater coastal ecosystems. Risk of increased coastal flooding affecting coastal ecosystems. Risk of degradation of terrestrial ecosystems.	Risk of marine intrusion and salinization of surface and groundwater in coastal areas and destruction of salt-intolerant coastal terrestrial habitats.
Transportation			Risk of road damage due to flooding from cyclones. Risk on other modes of transport (rail, air).	Risk of damage to road infrastructure in the immediate vicinity of the sea. Risk of damage to port infrastructure.
Fishing	Risk of changes in fish populations and reproductive cycles. Risk of degradation of habitats and ecosystems (coral reefs and mangroves) and migration of fish out of historical fishing areas.	Risk of lengthening low-water periods, thus disrupting the cycle of species, and potentially generating a loss of resources in fresh water.	Risk of increased production costs due to destruction of infrastructure and disruption of supply chains.	
Land-use planning	Risk of reduction of cultivable land and water bodies.	Risk of reduction of cultivable land and water bodies.	Risk of infrastructure degradation Risk of degradation of agricultural land.	Risk of increased soil erosion on the coastal fringe.
Tourism	Risk of loss of tourist appeal due to worsening heat conditions, reducing the number of tourists.	Risk of loss of tourist attractions due to drought conditions affecting the green landscape, as well as biodiversity (flora and fauna).	Risk of damage to tourist infrastructure.	Risk of damage to coastal tourism infrastructure.

Livestock raising

Livestock raising takes place on a small-scale and mainly consists of poultry and ruminants. Prolonged drought leads to a reduction in pasture, due to the drying up of grasses. Land degradation and the disappearance of fallow land also limit the capacity for forage production. The reduction of water resources reduces watering possibilities; often, banana trees are chopped up to be used as a source of water for livestock. This leads to undernourishment and a high susceptibility to parasitic attacks and epidemics, such as theileriosis, which has decimated 20 percent of the cattle on Grande Comore.

High temperatures reduce the ingestion capacity of food, especially for small-scale poultry farming, which reduces already low production. Climate change has a negative influence on local meat production, increasing the country's dependence on protein imports. The high cost of access for the poorest people exposes them to chronic malnutrition.

Forestry

The Union of the Comoros has a forest heritage characterized by high levels of endemism. This heritage is currently undermined by significant and uncontrolled deforestation for agricultural purposes (banana, taro, coconut, etc.) or extraction of timber, fuelwood, charcoal, most notably for the distillation of ylang-ylang. The forest no longer plays its role as a provider of ecological services, such as the protection of water resources and soil. Forest degradation and deforestation have had considerable impacts on coastal erosion and regulation of the flow of springs and rivers in the country. In spite of the numerous reforestation operations carried out, the country has been facing deforestation and an accelerated degradation of its terrestrial biodiversity for several years.

The effects of climate change are affecting the distribution, composition, structure and health of forests. The main manifestations are the decrease in forest area and the loss of biodiversity. The most recent data show that, from 1950 to 2016, the forest area is estimated to have decreased from 31,000 ha to 3,000 ha, or 2 percent of the national territory (FAO 2016). Only a few relics of natural forest remain, at high altitudes and on steep slopes. Deforestation plays a very important role in the loss of natural habitats and the drying up of water sources in the country. It is driven by inadequate and unsustainable cultivation and agricultural practices.

Fishing

Fishing is a relatively dynamic sector, but it is still artisanal in nature. It is practiced in a maritime area estimated at more than 160,000 km², covering 900 km² of continental shelf and 427 km of coastline. The fishery resources of this area are estimated at 33,000 metric tons annually, of which 64 percent is currently exploited.

Significant pressure continues to be exerted on the coastal fringe by certain fishing practices such as longline fishing concentrated on the fringing coral reef, and certain destructive techniques still practiced illegally, including use of a poison extracted from *Theophrosia* sp., explosives, pesticides, and nets with too fine a mesh. These practices as a whole threaten the balance of the food chain and the sustainability of fishery resources.

Climate and climate variability impact species migration and cause ecosystem degradation of reefs and mangroves. The abnormal rise in ocean temperatures causes coral bleaching, leading to high coral mortality. The disappearance of reefs contributes to coastal erosion and accelerates the decrease of coastal fishing. Consequences include a decline in fishing revenues and significant post-harvest losses due to high temperatures, in the absence of means of preserving products and limited sea trips during cyclonic periods and heavy rains. The result is a chronic shortage of fish on the market and difficult access to markets and protein, especially for the poorest.

Table 53 Potential risks from climate change in the Comoros

Sector	Climate hazard			
	Increase in temperature	**Decrease in precipitation**	**Tropical cyclones possibly more intense**	**Sea level rise**
Agriculture	Direct risk of increased temperatures on crop yields. Risk of increased evapotranspiration rate, reducing soil moisture and increasing soil degradation.	Risk of increased irrigation water requirements, especially for market gardening.	Risk of damage to tree crops, such as orchards, cloves and ylang-ylang plantations in particular.	Risk of marine intrusion and water salinization in low-lying coastal agricultural areas with negative impacts on agricultural yields. Loss of coastal agricultural production.
Livestock raising	Risk of pasture reduction due to grass desiccation. Risk of wildfire and grassland for livestock grazing	Risk of reduction of livestock numbers by reduction of watering points by the drying up of the rivers and wetlands.	Risk of death or injury to animals due to collapsing stables.	Risk of relocation of livestock from coastal areas to highland areas due to the absence of fodder in areas flooded by the sea.
Fishing	Risk of changes in fish reproduction cycles. Risk of degradation of habitats and ecosystems and migration of fish out of the usual areas.	Risk of lengthening low water periods, thus disrupting the cycle of species, and the immigration of amphidromous species.	Risk of increased production costs due to destruction of infrastructure and disruption of supply chains. Risk of loss of life.	
Health	Increased risk of acute respiratory illness and vector-borne diseases, e.g., malaria. Increased risk of heat stress, especially for the elderly, with the resulting health problems.	Risk of lack of availability of drinking water resources.	Public health risk due to the degradation of water and sanitation quality and drinking water distribution infrastructure.	Health risks related to the salinization of groundwater.
Infrastructure	Risk of weakening of built structures due to expansion during extreme heat events.		Risk of degradation and destruction of infrastructure	Risk of degradation and destruction of coastal infrastructure. Risk of flooding.
Biodiversity	Risk of degradation of biodiversity and ecosystems, particularly increased by deforestation and the spread of invasive alien species.	Risk of degradation of biodiversity and ecosystems, particularly increased by deforestation and the search for new arable land.	Risk of degradation of coral reefs and coastal ecosystems. Risk of degradation of terrestrial ecosystems.	Risk of saltwater intrusion and salinization of surface and groundwater in coastal areas and destruction of salt-intolerant coastal terrestrial habitats.

Water resources

The Comoros have significant water potential but it is distributed differently among the islands. There is no permanent hydrographic network in Grande Comore because of the permeability of its soils. Problems associated with water resources are therefore not the same on all the islands.

Due to the increase in temperature, runoff and evapotranspiration are increasing the risk of decreased water reserves on Grande Comore. The deterioration of water quality caused by the rise in sea level is especially evident in the localities of Chindini, N'tsaouéni, Mitsamihouli, Chamlé, Foumbouni. As a result of the increase in temperature and a decrease in rainfall, the hydrographic network on Anjouan and Mohéli is shrinking; there is a deterioration in water quality, difficulties in water supply, and a reduction in hydroelectric potential, which is fueling the current energy crisis on these two islands.

Health

The health sector is very sensitive to climate change; in particular, water quality and the state of sanitation are very unfavorable risk factors. The poor quality of water is considered very critical. According to the findings of the 2000 Multiple Indicator Cluster Survey, almost the entire population uses unsafe water, which is a potential source of diarrheal, infectious and parasitic diseases; children suffering from malnutrition are the most vulnerable.

Although tangible results have been achieved in the fight against malaria, the Union of the Comoros continues to experience repeated health crises, fostered by the development of widespread insalubrity, the absence of basic hygiene and sanitation measures, and inadequate sanitary control.

Recent studies also show that 88 percent of diarrheal diseases are attributable to poor water quality and sanitation. There is already an increased incidence of vector-borne diseases, and some health problems are likely to increase as a result of climate change, such as vector-borne infectious diseases and marine animal poisoning resulting from toxic algal blooms due to coral bleaching, death and pollution.

Infrastructure

Infrastructure, such as roads, water infrastructure, hotels, ports, airports and homes, are experiencing varying degrees of deterioration due to climatic events, among other things. For example, the Comorian road network has seen accelerated deterioration along 70 percent of its roads.

The infrastructure sector is highly exposed to climatic factors and, in particular, to extreme events, including landslides and floods. The overall vulnerability of the infrastructure sector is high but not critical.

Biodiversity

The Union of the Comoros has natural resources and a fairly rich biological diversity. It has invaluable potential in terrestrial and lacunar ecosystems characterized by high levels of endemism for both flora and avifauna. This heritage is currently weakened by both anthropic actions and the effects of climate change.

Climate change favors the proliferation of invasive alien species, which is considered the primary cause of biodiversity loss on small islands. Also, in the marine environment, the rise in temperature favors the proliferation of toxic algae and bleaching resulting in a drastic reduction in the marine fauna and flora that directly depend on seagrass beds and coral reefs.

This situation in marine and terrestrial environments affects vital ecological processes, such as the water cycle and the fight against pollution by silting up coastal and marine areas, as well as the dynamism of buffer zones in protecting against natural disasters.

11.2.3. Mauritius

In Mauritius**,** large urbanized areas on the coast, particularly on the exposed west coast, will likely be threatened by swell if the barriers reefs were to disappear. The degradation of beaches and corals could hinder the development of tourism. Deterioration of the reefs could lead to the decline of many commercial fish species and cause a decrease in income for fishing communities. The economic loss to the tourism and fisheries sector from the 1998 bleaching event has been estimated to be between US$608 million and US$8,026 million for the Indian Ocean as a whole (Caesar 2003). Finally, the increase in water temperature and the degradation of coral reefs in the region create ideal conditions for the development of certain microalgae that are highly toxic to marine fauna and humans.

Most productive sectors are likely to suffer from climate change, although the degree of vulnerability varies (Table 54).

Table 54 Expected degree of vulnerability of different productive sectors in the western Indian Ocean, in particular for Mauritius

Sector	Features	Degree of vulnerability
Agriculture	Sugar cane cultivation can adapt to climate change. However, the production of vegetables and fruits is affected by climatic extremes.	Medium
Food safety	The availability of food is highly dependent on transport costs and availability in the producing countries: if the latter is affected by climate change, products will become scarcer and more expensive. In recent years, food production has been affected by climate change (droughts, floods), causing soil erosion and resulting in food shortages that have had to be overcome by food imports (even by air).	Low
Artisanal fishing	Although the effects of climate change on ocean fisheries is not well understood, global climate change could affect fish migration and concentration. The apparent increase in bad weather days, including torrential rains, has affected the number of fishing days, and therefore income, and the supply of fish.	Medium
Livestock raising	Heat stress could reduce livestock productivity.	Low
Supply of drinking water	Despite forecasts of reduced rainfall, some large hotels are legally required to desalinate water to meet demand.	Low
Health	Climate-related diseases, such as Chikungunya or dengue fever, could spread in the region but good preventative activities have been developed.	Medium

Source: adapted from Rakotobe et al. *(2012).*

11.2.4. Seychelles

Biodiversity

The spread of invasive alien species will increase in a changing, and particularly warmer, climate. This could have dramatic consequences for endemic and native ecosystems that are less resilient to climate change.

Changes in rainfall patterns and the possible intensification of droughts will affect ecosystems with a range of possible consequences, including forest fires and water scarcity for fauna and flora. Increased sea surface temperature and sea level rise will directly affect marine and coastal ecosystems, resulting in negative effects on marine microbiomes or coral bleaching events, as well as instability or loss of the mangrove ecosystem due to possible higher wave intensity (combined with sea level rise).

Human population

The impacts of climate change on coral reefs, plankton and the marine ecosystem in general could have a negative impacts on the country's fishing activities (artisanal fisheries and part of the national culture) and industry.

Future water scarcity could have significant consequences for access to fresh water (especially in an island state) as well as for food security (impacts on agriculture).

Intensified flooding of key areas for the human population will likely adversely affect critical infrastructure (hospitals, roads, schools, houses) and the country's economic system.

The risk of increased landslides must also be considered with changes in the rainfall regime.

All of the above impacts could, in the long run, also affect the tourism industry, which is one of the main sources of income for the country.

11.3. Opportunities for climate adaptation and mitigation

11.3.1. Madagascar

The following sectors have been prioritized for climate adaptation measures in the NAP (adopted in 2021): agriculture-livestock-fisheries; water resources; public health; biodiversity and forestry; coastal zones; infrastructure and land-use planning; risk and disaster management; and housing and new cities.

The strategic priorities proposed for these sectors are the promotion of climate-change-resilient activities, as well as the promotion of research and the creation of favorable conditions for the implementation of these proposed activities. Many of the planned activities are already being implemented in several regions of the country and adopt the EbA approach.

In Madagascar, the EbA approach has effectively embraced the three imperatives of EbA: (i) consideration of stressors and climate shocks; (ii) consideration of the impacts on livelihoods, and thus the wellbeing of local populations; and (iii) actions in natural areas to restore or strengthen ecosystem functions.

The priorities for climate change adaptation in Madagascar are detailed in Table 55. In addition to these actions, the surface area of Marine Protected Areas (MPAs) will be tripled, according to the Sydney Promise made by Madagascar at the World Parks Congress in 2014).

Table 55 Priorities for adaptation in Madagascar

Agriculture	Livestock raising	Fishing	Water resources	Biodiversity and forestry	Coastal areas
Promote resilient agricultural systems	Support sustainable livestock practices	Establish marine reserves and protect corals and mangroves	Preserve and secure water resources through the implementation of integrated water resources management	Maintain existing forest cover	Develop and promote sustainable economic activities in coastal areas
Secure the land	Improve livestock resilience	Develop and popularize new fishing techniques	Better manage flood and erosion risks in urban and rural areas	Create a network of conservation forest corridors	Reinforce the fight against erosion and marine submersion
Support the development of resilient crops, particularly through support for agribusiness activities	Promote scientific and technological research to better understand the impact of climate change on livestock	Develop weather early warning systems for fishermen	Support sustainable water management in times of drought, especially in the southern part of the country	Implement a large-scale restoration program for the most threatened ecosystems	Ensure optimal protection of the coastline through adequate Integrated Coastal Zone Management (ICZM)
Establish an early warning and disaster management system tailored to agricultural systems					

Initiatives are being conducted or planned across different sectors to contribute to the mitigation of greenhouse gas emissions and, in so doing, to the preservation of ecosystems and biodiversity as detailed in Table 56.

Table 56 Planned mitigation actions in Madagascar

Sector	Planned mitigation actions
Agriculture	Scaling up integrated models of resilient agriculture, including intensive rice farming systems and improved rice farming systems. Modernization and innovation of existing farming models, development and promotion of organic agriculture covering the main food commodities produced in the country. Scaling up of rice production improvement initiatives taking into account best low-carbon and climate-resilient techniques, covering at least the regions providing one-third of the national production. Diffusion of conservation agriculture.
Land Use and Forest Conversion	Strengthening the national network of protected areas by achieving an average annual deforestation rate below 0.5 percent in all protected areas. Conducting sustainable development actions for the population living in the vicinity of protected areas and forest zones. Strengthening of reforestation and restoration of forests and natural ecosystems.
REDD +	Implementation of the national REDD+ strategy and regional REDD+ strategies.

Sector	Planned mitigation actions
Energy	Scaling up access to modern lighting and electricity for isolated rural households. Energy recovery from agricultural residues and waste. Scaling up the various initiatives for the promotion and development of alternative and/or substitute energy production activities. Dissemination of fuel-efficient stoves to all charcoal-consuming areas and scaling up of bioenergy initiatives (bioethanol, biofuels) to all wood-energy consuming areas.

11.3.2. Comoros

The process of creation and operationalization of protected areas will eventually contribute to the protection of at least 46,800 ha of new terrestrial areas (Karthala forests, Ntringui mountain, and Mwali rainforest), thus expanding the area of protection of terrestrial areas to 27 percent of the national territory. The project will also create MPAs (Turtle Island/North Ngazidja, Coelacanth area and Bimbini Peninsula), covering about 11,020 ha of marine areas, thus extending marine protection to some 3.8 percent of the territorial waters. All existing protected areas/MPAs provide habitat for unique and threatened species throughout the country.

The long-term solution is to establish an effective PA management system in Comoros, consisting of terrestrial and MPAs, that is representative of the country's biodiversity and provides much greater protection for currently unprotected ecosystems and a refuge for threatened species. The sustainability of this system must also be assured. The establishment of protected areas requires investment and commitment from both government and donors.

11.3.3. Mauritius

Since the ratification of the Paris Agreement in 2016, the government of Mauritius has strengthened its multi-pronged approach to building resilience to climate change and moving towards a low carbon economy. In addition, the government has proposed a series of laws to support the mainstreaming of climate change in key sectors, culminating in the approval of the Climate Change Act in November 2020.

The upcoming Environmental Blueprint, which will provide a policy strategy for the next 10 years and a five-year action plan, also includes a dedicated climate change component with key actions that will support the goal of building resilience to the impacts of climate change and achieving a low-carbon economy model.

Of the three categories of responses required to protect human life and property, as recommended by the Intergovernmental Panel on Climate Change, the protection and accommodation options would be the most appropriate for Mauritius, as the size of the country is too small for the withdrawal or abandonment options.

There are a number of opportunities to apply EbA in the context of protection or accommodation measures. For example: native vegetation cover can be increased to preserve and enhance surface water supply and groundwater recharge; strengthening and restoration of coral reefs and coastal vegetation can enhance coastal protection from cyclones and storm surges; and agroforestry can help agricultural systems adapt to more pronounced droughts and higher air temperatures.

In terms of mitigation, according to the updated 2021 NDC and based on current projections, Mauritius aims to reduce overall greenhouse gas emissions by 40 percent in 2030 compared to the business as usual (BAU) scenario (equivalent to 2,893 ktCO_2eq of avoided emissions). Compared to the 2015 INDC target of 30 percent reduction in greenhouse gas emissions and given its national circumstances, Mauritius' mitigation ambition has been significantly enhanced. In addition, the national budget released in June

2022 included significant tax incentives for increased electricity production from solar panels, and the purchase of electric cars, in line with the policy of achieving carbon neutrality by 2070.

Table 57 summarizes the information on the planned mitigation measures and their respective targets.

Table 57 Planned mitigation actions in Mauritius by 2030

Mitigation action	Sector	Quantitative objectives	Status
Accelerating the transition to a low-carbon economy in the Republic of Mauritius	Energy	Greenhouse gas reduction of 4.27 million tCO2e over the life of the investments made	In progress
Mandatory energy labelling	Energy	Reduce household energy consumption by transitioning to more energy efficient appliances by 2030	In progress
Change to a mass transport system (light rail)	Transport	20 percent of bus users and 10 percent of personal vehicle users switch to the light-rail transit Metro Express system (light exhaust system), reducing traffic congestion and carbon emissions	In progress
Standards for treated manure from animal waste	Agriculture	Reduction of greenhouse gas emissions by 20 percent of total manure management emissions	In progress
Promotion of small livestock projects in the gardens	Agriculture	Reduction of greenhouse gas emissions by about 1 to 5 percent of livestock-related emissions	In progress
Tree planting and creation and maintenance of mini forests, nature walks, urban forests, parks and gardens, etc.	Land use and forest conversion	Planting of at least 100,000 trees annually until 2024	In progress
Forest restoration - Nature reserves, mountains, rivers, forest plantations	Land use and forest conversion	75 ha of mountain reserves are restored by 2030	In progress

Source: First Biannual Update Report, Republic of Mauritius (2021).

11.3.4. Seychelles

For the Seychelles, the following opportunities for adaptation and mitigation in the context of climate change are noted. These are based on the Seychelles NDC (2021) and input from stakeholders during the national consultation:

- Reforestation of interior forests with endemic and native species projects.
- Mangrove planting and preservation projects.
- Transition from the national energy model (fossil fuels) to renewable energies.
- EbA actions, such as the continuation of initiatives to reduce the vulnerability of the country in terms of freshwater scarcity and flood risk, by implementing wetland and coastal (including coral reef) rehabilitation and watershed restoration projects with an important dimension of local community involvement.
- Awareness raising and empowerment for the general public and local communities (including youth and women) on issues related to EbA.
- Integration of EbA into public policies.
- Implementation of the Seychelles Marine Spatial Plan and effective management of 30 percent of the MPAs in the Seychelles EEZ.

- Implementation of blue carbon sequestration projects.
- Strengthened protection status of ecosystems that are critical for climate change adaptation and mitigation: 50 percent protection of Seychellois seagrass and mangrove ecosystems by 2025; and 100 percent protection of seagrass and mangrove ecosystems by 2030.
- Establishment of a long-term monitoring program for seagrass and mangrove ecosystems.
- Integration of climate change adaptation into national fisheries strategies.
- Strengthened use of nature-based solutions to build resilience in coastal ecosystems, and in particular nature-based blue solutions.
- Further development of the ridge-to-reef approach and its implementation in the agriculture, environment, water resources and urban development sectors.
- Strengthened implementation of capacity building actions and strengthening data collection and management.

With regard to carbon sequestration, the last five years have seen an increased understanding of the role of seagrass beds in climate mitigation in the Seychelles. The country is now among those pushing this approach at the international level. Research and conservation actions have been implemented in recent years to better understand and protect this ecosystem for the mitigation opportunities it can provide.

11.4. Review of policy responses

This section examines the extent to which climate change policies are in place for adaptation and mitigation, and their effectiveness in integrating biodiversity considerations (including EbA) and potential future needs.

11.4.1. Madagascar

The various policies described in Chapter 9 enable Madagascar to benefit from support deployed at the global level (e.g., GCF, GEF) to combat climate change and protect its exceptional biodiversity.

The overarching legal basis for Madagascar's response to climate change is provided for by the National Climate Change Policy, adopted in 2011. The national response has five axes: promoting adaptation; promoting mitigation; mainstreaming climate change at all levels; developing funding instruments; and promoting research, technology transfer and adaptive management. In line with this policy, the NDC (2015) and the NAP (2021) provide the detailed policy and strategic basis for the national response to climate change.

The NDC, which is currently being updated, reflects the national and sectoral policy directions that countries will achieve to fight against global warming. The updated NDC aims at a 16 percent reduction of greenhouse gas emissions by 2030 (i.e., 28,182 Gg CO_2eq). In addition to this reduction in emissions, the updated NDC aims to increase greenhouse gas absorption capacity by 20 percent (i.e., 37,809 Gg CO_2eq of additional sequestration).

As for the NAP, it is now the reference document for all stakeholder interventions (sectoral ministries and partners) in terms of adaptation to climate change. The NAP was developed with a 10-year planning perspective, with the possibility of revision after five years, and proposes the following 12 multi-sectoral programs, reflecting the cross-cutting nature of climate change adaptation:

- Establishment of a green belt to strengthen the fight against desertification and resilience to climate change.
- Strengthened agricultural sector adaptation and rural resilience in the deep south.
- Strengthened the resilience of rural populations through the development and organization of export channels.

- Strengthened adaptation of the fisheries sector and developing warning systems and associated action plans.
- Improved access to safe water in urban and rural areas.
- Strengthened early warning systems for health sector resilience to climate change.
- Acceleration of reforestation through the operationalization of the REDD+ mechanism and the development of ecosystem services.
- Improved natural forest conservation and protected area management, incorporating the development of climate refugia in and around the interior.
- Protection of coastal infrastructure and economic activities (including tourism) from sea-level rise.
- Improved cyclone early warning systems under a regional effort in the Indian Ocean.
- Development of resilient, less methane-emitting rice fields.
- Optimized resilience of new cities and sustainable and innovative housing for the modernization of Madagascar.

To date, the mobilization of funding for the fight against climate change remains low in Madagascar. The NAP and the NDC thus help guide the search for funding. They also serve to inform the Conference of the Parties on Madagascar's progress in the fight against climate change to which the country is committed.

11.4.2. Comoros

The Union of the Comoros was among the first countries to ratify the UNFCCC, adopted in New York on 9 May 1992 (Decree N°94-010/AF of 6 June 6 1994), and has prepared three National Communications to the UNFCCC and adopted a National Adaptation Programme of Action (NAPA) in 2005.

As a signatory to the Paris Agreement and in line with its commitments, the Union of the Comoros also submitted its first NDC in September 2015 with a revised version in 2020. It has developed a policy and strategic framework that already partly reflects the importance of climate change and the natural environment for the country's sustainable development. This framework specifically includes the National Environmental Policy (NEP), the NAPA, the NDC, and the Strategy for Accelerated Growth and Sustainable Development (SCA2D).

Significant progress has been made, including with the prioritization of climate change issues and the improvement of environmental and climate governance (creation of state entities and regulatory texts dedicated to climate change). The Union of the Comoros has launched its National Adaptation Plan (NAP) development process, with the objective of reducing climate vulnerability in the medium and long term, and facilitating the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programs and activities, in particular development plans, processes and strategies, in all relevant sectors and at different levels, as appropriate. The NAP is not yet fully developed and, therefore, not yet adopted.

Given the country's high vulnerability to multiple hazards (cyclones, floods, droughts, earthquakes and volcanic eruptions) and the effects of these disasters compounded by natural and manmade threats (including climate change, environmental degradation, rapid and uncontrolled urbanization, as well as the lack of capacity and financial resources to which the Comoros are exposed), the country has relied on a number of opportunities to build its resilience, including:

- The establishment of a national platform for disaster risk prevention and reduction (Decree n°12-181/PR).
- The development of a National Strategy for Disaster Risk Reduction 2015-2019 (SNRRC). This strategy is being revised to align it with the post-2015 development agenda, namely the SDGs, the Sendai framework and the Paris Climate Agreement.

- The establishment of monitoring and warning centers (Karthala Volcano Observatory, Technical Directorate of Meteorology, and Epidemiological Monitoring Center).
- The development of local training and capacity building sessions.

11.4.3. Mauritius

The Republic of Mauritius is committed to fully supporting the international climate negotiation process and was among the first countries to ratify the UNFCCC (1992), the Kyoto Protocol (2001) and the Paris Agreement (2016). Mauritius has produced its third national report on climate change (for the UNFCCC) and is currently producing its fourth report.

The Global Risk Report for 2018 ranks Mauritius as the 16th country most at risk globally in terms of natural disasters. To combat climate change, a dedicated division has been created within the Ministry of Environment.

In preparing to deal with worsening climate change, the Republic of Mauritius has developed a number of policy and legislative measures to build resilience to the impacts of climate change and to embark on a low-emissions pathway. These include the Energy Efficiency Act (2011), the Renewable Energy Strategic Plan for 2018-2023, and the updated NDC (2021).

In the area of climate change, the institutional landscape is fragmented. While the Ministry of Environment plays a leading role in environmental management, its climate action is complemented by other ministries, in particular, the Ministry of Energy and Utilities, whose actions contribute directly to the mission of combating climate change. This sector plays a major role in the fight against climate change, through two separate authorities: the Energy Efficiency Management Office; and the Mauritius Renewable Energy Agency. These agencies aim to promote the efficient use of energy, raise national awareness and promote the adoption and use of renewable energy with the aim of achieving sustainable development goals.

In 2020, the government of the Republic of Mauritius published the Climate Change Act. This act establishes climate institutions and agencies and sets out their functions. An Inter-Ministerial Council on Climate Change has also been established and is responsible for setting national objectives, goals and targets for climate change resilience and emission reductions. The same law establishes a Committee on Climate Change, whose main function is to coordinate the preparation of reports related to climate change and to implement activities related to greenhouse gas inventory and reductions, as well as activities related to the assessment of vulnerabilities and adaptation to climate change. The act is also applicable to Rodrigues and sets up dedicated institutional bodies and specific strategies and policies.

The Environment Master Plan, which is being developed to provide a policy strategy for the next 10 years and a five-year action plan, has a dedicated climate change component with key measures that will support the goals of building resilience to the impacts of climate change in order to achieve a low-carbon economy model.

In general, Mauritius is committed to fully supporting the international climate negotiations process. The INDC (2015) committed to reducing greenhouse gas emissions by 30 percent by 2030 compared to the business-as-usual scenario of 7 MtCO_2eq. According to the updated NDC (2021) and based on current projections, Mauritius aims to reduce overall greenhouse gas emissions by 40 percent by 2030 compared to business as usual (equivalent to 2,893 ktCO_2eq of avoided emissions). Compared to the INDC target of 30 percent greenhouse gas emission reductions and given its national circumstances, Mauritius' mitigation ambition is significantly enhanced. The country also intends to provide a timetable for achieving carbon neutrality by 2070 at the latest.

Regarding climate change adaptation, in 2021, the new National Climate Change Adaptation Policy Framework (NCCAPF) was developed and approved by the government. In alignment with the previous NCCAPF (2012) and other national priorities, the updated NCCAPF (2021) focuses on the potential of nature-based solutions for adaptation, as well as the creation of green jobs, thus managing the impacts of the COVID-19 pandemic while addressing some of the most pressing issues regarding biodiversity and sustainable resource management. In line with the NBSAP (2017-2025), the updated NCCAPF promotes EbA, which leverages biodiversity and ecosystem services to reduce vulnerability and build resilience to climate change.

11.4.4. Seychelles

The Seychelles have adopted and implemented a series of plans and policies over the years regarding climate change mitigation and adaptation, beginning with the adoption of the UNFCCC in 1992, which advanced the creation of the National Climate Change Council.

The Seychelles' international climate change commitments and policy frameworks are outlined in Chapter 9. It is important to highlight that, over the past five years, several plans have been updated and new measures and approaches have been integrated into the national climate change strategy (such as the role of blue carbon in climate mitigation), both nationally and internationally. For example, the Coastal Management Plan for 2019-2024 allowed for the implementation of a coastal management strategy in some areas. In recent years, the following policies and action plans have been developed: the Wetlands Policy and Action Plan for 2018-2022; the Water Policy (2017); the Blue Economy Strategic Policy Framework and Roadmap for 2018-2030; the National Development Strategy for 2019-2023; and the NDC (2021), which established an important roadmap in terms of adaptation and mitigation for the Seychelles. Also to be considered is the NBSAP for 2015-2020, an updated version of which is currently being drafted.

11.5. Role of civil society

By definition, civil society, while not taking the place of state authorities, uses its facility to be a local interlocutor with local communities and various institutions.

The situation is not the same for all four hotspot countries regarding the existence and level of involvement of civil society in the fight against climate change. However, they have the following points in common: they can assume the role of relay actors for awareness raising activities; they can provide training; and they can monitor changes on the ground and report to the authorities. In terms of climate change, these actions obviously focus on mitigation and adaptation efforts.

Strengthening the participation of CSOs, combined with better coordination and adequate monitoring and evaluation mechanisms, are ways to address the fragmentation of governance, limited access to information, and significant geographic distances between communities and decision-making centers. To achieve this, there is a need for greater financial sustainability of CSOs, better clarification of roles and responsibilities, more widespread geographic coverage, and strengthened representative functions.

11.5.1. Madagascar

NGOs involved in biodiversity conservation are also *de facto* involved in the fight against climate change. They have significantly contributed to the updating of the NCCP and the NDC. In the field, with local communities, they work on sectoral adaptation actions, particularly in agriculture, by collaborating closely and being relay partners of donors and/or international NGOs. Furthermore, through local communities, indigenous knowledge is taken into account in adaptation actions and combined with scientific approaches.

The main obstacle to civil society interventions is the lack of knowledge about access to funding and new technologies.

11.5.2. Seychelles

The role of civil society in biodiversity conservation has been essential for many decades, and the same is true today for climate change issues in the Seychelles. NGOs, in particular, have done significant work over the past decade to have a positive and lasting impact on climate change adaptation and mitigation through: (i) education and awareness programs and actions (schools and general public); (ii) research and monitoring of key climate stressors; (iii) building scientific cooperation with local and foreign institutions to bring benefits to climate-related work in the country; and (iv) strengthening the knowledge of the Seychelles conservation community on research topics related to climate change (through symposia, webinars, etc.).

There are, however, obstacles, the main ones being: (i) lack of available data, leading to CSOs not being able to conduct crucial research or projects; (ii) lack of economic resources and funds; and (iii) lack of human capacity (lack of trained personnel with expertise in climate change issues, especially climate science).

11.6. Recommendations

Policy strengthening must include:

- Good communication, through target-specific education approaches, continuous awareness raising and facilitating public access to information.
- Transparency in the conduct of actions, knowledge of stakeholders, and management of resources.
- Capacity building, through non-selective but appropriate means, with relevant knowledge management and dissemination.
- Facilitation of access to financial resources.

According to the latest IPCC report, the finance is a major obstacle to climate change adaptation. The cost of climate adaptation has been estimated by the United Nations Environment Programme at between US$280 billion and US$500 billion per year by 2050; this figure is only for developing countries. The IPCC confirms that the budget allocated to Africa for adaptation is lower than what is needed.

11.7. Potential impacts of human response to climate change

11.7.1. Madagascar

For Madagascar, a study conducted in 2018, entitled *Migration, Environment and Climate Change: Information Base for Policy Development in Madagascar*, conducted by a consortium of researchers, associated with the International Organization for Migration and the Ministry of Environment, Ecology and Forests (MEEF) and composed mainly of researchers from CNRE and IRD, provides some insight into the potential impacts of human responses to climate change. This study aimed to provide the government of Madagascar and national partners interested in migration, environment and climate change issues with an information base to better understand the link between migration and environmental change in Madagascar, including climate change, in order to inform public policy formulation and operational planning.

According to this study, internal migration within the country is an important response adopted by men and women in the face of climate change impacts. The study established a national mapping of vulnerabilities, as well as of causes, effects and multisectoral impacts through a field study at two sites: Kirindy in Menabe (dry forests with high rates of deforestation in the west of the country) and Marovoay in Boeny (a rice-growing area in the northwest).

Against a backdrop of the precarious social and economic context in the country, migration is one of the strategies that some populations in Madagascar (especially those in the south) adopt to survive and reproduce their production system. It is a societal phenomenon associated with the chronic threat of drought and famine in the south. The migratory culture also becomes an alternative or an adaptation strategy to the lack of jobs and social advancement in the migrants' areas of origin.

It is thus noted that if climate change can be an opportunity to improve living conditions, it can also be a threat to biodiversity and natural resources in general, leading to food insecurity and social insecurity. Indeed, population growth due to migration in a given area can increase pressures on the environment, while the areas that have been left behind have not experienced any restoration or recovery or adaptation actions either. These impacts can hit in different ways, including worsening forest clearing and degradation, limited access to water resources, land depletion, threats to marine resources and coastal areas, land, air and marine pollution.

11.7.2. Comoros

The Union of the Comoros is among the countries in the western Indian Ocean region most exposed to extreme weather events. The archipelago is subject to a wide range of natural hazards such as cyclones, floods, drought but also earthquakes and volcanic eruptions. The effects of these disasters on the population are compounded by natural and man-made threats, including climate change, environmental degradation, rapid and uncontrolled urbanization, and lack of capacity and financial resources. The intensity and frequency of these disasters are amplified by climate change, leading to a sharp increase in losses and damages for the population.

11.7.3. Seychelles

The Seychelles, like its neighboring islands, expects to be increasingly affected by climate change. This is one of the greatest threats to the fragile nature of the country but also to the population and its economy. Intense rainfall, drought, coastal erosion, flooding, ocean acidification, sea level rise, etc. are causing significant damage to the landscape and ecosystems, including to rare species, such as certain corals and Seychelles giant tortoise. Furthermore, the rise in sea level endangers the coral islands, as well as the entire coastline of the islands of the archipelago. In the case of the main islands, where the majority of the population and the crucial infrastructure for the country are concentrated, such as schools and hospitals, or the port of Victoria through which almost all imports and exports transit, including gas and oil and food products, sea-level rise presents tremendous risks. The fight against climate change, therefore, not only focuses on important migration phenomena, but also ensures the continuity of the economy and the development of the society.

In order to fight against climate change, the Seychelles has been among the leaders in the field of marine conservation, creating 13 new MPAs in 2020. The actions do not stop there, since in the development strategy (NSDS 2019-2023), climate change adaptation is a major axis. Well aware of the situation, Seychellois see the development of resilience to climate change as essential to support a people-centered development strategy. In addition, a considerable effort to reduce greenhouse gas emissions has taken place in recent years in the Seychelles, reflecting the concern over the increasing loss of their natural resources, ecosystems and territories. Thus, through an advanced sustainable development policy, Seychellois see not only an opportunity to combat climate change, but also an opportunity to take advantage of it to include social, equity and development dimensions.

12. ASSESSMENT OF CURRENT INVESTMENTS

12.1. Madagascar

Currently, a study mandated by the National Climate Change and REDD+ Office and supported by UNDP is being conducted on the analysis of constraints and opportunities of climate change adaptation expenditure and budget allocations within the different sectors.

The analysis is not yet complete but initial surveys of various sectoral ministries show that, while a number of sectors have developed or are in the process of developing a climate adaptation sectoral policy, the process is far from being translated into investments or budget allocations integrated into ministerial programming.

First, investments are dependent on donor allocations. Secondly, it is almost impossible to identify the amounts of investments that are exclusively targeted to climate change adaptation Finally, while the current reference is the NAP with its 12 multisectoral national programs, many of the actions planned in these programs have not yet been initiated or are still at the start-up stage.

In addition, the only data available data on financial contributions from bilateral and multilateral donors to public investment for biodiversity are from the period 2014-2018 (Table 58); more recent data are not available in a consolidated format.

Table 58 Bilateral and multilateral donor contributions to public investment in biodiversity in Madagascar (MGA thousands)

Year		2014	2015	2016	2017	2018	Total
Loan	FAD	12,000,000	1,000,000	440,283	4,962,000		**18,402,283**
	IDA	20,000,000	1,000,000	1,436,934	27,679,000	9,121,000	**59,236,934**
	S Korea		18,000,000	3,233,214	36,003,000	9,121,000	**66,357,214**
Grant or aid	AFD	500,000	500,000	670,000	8,215,000	4,947,000	**14,832,000**
	GTZ	6,900,000	6,900,000	15,840,000	7,107,000	33,875,000	**70,622,000**
	KFW	1,879,000	1,668,000	8,240,225	8,815,000	111,214,000	**31,816,255**
	FAO	35,600,000	35,700,000	1,458,000	35,000	803,000	**73,596,000**
	JAPAN JICA	4,100,000	5,600,000	2,800,000	2,871,000		**15,371,000**
	WFP	6,600,000	10,400,000	12,300,000	15,000,000		**44,300,00**
	UNDP	1,000,000				6,425,000	**7,425,000**
	EU	2,200,000	7,200,000	5,600,000	48,149,000	32,619,000	**95,768,000**
	UNCEF	1,300,000	1,300,000	5,390,000	4,431,000	8,044,000	**20,465,000**
	UNEP		300,000	508,000	119,000		**927,000**
	IDA				2,694,000	6,489,000	**9,183,000**
	USAID			7,100,000	10,335,000	5,740,000	**23,175,000**
	Germany					6,000,000	**6,000,000**
	GEF					2,946,000	**2,946,000**
	GEF UNDP			4,000,000	6,263,000	3,404,000	**13,667,000**
CVF	EU			189,904	488,377		**678,281**
TOTAL		**92,079,000**	**89,568,000**	**69,206,590**	**183,166,377**	**140,748,000**	**574,767,967**

Source: BIOFIN Madagascar Report (2021)

Three types of contributions from donors are distinguished in Table 58:

- Loans, consisting of highly concessional debt from multilateral donors, in particular, and from bilateral donors, most of whose financing is on concessional terms. For biodiversity, the major providers of concessional loans at the World Bank and South Korea.

- Grants or subsidies, consisting of non-repayable financial assistance. The main providers of aids, which are neither loans nor cash advances. For biodiversity-related activities, the main donors to Madagascar are the EU, Germany (via GIZ and KfW) and the World Food Program.
- Counter-Value Funds (CVF), which correspond to non-reimbursable aid granted by bilateral partners to promote efforts aimed at alleviating economic difficulties and contributing to the financing of the balance of payments deficit granted to the state.

The analysis of the three types of contribution from donors indicates that grants and subsidies (including direct support to specific state programs for the conservation of biodiversity) for the period 2014-2018, accounted for 74.83 percent, concessional loans for 25.05 percent and CVF funding for 0.12 percent.

As for civil society, available information on spending on biodiversity by NGOs and foundations, comes from two foundations (Tany Meva Foundation and FAPBM) and four international NGOs (Blue Ventures, CI, WCS and WWF). It is, therefore, an underestimate of the total amount of conservation investment from this source. Over five years, the investments by these six entities represented more than US$70 million (MGA 219 billion), which constitutes a large investment in financial terms (Table 59).

Table 59 Annual expenditures by NGOs and foundations on biodiversity in Madagascar (MGA and US$)

	2014	2015	2016	2017	2018	Total
Expenditure in MGA	35,168,664,813	41,986,472,304	39,927,952,046	50,481,275,048	51,853,268,587	219,417,622,718
Exchange rate	2,555	3,166	3,280	3,192	3,455	
Expenditure in US$	13,764,644	13,261,678	12,173,156	15,814,936	15,008,182	70,022,596

Source: BIOFIN Madagascar Report (2021).

Table 60 details the different activities and funding sources of NGOs and foundations investing in Madagascar. Most of the funds come from bilateral and multilateral donors. Their activities and funding are mainly related to protected areas and biodiversity conservation.

Table 60 Sources of civil society funding for biodiversity in Madagascar

Civil Society	Source of Funding	Activities
Foundation	Endowment funds, funds with management mandate Contribution of the state, KFW, French government, IDA/GEF	Financing and promoting sustainable development Financing of protected areas

Source: BIOFIN/Madagascar Report (2021).

Information on selected climate adaptation projects in Madagascar is presented in Appendix 6. Information on selected investments in biodiversity conservation at the 30 priority sites in Madagascar (Table 63) is presented in Appendix 8.

12.2. Comoros

The Union of the Comoros is one of the countries in Africa to benefit from official development assistance. In 2017, the last year for which comprehensive data are available, 15 development partners committed funds, comprising seven bilateral donors and nine multilateral donors. The total commitment amounted to KMF 52.5 billion (equivalent to US$121 million). This amount represented 47 percent of the national budget for the year.

These sums constitute the primary source of investment financing for the country. Grants received amounted to 15 percent of GDP in 2015 and 8.9 percent of GDP in 2016.

The country's extreme poverty, coupled with the constraints of its international creditors, no longer allow the Comorian state to generate resources to meet its international commitments or national policy and legislative arrangements for the protection of its natural environment. Consequently, the conservation of the Comoros' biodiversity and adaptation to climate change depends on the implementation of financing agreements and multilateral cooperation or bilateral cooperation frameworks, particularly with France, the Comoros' main bilateral partner in terms of investment volume.

The ratification of various international and regional conventions, in particular those resulting from the 1992 Rio Conference, allow the Comoros to access funding from these conventions to implement projects or programs related to the conservation of its biological diversity and adaptation to climate change. The principal mechanisms are the GCF and the GEF.

Between October 2015 and December 2021, with GEF funding through UNDP, a project entitled *Development of a National Network of Terrestrial and Marine Protected Areas representative of the unique natural heritage of the Comoros and co-managed by local village communities (RNAP*) was implemented. The main investments were directed towards the operationalization of a national network of protected areas with the establishment of five national parks and the implementation of climate change adaptation activities in the agriculture and water sectors.

In 2019, France and the Union of the Comoros reaffirmed their intention to initiate a new dynamic together and signed a partnership framework document, which provides for reciprocal commitments including a France-Comoros development plan, with a budget of EUR 150 million over three years. Its implementation is entrusted to AFD.

Environmental preservation and access to water are among the three key actions of the plan, including the following priority actions:

- Support for preservation of land and marine resources, climate change, and access to drinking water.
- Support for preservation actions by Mohéli National Park.
- Support for the establishment of a trust fund for the sustainable financing of protected areas in the Comoros.
- Establishment of an Adaptation Facility, over a period of four years. This facility aims to: (i) strengthen climate governance for the success of the NDC, by conducting capacity building activities; (ii) translate the NDC into sectoral public policies and action plans in the field of adaptation, and possibly that of renewable energy; and (iii) design concrete programs and projects, with a strong focus on adaptation to the effects of climate change.

The EU's Multiannual Indicative Program (MIP) for the Comoros for 2021-2027 is based on the Emerging Comoros Plan for 2020-2030 of the Comorian government: a national policy that aims at the structural transformation of the country's economy. It aims to transform and diversify the economy, through the development of the blue economy, agriculture and tourism. The MIP has set priority areas of intervention, including the protection of the environment through the terms of the Green and Blue Pact.

The EU will focus its priorities on the sustainable management of natural resources and biodiversity, food systems, restructuring and capacity building for the private sector, vocational training, and inclusive governance.

Table 61 Main biodiversity and climate adaptation projects in the Comoros

Project title	Objective	Expected results	Main donor	Budget	Period
Technological support and capacity development of rural populations for a resilience of natural resources and the most vulnerable groups: the case of water resources and the adoption of intelligent agriculture in the face of climate change	Within three years, build resilience to climate change and disaster risk reduction by integrating digital technology into my management and improving knowledge of natural resources and the adoption of smart agriculture through the collection and monitoring of hydrographic data and their sharing on a digital platform, promoting food security through the development of smart and sustainable agriculture integrating digital technology and capacity building and awareness at all levels	1. 2,000 farmers are supported to strengthen and improve their agricultural productivity and resilience to the effects of climate change through the adoption of smart and sustainable agriculture. 2. Capitalization of the communication plan of the GCCA program and branding of the EU's actions in the Comoros on climate change.	EU	EUR 600,000	2021-2024
Protection of biodiversity through effective management of the national protected area network	Conserve the terrestrial and marine biodiversity of the Union of the Comoros by strengthening the effectiveness of the co-management of the new protected area network with local communities to support sustainable development.	1. By 2026, state and non-state actors, the Comorian population, especially the most vulnerable, will be more resilient to climate change, natural disasters and crises, and will ensure sustainable and integrated management of terrestrial and marine ecosystems and associated ecosystem goods and services, in the context of promoting sustainable habitat with a small environmental footprint.	GEF/ UNDP	US$ 4,424,479	2022-2027
Restoration of terrestrial and marine ecosystems in Anjouan and Grande Comore (NGO Dahari)	Restoration of Moya and La Grille forests, their biodiversity and the ecosystem services they provide. Reef restoration in southwest Anjouan. Increase agricultural yields in a sustainable way to enhance food security.	1. By 2027, 1,000 hectares of forest and 730 hectares of reef restored.	UK Darwin Initiative EU	GBP 300,000 EUR 130,000	2022-2026

Project title	Objective	Expected results	Main donor	Budget	Period
Family Farm Productivity and Resilience Project (PREFER)	To improve the food and nutritional security and livelihoods of the rural poor. Within this framework, the Project will aim to sustainably increase the food availability and agricultural income of beneficiary households	Food, nutrition and livelihood security of the rural poor are improved	FIDA, ASAP	US$ 7,000,000	2017-2023
Protection and Development of the Moroni Mangrove Ecotourism Park (NGO Banda Bitsi)	To restore and conserve the site, set up a playground, rehabilitate the existing sports complex, set up a greenhouse for the domestication of medicinal plants, and integrate environmental education.	1. A secure ecotourism park is set up in the capital. 2. Awareness of local residents and the general population is raised.	UNDP GEF SGP	US$ 1,200,000 US$ 850,000	2020-2022
Ensuring climate change resilient water supply in the Union of the Comoros	Strengthening water supply management by integrating climate risks into ongoing reforms of national water legislation, building the capacity of key water sector actors on climate risk management for water supply, and supporting the government to implement tariff reforms that include the additional costs of climate risk reduction. Improving water quality and regulating maximum and minimum river flows induced by extreme climatic events by using EbA methods and improving the integrated management of the 32 watersheds in the project area (through better monitoring of water resources), and applying an early warning system to inform stakeholders and take the necessary preventive measures. Strengthening the climate resilience of the water supply infrastructure network by diversifying water supply sources for 450,000 people, and designing and building infrastructure that takes into account climate change risks and is sized to withstand extreme weather events (drought and flooding).	1. The institutional, regulatory and policy framework for managing and reducing climate risks to water supply is strengthened. 2. Climate risks are integrated into water resources management through weather monitoring and forecasting and climate projections, as well as enhanced watershed monitoring. 3. Climate resilient infrastructure and technologies are in place to manage and address water supply shortages caused by drought, cyclones, tropical storms and saline intrusion.	GCF	US$ 60,751,495	2018-2026

Project title	Objective	Expected results	Main donor	Budget	Period
Renovation of the Biodiversity Room of the National Museum of Comoros and Study and Conservation of the Biodiversity of Comoros (MNHN Paris)	To work in collaboration between the MNHN Paris and scientific institutions, political authorities and associations in the Comoros, to: disseminate the richness and heritage value of organisms present in the Comoros Archipelago; raise awareness of the public, especially the young Comorian public, to the protection of species in great danger of extinction in the face of anthropogenic threats through the enhancement of the Biodiversity Room of the National Museum of the Comoros. The valorization of the National Museum combines an enrichment of the museum's collections, a renewed museography adapted to the tropical context, and a reinforcement of the capacities of the scientific and technical personnel of the Museum on the management of the patrimonial collections; the study of the reproduction and development of the coelacanth, an emblematic animal of the Comoros and in great danger of extinction, thanks to the discovery of new embryonic growth stages; and to contribute scientifically to the conservation policy of the coelacanth population of the Comoros.	1. Strong collaborations between the MNHN Paris, and the scientific institutions of the Comoros, in particular the National Museum of the Comoros and INRAPE, on themes of dissemination and awareness of the richness and fragility of the biodiversity of the Comoros, and on research themes on the study and conservation of the fauna/flora biodiversity of the Comoros. 2. Collaborative research on the biology and reproduction of the Comoros coelacanths. 3. Renovation of the biodiversity room of the National Museum of the Comoros. 4. Capacity building through training on heritage collection management.	French Ministry of Foreign Affairs	EUR 220,000	2019-2023

Project title	Objective	Expected results	Main donor	Budget	Period
Strengthening the Protection of the Oceans in the Comoros	To increase the protection and resilience of the marine biodiversity of the Comoros, and therefore support local fisheries, by promoting the sustainable use of marine resources and strengthening the resilience of local communities that depend on them.	1. Promote and improve the effective implementation of three recently established coastal MPAs and improve the management of the MPA of Moheli (established in 2001), thus doubling the marine area under effective protection, for a total area of 986 km². 2. To reach the objective of 20 percent of the total surface of each MPA classified in integral protection zone and to extend one of the MPAs to the mesophotic zone (MPA of Mitsamiouli-Ndroude). 3. Raise awareness of the economic importance of MPAs to the national blue economy and promote the direct benefits that can accrue to local communities living near MPAs. 4. Strengthen the protection of the sea and oceans in the Comoros EEZ, with the objective of increasing from 1 to 10 percent (or 16,500 km²) of the marine area classified as an MPA under enhanced protection. 5. Develop marine spatial planning for the Comoros EEZ to support the national blue economy plan, which calls for 30 percent of the EEZ to be dedicated to the protection, resilience and restoration of marine ecosystems. 6. Increase the prestige of Comoros as a marine conservation area of global importance and a tourist destination of choice by nominating Mohéli National Park as a UNESCO World Heritage Site.	Oceans 5 and Wild Ocean South Africa	US$ 1,000,000	2021-2023

Project title	Objective	Expected results	Main donor	Budget	Period
Moheli forest conservation project	To conserve the forest ecosystems of the island of Moheli (rainforests as dry forests), for their carbon potential and their biodiversity.	1. By 2026: Illegal deforestation is halted or slowed. 2. Carbon stocks in Mohéli's forests are maintained or increased. 3. The national park has an effective monitoring system and its land teams are trained and equipped. 4. The rules for the use of the conservation zones of the national park are known and popularized, the populations are informed and sensitized, the procedures for the management of wood cutting, the expulsion of illegal users and other non-regulatory activities are the subject of legal files and follow-up. 5. The national park is equipped with boundary markers. 6. The REDD+ project supports the social acceptance of the national park through community micro-projects. 7. Training in good agricultural practices is implemented on the periphery of the conservation areas. 8. Energy alternatives are proposed for domestic needs and ylang-ylang distillation. 9. Compensatory activities are set up for people displaced from the conservation areas.	Anon.	EUR 1,000,000	2021-2026

The three MIP priority areas are: (i) Green and Blue Pact, supporting general environmental protection and agriculture and forestry and fishing; (ii) growth and jobs; and (iii) governance. It should be noted that the MIP also includes actions to support civil society. The indicative amount for the initial period from 2021 to 2024 is EUR 46 million, of which 40 percent is allocated to the Green and Blue Pact.

In the context of this chapter, Table 61 shows the main projects related to biodiversity conservation and climate adaptation that were under implementation during 2022. Information on selected investments in biodiversity conservation at the 10 priority sites in the Comoros (Table 64) is presented in Appendix 8.

12.3. Mauritius

There has been a diversification of conservation investments in Mauritius since 2014, with several local developments and also new funders. Despite changes CSR laws and how it works, CSR is still a source of funding for conservation, both through the National Social Inclusion Foundation (NSIF) and directly from companies. Some private companies have also created their own foundations and may use part of their funds for CSR actions, as approved by the NSIF. The NSIF’s priority areas include environment and sustainable development.

New funding organizations include the Franklinia Foundation, the EU-funded Biodiversity and Protected Areas Management Program (BIOPAMA), and Botanic Gardens Conservation International (BGCI), while other conservation partners have increased their technical and financial support, including Brest Botanical Gardens, MBG, CEPF, Chester Zoo, Durrell Wildlife Conservation Trust, and the Western Indian Ocean Action Program (WIOSAP).

The Mauritian private sector invests in biodiversity conservation, mainly by weeding the forest on their properties, or providing funding or volunteers to NGOs. The major players are Vallée de Ferney and Bioculture (Ebony Forest, East Valley), as well as Agria (Bel Ombre) on Mauritius and François Leguat Reserve on Rodrigues.

There have also been significant investments made by multilateral donors, such as the UNDP, and bilateral donors, such as the EU, funding both terrestrial and marine conservation projects.

Some embassies also support conservation projects, such as the Australian High Commission, the British High Commission and the US Embassy. Following the Wakashio oil spill in 2020, funds were mobilized for community development and conservation activities by the Japanese government and Mitsui OSK Line. Some NGOs, such as EcoSud and MWF, made local and international appeals to crowdsource funding.

Funding from Mauritian government sources appears to have stagnated or decreased in recent years but further analysis is required to confirm trends.

Table 62 provides a list of the main biodiversity conservation and climate adaptation projects in Mauritius, to illustrate the range of activities and sources of funding. Information on selected investments in biodiversity conservation at the 10 priority sites in Mauritius (Table 65) is presented in Appendix 8.

Table 62 Main biodiversity and climate adaptation projects in Mauritius

Project title	Implementing agency	Island	Donor	Budget	Period
ASTIRIA	Conservatoire Botanique de Brest / MWF	Mauritius	CEPF	US$ 161,795	2016-2019
Mitigating climate change through reforestation in the Grande Montagne and Anse Quitor Nature Reserves, Rodrigues	MWF	Rodrigues	EU	EUR 808,635	2021-2025
Developing a management plan for Mondrain Reserve and improving accessibility for greater protected area management effectiveness and visibility	MWF	Mauritius	BIOPAMA	EUR 42,334	2020-2021
Training local fishers on coral reef rehabilitation on Mauritius	MOI	Mauritius	UNEP WIOSAP	US$ 219,444	In progress
Ridge To Reef (R2R) Mauritius Project on Ile D'Ambre National Park	National Parks and Conservation Service	Mauritius	EU	tbc	In progress
Assessment of Blue Carbon Ecosystem (Seagrass) around the Island of Mauritius	Ministry of Ocean Economy Marine Resources Fisheries and Shipping	Mauritius	UNEP WIOSAP	US$ 200,000	In progress
Restoring the integrated native terrestrial habitat and seabird community of Ile aux Aigrettes, Mauritius	MWF	Mauritius	UNEP WIOSAP	US$ 69,791	2020-2022
Avoiding tree extinctions in Mauritius - Global Trees	MWF	Mauritius	BGCI / Franklinia	GBP 83,947	2019-2024
Saving *Dictyosperma album* var *conjugatum*	Durrell Wildlife Conservation Trust	Mauritius	Franklinia	tbc	In progress
Forest restoration work	Ecosystems Restoration Alliance	Mauritius	Franklinia	tbc	tbc
Forest restoration work	Ebony Forest	Mauritius	Franklinia	tbc	tbc
E€OFISH: Promoting innovations to transform the life of artisanal fishers in Mauritius	Ministry of Blue Economy, Marine Resources, Fisheries and Shipping / RRA	Mauritius	UNDP	tbc	In progress
E€OFISH: Designing the Future of Tourism - Part II: the Integration of Artisanal Fishers in Future Community-based Tourism Models in Mauritius	Ministry of Blue Economy, Marine Resources, Fisheries and Shipping / RRA	Mauritius	UNDP	tbc	In progress
Mainstreaming Invasive Alien Species: Prevention, Control and Management	National Parks and Conservation Service	Mauritius	UNDP/GEF	US$ 3,800,000	2020-2025

12.4. Seychelles

There are three main sources of investments for nature conservation in the Seychelles:

- Multilateral funding: assistance to the government or directly to SNPA/SPGA or large local NGOs from international donors such as the GEF.
- Bilateral funding: direct support from governments, such as the EU, France (via the French Global Environmental Facility (FFEM) and AFD), the UK (via the Darwin Initiative) for national projects implemented by the government or UNDP, or directly by local agencies or national trusts (Seycatt, ETF, and SIF).
- Regional funding: financial assistance for international projects executed by a regional organization (mainly IOC) in several countries and implemented by governmental or local agencies (SNPA/SPGA, local NGOs, and private islands).

The GEF is by far the largest source of funding for biodiversity conservation initiatives in the Seychelles. For GEF funding, UNEP, UNDP, the World Bank, and AFD are the main agencies implementing the identified actions. An example is the World-Bank-implemented SWIOFish3 project, funded by the GEF, in partnership with the Seychelles Ministry of Finance, Trade and the Blue Economy. The GEF SGP, managed by UNDP, enables the Seychelles to receive funding for project implemented by CBOs or NGOs, among others.

Regarding the geographical scope of the identified projects, there is a large proportion of projects on a regional scale or including several territories in the Indian Ocean that include the territory of the Seychelles.

The combination of local and international funding is complementary and essential for financing actions aimed at preserving the environment, especially since these actions receive only a small amount of money compared to the financial value of ecosystem services.

The amount of funding received at the international level is significant. As mentioned above, the GEF is the main contributor with approximately US$35 million. According to data in Figure 54, international funding for environment projects in the Seychelles over the period 1991-2020 amounted to US$ 82 million.

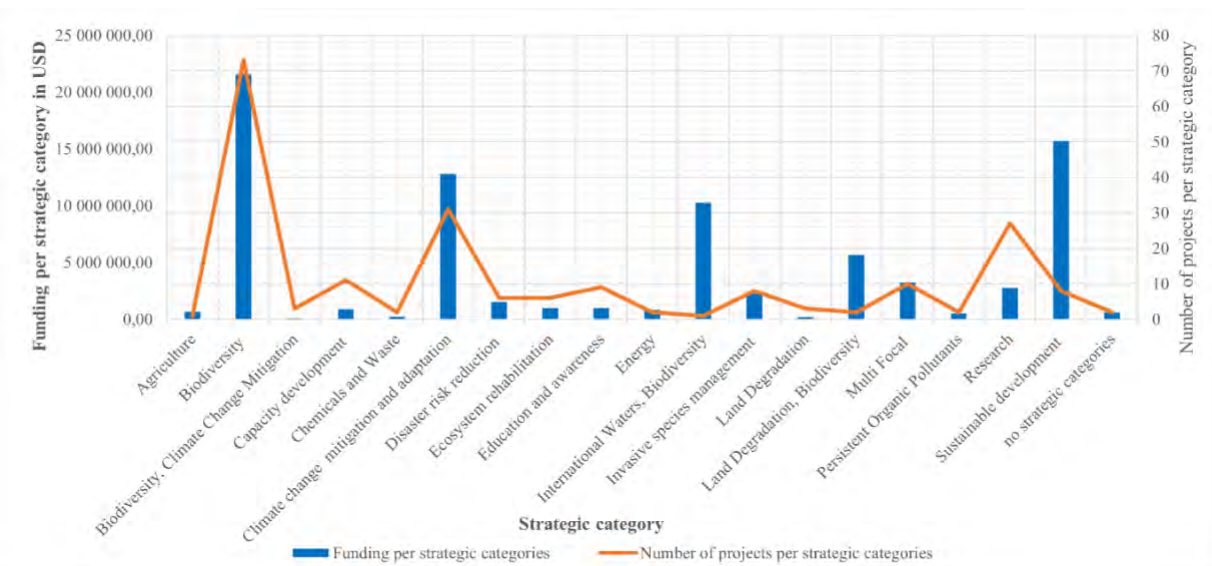

Figure 54 International funding for environmental projects in the Seychelles 1991-2020

Source: BFU-project overview-report DRAFT version.

Many environmental issues are addressed through international funding in the Seychelles. However, this is done in a rather uneven manner. Over the last three decades, actions directly related to biodiversity were the most represented (more than 70 projects for a total investment of about $22 million; Figure 54). There was also significant investment in climate change mitigation and adaptation, international waters and biodiversity, and sustainable development. Some themes were widely addressed by projects but receive little funding (e.g., research). Conversely, some themes seemed to be widely overlooked, such as land degradation and chemicals, which each received only $50,000 in international investment.

In addition, a larger share of international funding goes to the marine environment, although the number of projects is relatively the same between marine and terrestrial environments. Examples include (but are not limited to) the IRD and EU-funded SEYFISH program in 2016, CEPF-funded protection of KBAs in the Grande Police wetland, and a GEF/SGP-funded mangrove restoration project in 2019.

At the national level, the Seychelles has two environmental and conservation trust funds (ETF and SeyCCAT), which raise, invest and mobilize funds for environmental purposes. They have been the main contributors to the funding received locally, with SCR 44,427,020 and SCR 19,863,304 respectively, although other local donors have also contributed.

A total of SCR 64,436,604 was received from local donors between 2000 and 2019 (Figure 55). Again, this funding was unevenly distributed. While more actions directly related to biodiversity were funded locally, waste management received the most funding. Due to lower funding at the local level, fewer types of actions were addressed, in contrast to international funding, which supported a greater range of environment-related areas.

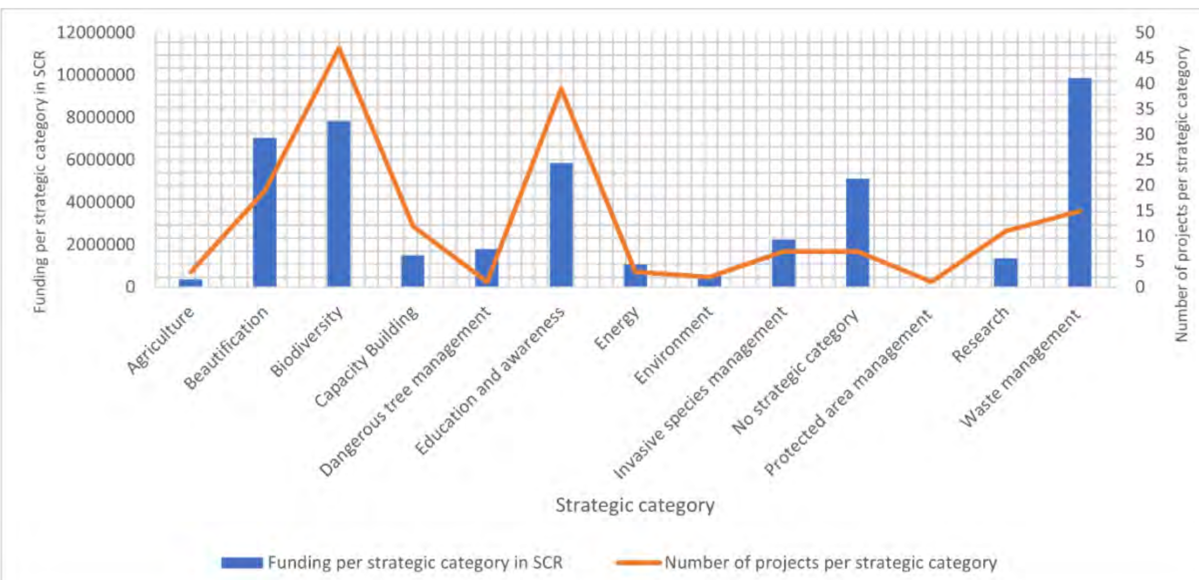

Figure 55 Local funding for environment projects in the Seychelles 2000-2019

Over the years, more local funding has been allocated to the terrestrial realm. However, starting in 2017 and in line with the new blue economy policy and political commitments, funding for marine projects increased. Conversely, projects in the terrestrial realm have tended to decrease since 2019. In the future, more funds may be dedicated to marine-related projects to ensure that the marine spatial plan is implemented accordingly.

As for current funding, more than 400 projects have been funded since 1991. While most of them have been completed, about 10 will continue through 2022. At the international level, operations in favor of biodiversity such as *Capacity building for the preparation and implementation of the Seychelles National Forest Inventory Phase II* and *Restoration of marine ecosystem services through the restoration of coral reefs to cope with a changing climate future*, have been funded by the FAO to the tune of US$258,366 (2020-2022) and by the UNDP to the tune of US$2.5 million (2020-2026).

At the local level, projects include *Developing entrepreneurship in the blue economy sector through capacity building of MSME and ESA staff* funded by SEYCATT, or the *Predicting foraging hotspots for seabirds on the Great Barrier Reef* project funded by the University of Leeds with data contributions from ICS, the Higher Institute for Environmental Protection and Research and IBC-UniSey.

Twenty priority sites for CEPF investment have been selected in the Seychelles (Table 66). Information on selected investments in biodiversity conservation at these sites is presented in Appendix 8.

Finally, the role of the private sector in biodiversity conservation in the Seychelles has been important over the years, not just as a source of funding. In addition to funding, many private businesses, mostly related to tourism, have played a key role in biodiversity restoration initiatives (Khan and Amélie 2014). Resorts and hotels have been the most important actors in this regard. In recent years, however, other stakeholders, such as dive centers or tour guides, have also started to follow this approach (e.g., by facilitating transportation for marine research or doing joint hikes and cleanup activities). Private islands should also be included among these stakeholders, as some of them have carried out island restoration activities by partnering with local NGOs for conservation actions, or even creating environmental foundations (see Sections 8.4.4 and 10.4.2). This partnership between the private sector and local NGOs has created some comanagement approaches to projects. This has been the case for many resorts in the Seychelles for many years, particularly in wetland and coastal restoration and coral reef rehabilitation. For example, this type of initiative has created wetland-tourism linkages (Khan and Amélie 2014), whereby, in addition to preserving the site, the initiative contributes to a more ecotourism-focused approach in the Seychelles and attracts visitors. ICS, in partnership with the parastatal IDC, and hotel and fishing operators, has implemented an innovative financing and comanagement system on the outer islands (Alphonse, Desroches, Farquhar, and Cosmoledo-Astove) and Silhouette, which has received international acclaim. While the Green Island Foundation, linked to Denis Island, operates on several private granite islands.

In recent years, the EbA approach has also made its way into NGO/CBO partnerships with resorts and the private sector. Indeed, there are opportunities for such partnerships in the Seychelles; past experiences have proven this, and current initiatives continue to prove it. These EbA actions focus primarily on ecosystem restoration but the many projects that have been developed in this framework in recent years can help pave the way for different types of EbA actions. In addition, it is important to note the cost-effectiveness of such projects, because they do not require expensive physical infrastructure (Khan and Amélie 2014).

The amount of money invested in the environment seems small compared to the many issues at stake, especially since the actions can be costly (e.g., the NBASAP 2015-2020 alone required SCR 320 million; BIOFIN 2017). Some areas, such as waste and chemical management, are relatively untouched by funding. However, the latter represents important issues, as it can lead to environmental degradation and a significant loss of biodiversity. This problem is further compounded by climate change and extreme weather events. This has also been identified as a national priority.

The Seychelles' international funding sources are being reduced due to the country's financial situation, which is now considered high income. This makes the country ineligible for certain funding, and will lead to a decrease in the amount of funding available for biodiversity conservation and climate adaptation. However, the Seychelles are a globally important hotspot and have high conservation ambitions, as evidenced by actions such as the Blue Bonds.

Over the years, the amount of local funding has increased, especially with the creation of SeyCCAT. Nonetheless, the problem of the sustainability of funding is still present and prevents the follow-up of successful actions.

Although the trend of projects is towards the marine realm, the terrestrial realm should not be neglected, as some species and ecosystems are seriously threatened and must be the subject of protection programs. A balance of funding between the two realms is necessary to ensure the effectiveness of actions on both sides.

Some of the actions that appear to be of primary importance for the Seychelles concern both the blue economy and the development of the marine space. Also, the issue of invasive alien species, the main cause of biodiversity loss on small islands, is common to the island context and to the MADIO Hotspot as a whole.

13. CEPF NICHE FOR INVESTMENT

The ecosystem profile presents a shared situational analysis and overarching set of investment priorities that can guide investment by CEPF in biodiversity conservation and EbA actions with a leading role for civil society. The analyss in the preceding chapters shows that, while significant progress has been made with conserving the ecosystems of the MADIO Hotspot and maintaining the ecosystem services they provide, threats remain strong, and degradation of ecosystems continues at a steady pace. This threatens the long-term existence of thousands of species and the wellbeing of an ever-growing population that is highly dependent on ecosystem services.

There is a need to define an investment niche to guide future CEPF investments in thematic and geographic areas that will maximize the program's impact in terms of biodiversity conservation and climate change adaptation. The definition of a CEPF niche should also reduce the risk of duplicating initiatives funded by other donors and avoid investments that would have only marginal impact.

The definition of the CEPF investment niche emerged from a highly participatory process among regional stakeholders. Based on the threats identified and prioritized in previous workshops and bilateral consultations, participants were asked to identify, organize and prioritize potential intervention themes for CEPF. These recommendations allowed for the definition of the investment strategy presented in Chapter 14.

Like all island states, the four hotspot countries are extremely vulnerable to climate change. Their populations, agricultural land and infrastructure are highly exposed to climate change and, particularly in the Comoros, Mauritius and the Seychelles, tend to be concentrated in coastal areas, where sea level rise and the increased frequency and severity of extreme weather events are the most damaging.

The combined effects of projected climate change mean that many people are at risk. While the populations and economies of the hotspot countries are highly dependent on ecosystem services, the natural ecosystems that provide these services are already under severe threat from human activities in all four countries. As a result, the resilience and capacity of these ecosystems to provide the essential services necessary for people to adapt to climate change is diminishing, further exacerbating vulnerability to climate change.

Twenty years ago, the MADIO Hotspot benefited from the first CEPF investment, which covered only Madagascar. The Comoros, Mauritius and the Seychelles were then added in 2015. From 2015 to 2022, CEPF investments not only directly addressed the conservation of species and ecosystems but also strengthened civil society's knowledge and skills in research on biodiversity, spatial analyses, information systems, database management, and community-based approaches, while improving interdisciplinary collaboration.

Over the next five years, CEPF grant making will support EbA actions to restore and improve the management of KBAs that make the greatest contribution to the delivery of ecosystem services important to local populations. These actions will improve the resilience to climate change of the most vulnerable species, ecosystems and people in the hotspot. CEPF will work through CSOs, and grant-making will be complemented by actions to help build their capacity and assist them in developing partnerships with the private and public sectors.

This grant making will form part of the *Ecosystem-based Adaptation in the Indian Ocean* program financed by the GCF, through AFD is the accredited agency. The goal of the program is to reduce the vulnerability of island populations by ensuring the essential ecosystem services they need to be resilient to climate change. The program will use proven tools and methodologies that CEPF has developed over the past 20 years to strengthen and engage civil society actors in ecosystem conservation.

The current CEPF model, which prioritizes biodiversity conservation, will be reoriented to direct investments to the highest priority geographic and thematic areas for EbA. The program will work through CSOs, help build their capacity, and assist them in developing partnerships with the private and public sectors. The program also includes a component to ensure long-term sustainability and encourage replication of best practices in EbA.

The program has three components:

Component 1: Development of strategic plans for EbA in the small island biodiversity hotspot that are well aligned with national climate change strategies;

Component 2: Support for EbA activities through grants to CSOs;

Component 3: Ensure long-term sustainability and replication of success through knowledge products and tools for EbA.

EbA actions have been identified as high priority in the climate change strategies of all hotspot countries. EbA promotes conservation, improved management, and restoration of ecosystems to provide the essential services that people need to adapt to climate change and variability. However, beyond a few pilot projects, funding for EbA is currently inadequate in the hotspot countries, despite the urgent need and opportunity to scale up EbA action. While the focus has been on strengthening government programs to address the impacts of climate change, less attention has been paid to the capacity of civil society to address these challenges. Despite their potential to play an effective role in addressing EbA, CSOs are generally underutilized, undervalued and underfunded. In this context, CEPF will provide targeted funding to mobilize CSOs.

14. CEPF INVESTMENT STRATEGY AND PROGRAM FOCUS

This chapter presents the investment strategy for CEPF in the MADIO Hotspot over a five-year period from 2022 to 2027. In relation to the GCF program *Ecosystem-based Adaptation in the Indian Ocean*, this chapter presents the Eligibility Criteria for the selection of Sub-Projects and KBAs. To be eligible for support under this program, CEPF projects must meet the following criteria:

- Address one or more of the priority KBAs presented in Section 14.1 below.
- Address one or more of the Investment Priorities presented in Section 14.2 below.
- Be implemented by CSOs. Eligible CSOs may be government-owned enterprises or institutions, provided that they meet the following minimum requirements:
    - The enterprise or institution possesses individual juridical personality, separate from the government of the hotspot countries or any other entity;
    - The enterprise or institution has the authority to apply for, enter into contracts and receive private funds in its own name and capacity; and
    - The enterprise or institution shall not assert a claim of sovereign immunity. If the recipient of the Sub-Grant enjoys any privileges and immunities in the hotspot countries, the relevant Sub-Grant agreement shall include provisions by which the CSO waives such privileges and immunities and represents that its acts under such agreement constitute commercial and private acts.
- Contribute to achieving the GCF's investment criteria, as defined in Annex III of decision B.09/05, "Initial investment framework: activity-specific sub-criteria and indicative assessment factors"[22].
- Demonstrate that the proposed EbA activity addresses vulnerability based on a clear climate change risk.
- Adopt EbA approaches that increase the resilience of ecosystems and ecosystem services in the relevant priority KBA(s) that are critical to local or national populations.
- Reflect on the climate change mitigation potential of the project.
- Address priorities identified in the national climate change policy or strategy documents of the relevant hotspot country.
- Avoid or fully mitigate negative environmental and social impacts, for purposes of ensuring consistency with the safeguard policies set out in CEPF's Environmental and Social Management Framework.
- Meet the requirements of the GCF's Environmental and Social Standards and all relevant GCF policies.
- Meet the due diligence requirements of CEPF, as set out in the Operational Manual.
- Demonstrate positive gender impacts.
- Demonstrate effective and efficient use of funds.
- Demonstrate a clear strategy for achieving financial sustainability.
- Complete implementation prior to the end date of the CEPF investment phase (currently 30 June 2027).

Priority will be given to proposed projects that are the closest fit to the investment strategy as set out in Section 14.2. Preference will also be given to projects that:

- Demonstrate a leading role for local organizations and/or an explicit focus on capacity building for local civil society.
- Show that they will coordinate with other organizations to prevent duplication of efforts by working through partnerships and alliances.

[22] https://www.greenclimate.fund/sites/default/files/document/investment-framework-criteria-assessment.pdf

Other factors that will strengthen an application include:

- Endorsement by relevant government authorities, through the corresponding NDA.
- Clear plans for continuing the work after the CEPF grant funding has been deployed.
- Support for local communities in community-based or co-management activities for EbA and actions that enhance local communities' tenure and resource use rights.

If CEPF awards grants with financial support from other funding sources, other eligibility criteria may be used.

14.1. Geographic priorities for CEPF investment

14.1.1. Madagascar

In each hotspot country, the KBAs were ranked based on their relative priority for the delivery of ecosystem services important for local populations, following the KBA+ methodology outlined in Chapter 6.

In addition, for Madagascar, a spatial weighting of KBAs was done by overlaying data layers on vulnerability to climate change and potential to adapt to climate change stressors, derived from a study conducted by the WHO.

The transformation of ecosystem service values into relative values, combined with weighting, and followed by stakeholder feedback, resulted in the identification of the top-ranked KBAs that contribute the most to EbA (Table 33). As the main objectives of the process was to find areas where EbA actions could be implemented by CSOs, some of the initially top-ranked KBAs were not considered priorities for CEPF investment, either because they did not have a manager, project partner or institutional structure to support the implementation of EbA activities during the next five years (Mangoky River, Lake Itasy, Mahatsara (Mahambo Foulpointe), Ivoloina River, North Pangalane, Mahevatanana-Ambato-Boeny Wetlands, Ankafina (Ambohimahasoa), Mananjary River, Angavokely Forest Station, and Ambila-Lemaintso Wetland), or because their ecosystem service values had been degraded beyond reasonable recovery efforts (Ranobe PK32 Protected Area). These KBAs were removed from the list of priority sites, and the next highest ranked KBAs were moved up, resulting in the final ranking (Table 63). The 30 priority sites for CEPF investment selected through this process are concentrated in the Eastern Ecoregion and the southwest of Madagascar (Figure 56).

Table 63 Priority sites for CEPF investment in Madagascar

KBA code	KBA name	Multi-criteria score	Rank
MDG-199	Mangoro-Rianila Rivers	4.75	1
MDG-111	Sahafina Forest (Anivorano-Brickaville)	4.18	2
MDG-98	Analamay-Mantadia Forest Corridor	3.43	3
MDG-131	Nosivolo Wetlands	3.29	4
MDG-67	Amoron'i Onilahy and Onilahy River	3.17	5
MDG-99	Forest Corridor Fandriana - Marolambo National Park	3.11	6
MDG-95	Ambositra-Vondrozo Corridor	3.11	7
MDG-179	Mangerivola Special Reserve	2.88	8
MDG-164	Betampona Strict Nature Reserve	2.80	9
MDG-96	Ankeniheny-Zahamena Corridor	2.79	10
MDG-230	Nosivolo River and Tributaries Ramsar Site	2.61	11
MDG-28	Belalanda	2.58	12

KBA code	KBA name	Multi-criteria score	Rank
MDG-155	Zombitse-Vohibasia National Park	2.52	13
MDG-11	Tsinjoriake-Andatabo	2.48	14
MDG-129	Vohibe Ambalabe (Vatomandry)	2.43	15
MDG-90	Lake Ihotry-Mangoky Delta Complex	2.42	16
MDG-73	Analavelona	2.41	17
MDG-153	Ranomafana National Park	2.37	18
MDG-217	Faraony Headwaters	2.26	19
MDG-57	Makay	2.21	20
MDG-71	Analalava Special Reserve	2.20	21
MDG-107	Vohibola Classified Forest	2.17	22
MDG-92	Mangoky-Ankazoabo Complex	2.14	23
MDG-46	Toliary Great Reef	2.06	24
MDG-200	Namorona-Faraony River	2.02	25
MDG-89	Mahafaly Plateau Forest Complex	2.01	26
MDG-34	Three Bays Complex	1.97	27
MDG-175	Beza-Mahafaly Special Reserve	1.97	28
MDG-187	Pic d'Ivohibe Special Reserve	1.97	29
MDG-54	Lake Tseny	1.97	30

14.1.2. Comoros

The priority sites for CEPF investment in the Comoros are the top 10 ranked KBAs from the KBA+ analysis (Table 34). These KBAs have the highest combined importance for the delivery of the priority ecosystem services identified during the stakeholder consultations: (i) commercial fisheries; (ii) water for domestic use; (iii) water for irrigation; (iv) hydropower; (v) wood for energy; (vi) flood protection by mangroves; (vii) flood protection by watershed forests; (viii) ecotourism; and (ix) cultural and spiritual value. No adjustments to the ranking were made. The 10 priority sites for CEPF investment are presented in Table 64 and Figure 57. Priorities are located on all three of the main islands.

Table 64 Priority sites for CEPF investment in the Comoros

KBA code	KBA name	Multi-criteria score	Rank
COM-7	Mount Ntringui (Ndzuani highlands)	0.54	1
COM-5	Karthala mountains	0.45	2
COM-20	Coelacanth area	0.43	3
COM-1	Moya forest	0.27	4
COM-14	Domoni area	0.25	5
COM-4	La Grille mountains	0.22	6
COM-8	Mohéli Marine Park	0.21	7
COM-12	Bimbini area and La Selle islet	0.19	8
COM-19	Pomoni area	0.18	9
COM-16	Moya area	0.17	10

Figure 56 Priority sites for CEPF investment in Madagascar

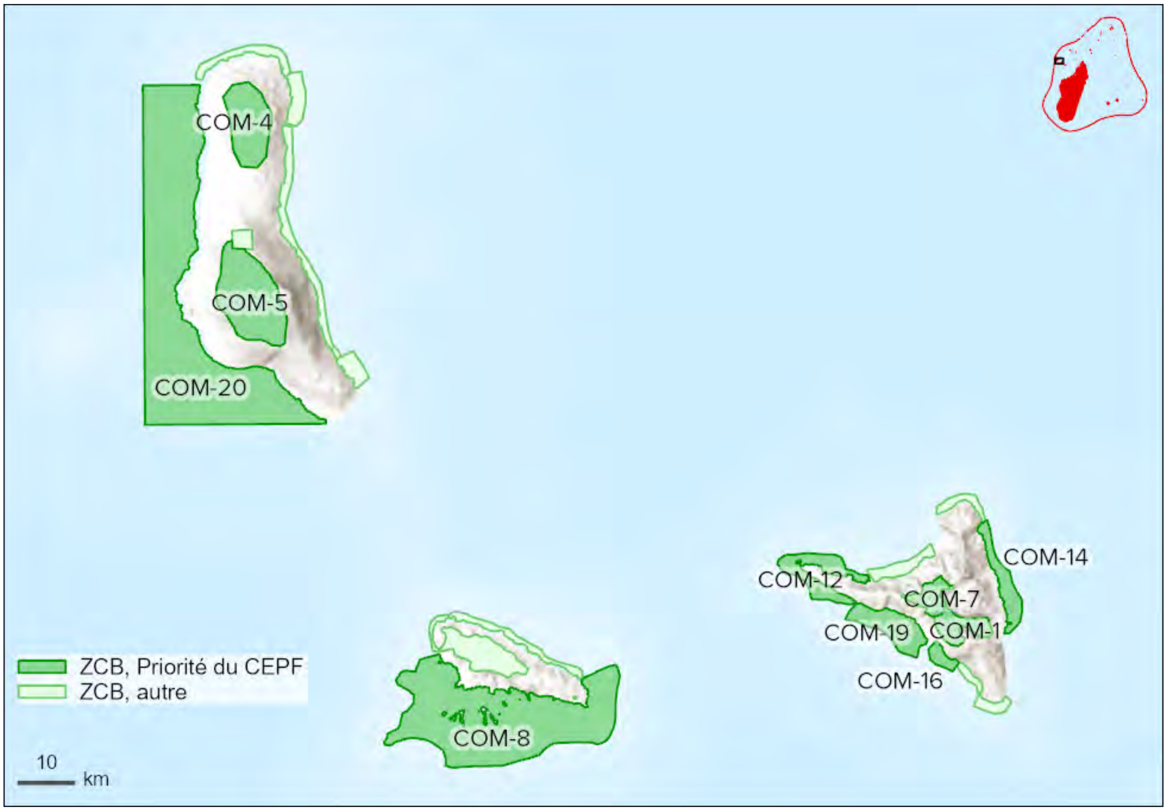

Figure 57 Priority sites for CEPF investment in the Comoros

14.1.3. Mauritius

The priority sites for CEPF investment in the Republic of Mauritius are the top 10 ranked KBAs from the KBA+ analysis (Table 35). These KBAs have the highest combined importance for the delivery of the priority ecosystem services identified during the stakeholder consultations: (i) commercial fisheries; (ii) water for domestic use; (iii) water for irrigation; (iv) water for hydropower; (v) cyclone protection; (vi) flood protection; and (vii) ecotourism. No adjustments to the ranking were made. The priority sites are presented in Table 65 and Figure 58. Priorities are located on both Mauritius and Rodrigues islands.

Table 65 Priority sites for CEPF investment in Mauritius

KBA code	KBA name	Multi-criteria score	Rank
MUS-2	Bamboo Mountain Range	0.655	1
MUS-5	Relict Forests of the Central Plateau	0.550	2
MUS-14	Plaine des Roches - Bras d'Eau	0.537	3
MUS-12	Black River Gorges National Park and surrounding areas	0.520	4
MUS-3	Chamarel - Le Morne	0.503	5
MUS-8	Mauritius Island's South-Eastern Islets	0.395	6
MUS-16	South Slopes of Grande Montagne	0.364	7
MUS-17	Yemen-Takamaka	0.353	8
MUS-11	Corps de Garde Mountain	0.343	9
MUS-6	Rodrigues' Islets	0.308	10

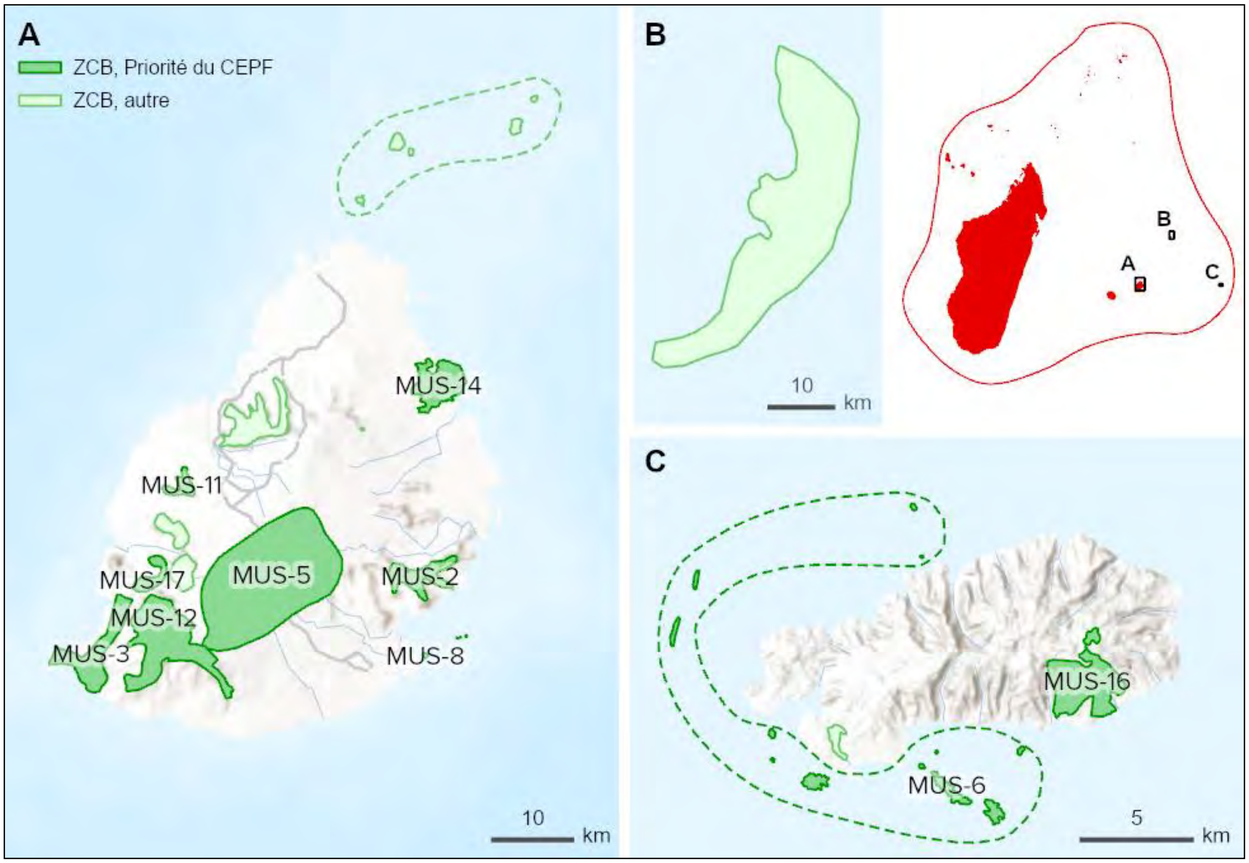

Figure 58 Priority sites for CEPF investment in Mauritius

14.1.4. Seychelles

Based on literature reviews and consultations, each priority ecosystem service was assessed for each of the 57 KBAs in the Seychelles. Based on the data available in the Seychelles, and using the KBA+ methodology, the key priority ecosystem services for local community resilience to climate change were assessed, as well as the relative contribution, or importance, of the Seychelles KBAs to these ecosystem services (Table 36).

The priority ecosystem services identified during the stakeholder consultations were: (i) commercial fisheries; (ii) water for domestic use; (iii) forest products; (iv) medicines; (v) local climate regulation; (vi) coastal protection; (vii) flood protection; (viii) sustaining habitats and genetic diversity; (ix) ecotourism; and (x) cultural and educational value.

No adjustments to the ranking were made; the top 20 ranked KBAs were considered priorities for CEPF investment. The priority sites are presented in Table 66 and Figure 59. Priority sites are located in both the inner islands and outer groups of islands.

Table 66 Priority sites for CEPF investment in the Seychelles

KBA code	Group of islands	KBA name	Multi-criteria score	Rank
SYC-43	Inner	Morne Seychellois National Park	0.719	1
SYC-38	Inner	Planneau Mountain (Grand Bois-Varigault-Cascade)	0.633	2
SYC-41	Inner	Praslin National Park	0.586	3
SYC-42	Inner	Silhouette National Park	0.563	4
SYC-36	Inner	Burnt Mountain-Piton de l'Eboulis	0.500	5
SYC-50	Aldabra	Aldabra Special Reserve	0.469	6
SYC-47	Inner	Port Launay Marine National Park and coastal wetlands	0.469	6
SYC-15	North edge	Bird Island (Ile aux Vaches)	0.469	6
SYC-5	Cosmoledo	Cosmoledo	0.453	9
SYC-51	Inner	Aride Island Special Reserve	0.445	10
SYC-52	Inner	Cousin Island Special Reserve	0.445	10
SYC-48	Inner	Sainte-Anne Marine National Park	0.438	12
SYC-20	North edge	Denis Island	0.430	13
SYC-46	Inner	Curieuse Island Marine National Park	0.406	14
SYC-32	Amirantes	Saint-François and Bijoutier Islands	0.406	14
SYC-3	Cosmoledo	Astove	0.398	16
SYC-18	Inner	Curieuse Island	0.391	17
SYC-19	Amirantes	D'Arros Island and Saint Joseph Atoll	0.383	18
SYC-6	Farquhar	Farquhar - South Island and islets	0.375	19
SYC-9	Inner	Fond Ferdinand	0.352	20

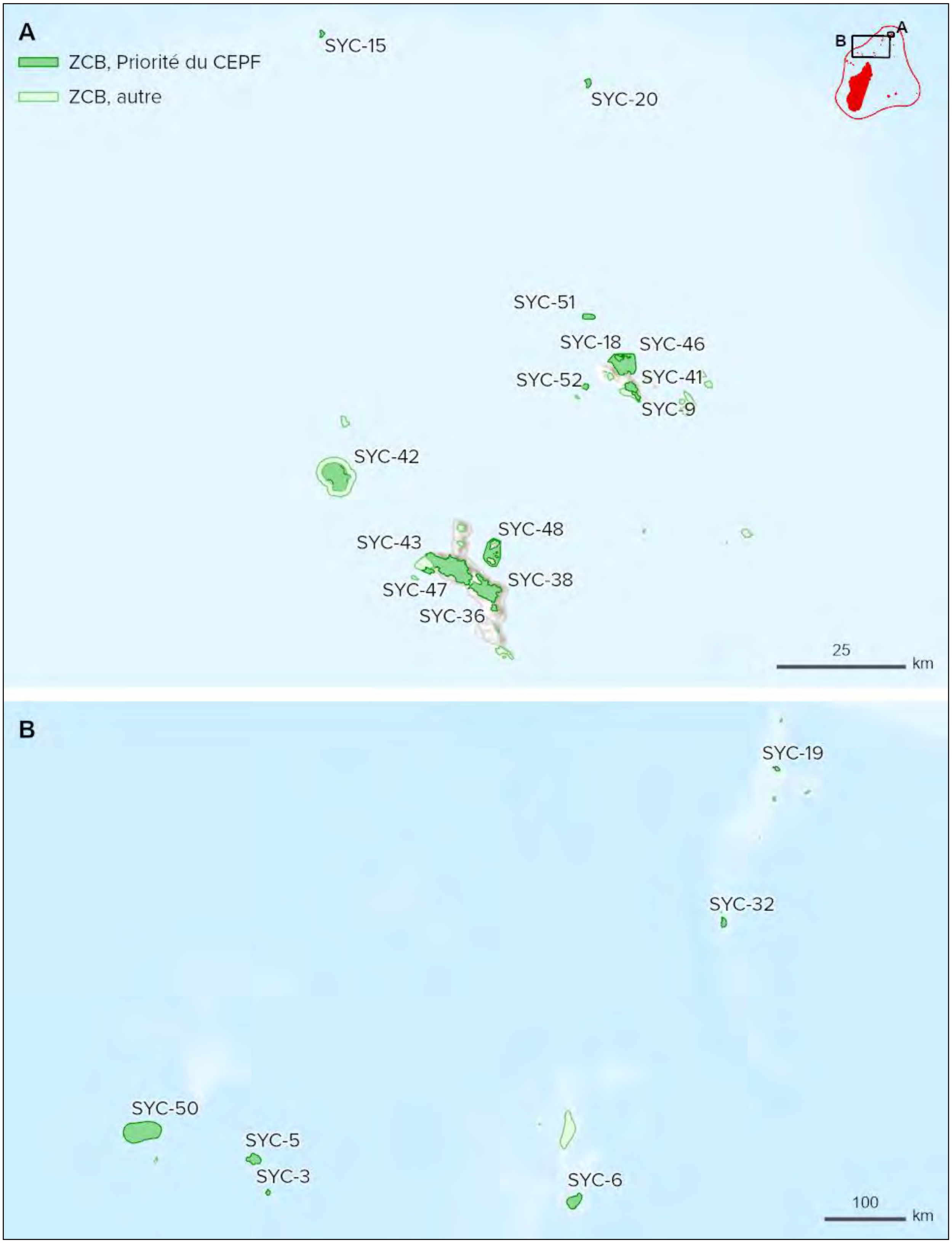

Figure 59 Priority sites for CEPF investment in the Seychelles

14.2. Strategic Directions and Investment Priorities

The investment strategy for the MADIO Hotspot was comprehensively updated based on the consultations, literature review and analysis conducted during the ecosystem profile updating process, and taking account of the fact that the strategy will inform grant making under the GCF program on EbA. The investment strategy comprises 13 "investment priorities": thematic priorities for CEPF grant making. These are broader than specific project concepts but are intended to provide guidance to applicants, as well as the CEPF Secretariat and RIT, on the eligibility of project ideas. The investment priorities are grouped into five strategic directions. The first four will guide the development of the CEPF grant portfolio in the hotspot; the fifth provides for the funding of the RIT (Table 67).

Strategic Direction 1*: *Empower communities and civil society to implement actions to improve the resilience of species, ecosystems, and human populations to climate change in priority KBAs

This strategic direction will focus on providing the necessary funding, technical support, and capacity building for CSOs to implement EbA actions to improve the resilience of the most vulnerable species, ecosystems, and people to climate change. Expected outcomes include increased resilience and improved livelihoods for vulnerable populations, but also improved resilience of ecosystems and ecosystem services.

Adaptation is the adjustment of natural or human systems in response to actual or expected climate disturbances or their effects, in order to moderate damage or maximize beneficial opportunities. It involves reducing risk and vulnerability to climate change, seeking opportunities, and building capacity to cope with climate impacts.

EbA includes the conservation, sustainable management, and restoration of natural ecosystems to help people adapt to the adverse effects of climate change. EbA interventions respond to a specific risk or pressure posed by climate change experienced by a particular human population, and they support, conserve, or restore natural areas that help regulate or mitigate these impacts.

Investment Priority 1.1: Implement EbA actions, including agroforestry, "climate smart agriculture", eradication of IAS, restoration of degraded watersheds and coastal ecosystems (including wetlands, mangroves, reefs and seagrass beds), and promotion of sustainable management of coastal and terrestrial ecosystems

Initially, actions will focus on supporting CSOs in the design and implementation of EbA and nature-based adaptation solutions and conservation actions that respond to climate impacts at priority sites. Solutions will be identified by analyzing the adverse impacts of climate change on human livelihoods and EbA interventions will be proposed that can support, conserve, or restore species and natural areas in ways that help regulate or diminish the negative impacts.

In each country, priorities can be identified jointly among government, the private sector, and civil society, based on a common recognition of the KBA+ methodologies and the value of the EbA approach. Once EbA priorities have been identified and planned, it will be necessary to understand their costs and have strategies to cover those costs, both during the program period and beyond, to ensure the sustainability and continuity of support to CSOs for new EbA actions.

Priority will be given to the following approaches:

i. Promoting resilient agroforestry and developing "Climate Smart Agriculture".
ii. Promoting the sustainable management of freshwater, wetlands, and marine and coastal ecosystems (mangroves, coral reefs, seagrass beds).

iii. Strengthening management of intact watershed forest ecosystems through the implementation of protected area management plans in collaboration with local communities.
iv. Enhancing resilience and adaptation of ecosystems.
v. Restoring degraded coastal ecosystems (wetlands, mangroves, coral reefs, sea grass beds).
vi. Restoring degraded watershed forest ecosystems.
vii. Promoting control and eradication of invasive alien species.
viii. Strengthening the capacity of local communities in participatory ecological monitoring of KBA target species and their habitats.

Investment priority 1.2: Support for the establishment and development of economic models that improve the resilience of local communities to climate change and support value chains for natural products, while strengthening ecosystem services that contribute to EbA

The actions that will be carried out through this investment priority will support the development of economic models that improve community resilience to climate change, including nature-based tourism and sustainable production of natural products. This could be done, in particular, through strengthening the factors of production, improving access to national and international markets and/or capacity building in business management and entrepreneurship.

Value chains could be restructured and reorganized in order to increase the sustainability, resilience and competitiveness of production systems and add value to them, particularly at the international level. Access to national and international markets for small and large producers may be reconsidered. This may include prospecting for potential markets, transportation of goods, development of infrastructure for the collection and processing of natural products and product packaging. The reorganization of access to local markets for agricultural and livestock products may also be supported. The capacities of women, men and youth in agribusiness, entrepreneurship and sustainable development of value chains may also need to be strengthened, particularly through targeted training.

Strategic Direction 2*: *Support local communities and civil society to strengthen the integration of the EbA approach, ecosystem resilience and biodiversity conservation into political and economic decision-making processes and education

The involvement of all stakeholders in society is crucial to ensure a holistic and integrated approach to the preservation and sustainability of ecosystem services. Indeed, climate change and its impacts affect the whole planet and a global response must be provided. For this to happen, all stakeholders must be made aware of and convinced of the importance of ecosystem services.

EbA is one of the proposed solutions to reconcile economic development and resilience to climate change. In order to spread this approach and to convince actors outside the environmental sector, it is important to carry out actions to raise awareness and inform the greatest number of people, both in the economic sector and among political decision makers.

The objective of this strategic direction is to support civil society in this sense so that the private sector commits itself to develop EbA actions and that political and economic decision-makers integrate this approach in their decision-making.

Investment Priority 2.1: Develop engagement strategies with private sector actors for the integration of EbA into their activities, and also for the conservation and sustainable use of biodiversity and renewable natural resources

The MADIO Hotspot is undergoing steady economic development, and national strategies envisage development axes for investments in sectors sensitive to climate change.

Chapter 8 shows the potential for development of tourism activities throughout the hotspot, as well as the importance of fishing and cash crop agriculture (vanilla, cloves, etc.) and the mining sector in Madagascar. These economic development activities, mainly based on natural living or subsoil resources, depend on the quality of the services provided by natural ecosystems (fisheries production, water for irrigation, ecotourism value, etc.) while also presenting risks, especially in terms of overexploitation or pollution.

This investment priority will support CSOs to explore and develop partnerships with private companies operating in the key natural resource sectors of fisheries, agriculture, tourism, and mining to identify and implement pilot actions to improve environmental and social practices to ensure the quality and sustainability of ecosystem services provided by their surrounding environment. These practices could be based on the application of the mitigation hierarchy (avoid-minimize-restore-compensate) and on global standards for sustainable business practices, or any other type of mechanism adapted to the hotspot context.

CEPF will also seek to fund innovative mechanisms, including with the private sector, that can provide sustainable financial incentives to local communities for managing priority KBAs, or that can provide sustainable benefits for the conservation of ecosystem services.

In parallel, initiatives that improve the climate change resilience of the private sector through EbA actions may also be funded by CEPF (e.g., integrated water resource management).

Investment Priority 2.2: Support civil society to disseminate information and influence political and economic decision-making processes in favor of biodiversity, conservation priorities, ecosystem services and EbA

The ecosystem profile raises the need to strengthen communication on the value of ecosystem services and EbA to stakeholders outside the environmental arena, particularly policy makers and the private sector. Even when information exists, it is not used (or is misunderstood, misinterpreted, or ignored) by a large majority of actors, with immediate consequences for ecosystems. This observation is shared throughout the countries of the hotspot. Small or medium-scale projects to raise awareness and influence, currently with little or no financing by other actors, could thus have a strong impact on ecosystem services, particularly with regard to fishing, agricultural development and the extractive sector.

The following types of activity may be financed under this investment priority:

- Undertake information campaigns on the concept of ecosystem services and the EbA approach, aimed at development actors, the private sector and government authorities.
- Engage in dialogue with government authorities through the establishment of multi-stakeholder discussion platforms, to support preparatory actions in support of the adoption of legislation on specific issues.
- Support civil society participation in consultations on economic development plans and national strategies, in EIAs, and appropriate fora, to strengthen the consideration of ecosystem services and EbA actions.

- Support, through advocacy, the protection of KBAs and the development of related management plans.

In the Seychelles, in particular, the stakeholder consultation showed the need to support advocacy for the reestablishment of CSR and the Environmental Trust Fund, or an equivalent instrument, as the main national sources of CSO funding for the preservation of ecosystem services.

This investment priority is not restricted to CEPF priority sites. However, linkages to ongoing activities at these sites will be appreciated, where warranted.

Investment priority 2.3: Support civil society in the development and implementation of disaster risk reduction measures

For Madagascar in particular, this investment priority refers to the NAP, which calls for the establishment of an Early Warning and Disaster Management System adapted to the agricultural system. Climatic or health disasters are often devastating in Madagascar. Early warning systems linked to agriculture, enabling communities to anticipate such events, are not always sufficiently effective. The aim is to promote the use and sharing of climate information. Climatic data collected, observed and analyzed by the Directorate General of Meteorology (DGM) will be shared, monitored and used regularly for the planning of agricultural activities at the national and decentralized levels. Based on agrometeorological bulletins produced monthly by the DGM and crop calendars also available by season and region, it will promote a rapid communication adapted to the end users, recognizing a differentiated activity and capacity of farmers. To do this, the mobilization of media and extension methods will be necessary to make effective use of the results of these bulletins for the greatest number. The challenge is more to systematize and sustain this sharing system than to operationalize it. It is therefore important that the authorities take ownership of the system while seeking to ensure the sustainability of the means (human, financial, technical). Similar approaches could be developed for the other countries.

Strategic Direction 3: Strengthen the capacity of local communities and civil society at regional and local levels to enhance adaptive capacity and reduce exposure to climate change risks

Measures to respond to the direct effects of climate change felt at the local level must be adapted to local conditions. Therefore, use of participatory planning processes at the local level, and the capacity of local communities and CSOs to analyze climate risks and plan and implement required actions are necessary preconditions for successful actions to strengthen adaptive capacity and reduce exposure to climate change risks.

In many case, capacity building for local communities and/or CSOs is required. Beyond a few pilot projects, funding for technical, administrative and financial capacity building of local grassroots and CSOs with environment and climate change related missions is currently insufficient in the hotspot countries, despite the urgent need and opportunity to scale up action on EbA. While there has been a focus on strengthening government programs to address the effects of climate change, there has been little attention to date on harnessing the capacity of civil society to address these challenges. In addition, two main barriers have also been identified that limit civil society’s ability to carry out its actions effectively over the long term.

The first barrier is the insufficient number of young professionals with technical capacities in areas related to adaptation actions, especially ones based on ecosystems. Supporting the emergence of a new generation of young professionals is, therefore, essential to ensure local community engagement in efforts to advance the climate change adaptation agenda.

The second major barrier relates to the overall capacity of local CSOs in administration, management, use of new technologies, and fundraising. While local organizations often have an understanding of the local situation and strong relationships with local communities, weak capacity affects their effectiveness, limits their access to funding, and threatens their sustainability and independence. On a more positive note, Chapter 10 highlights the exceptional diversity of experience and skills among CSOs in the hotspot countries. Complementarities offer extraordinary opportunities for regional cooperation, which are still underdeveloped in the fight against climate change.

Investment priority 3.1: Strengthen the technical, administrative and financial capacities of local CSOs with missions related to the environment and the fight against climate change

Limitations in the administrative, management, and fundraising capacities of local CSOs form a major obstacle to biodiversity conservation and the fight against climate change in the MADIO Hotspot. Although local organizations often have a good understanding of the local situation and strong relationships with local communities, weak capacity limits their effectiveness and access to funding, as well as threatens their sustainability and independence.

Under this investment priority, CEPF will provide support to local CSOs to strengthen their technical, administrative and financial capacity in the areas of conservation, climate change, and EbA through training or custom-designed activities. As used by CEPF, the term "local CSOs" refers to organizations headquartered in one of the four hotspot countries, regardless of whether they work at the grassroots, national or regional level. Local CSOs supported under this investment priority do not necessarily need to work at priority KBAs. However, particular priority will be given to supporting organizations working to plan and implement EbA actions.

The issue of sustainable financing has emerged as a priority area where civil society feels the need to strengthen its capacity. At present, "project approaches" remain the main sources of funding. Projects are still mainly financed by international donors. However, the modalities for accessing these funds remain complex and limit their use to a limited number of organizations, mainly international. CEPF will support specific actions to strengthen the operational capacities of local organizations in the areas of project preparation, fundraising, programming and budget management, human resources, and organizational governance, in order to give these organizations greater access to diversified funding sources.

Investment Priority 3.2: Promote exchanges and partnerships (at the national and regional levels) among CSOs working in priority KBAs, to strengthen technical, organizational, management and fundraising capacities

The stakeholder consultations highlighted the exceptional diversity of experience and expertise in the hotspot, which offers great potential for regional cooperation by building platforms for regional technical and scientific collaboration. Such platforms could serve as a means of exchanging relevant data and information on progress with implementation of EbA actions. For example, organizations in Madagascar have considerable experience in engaging with local communities and jointly managing protected areas. Organizations in Mauritius, facing severe habitat loss, have experimented with innovative techniques for ecosystem restoration. Organizations in the Seychelles have developed extensive experience with eradicating invasive alien species on islets and are far ahead in terms of partnerships with the private sector. Organizations in the Comoros have a vibrant network of community-based organizations involving youth. While the French departments host high-level research centers and have extensive experience in engaging with local governments. These complementarities offer extraordinary opportunities for regional cooperation, which are still underdeveloped.

Under this investment priority, exchange programs, "twinning" (or mentorship) between CSOs in the hotspot and establishment of platforms and networks based on concrete technical cooperation will be eligible for support. Exchanges and partnerships will need to demonstrate that they are action oriented (i.e., more about "doing together" than "discussing together"). The priority areas for such actions will include: planning, implementing and monitoring EbA actions; management of marine and coastal areas; wetland management; restoration of island ecosystems; invasive alien species control; conservation of critically endangered species; and local community participation and co-management.

Investment Priority 3.3: Support the emergence of a new generation of conservation professionals and organizations specializing in biodiversity conservation, ecosystem services and climate change by supporting, with small grants, technical and practical training and exchange visits

In many cases, organizations must rely on experts from other countries, which can jeopardize the sustainability of their activities. Supporting the emergence of a new generation of young professionals is therefore essential to the consolidation and maintenance of a regional conservation community. It is also an important element for the integration of conservation including EbA into government and private sector actions over the long term.

Training opportunities in areas related to climate change themes in general, including EbA, are not yet well developed at the hotspot level. With this investment priority, CEPF aims to help reduce this gap through training opportunities, including support for the development of short programs for community leaders, development professionals, or any other relevant stakeholder group. Small grants could be awarded to young professionals to encourage their active participation in training programs aimed at strengthening adaptive capacity and reducing exposure to climate risks.

It should be noted that for procedural reasons, CEPF will not be able to provide support to students or organizations from outside of the eligible countries of the MADIO Hotspot. However, it may support students or organizations from eligible countries to benefit from training or exchange internships outside of the eligible countries of the hotspot. It should also be noted that CEPF grants cannot be used to support students to undertake bachelors, masters or doctoral studies.

Strategic Direction 4: ***Support research and ensure the dissemination of results for the promotion and improvement of knowledge on EbA actions and related good practices***

Although the MADIO Hotspot is a privileged research ground for the scientific community, there are still major gaps in knowledge, particularly with regard to the economic evaluation of natural capital. Limitation in knowledge makes it difficult to identify priority EbA activities and seriously handicaps planning their implementation and evaluating their impacts, both at the national and site levels.

There are many priorities for research related to biodiversity and climate in the hotspot, including: the status of flagship species and their habitats on each island in the face of climate change; the distribution of invasive alien species and their degree of colonization of different ecosystem types; the rate of deforestation and reforestation; the effectiveness of different methods for soil strengthening and watershed management; and long-term habitat monitoring at sites targeted by EbA activities. CEPF funding will be targeted to research that improves knowledge of the role of ecosystem services in helping local communities adapt to climate change, and the effectiveness of EbA actions.

CEPF will look for opportunities to develop common methodologies that can be applied at the regional level. For example, studies to assess the natural capital of marine and terrestrial ecosystems and ecosystem services could be undertaken by different actors in each country but following to an agreed methodology throughout the hotspot. Each of the projects supported under this strategic direction will need to integrate dissemination actions with the identification of key audiences and appropriate budgeting.

Investment Priority 4.1: Support applied research activities that improve understanding of the role of specific ecosystems and test the effectiveness of promising EbA techniques

More in-depth knowledge is needed on the ecosystem services prioritized in each country as part of the KBA+ analysis (Chapter 6) and on the contribution that specific ecosystems make to climate adaptation. Priority will be given to applied research activities that improve understanding of the role of specific ecosystems in the provision of ecosystem services. Priority will be given to research activities that are specifically designed to quantify and/or verify the impacts of EbA approaches supported under the grant portfolio, so that promising techniques can be identified and replicated. To better understand the conditions under which promising approaches can be replicated, research should consider the enabling factors and barriers.

Given the different stages in the implementation of EbA, each of these stages will be researched to document the information needed to assess the effectiveness of promising EbA techniques. These include: (i) determination of the geographical context and goals for EbA; (ii) vulnerability analysis; (iii) identification of EbA options; (iv) development of EbA strategy and adaptation measures; (v) monitoring and evaluation for learning; and (vi) integration of EbA into policies and promotion of synergy with other approaches.

Investment Priority 4.2: Support research activities that measure and verify the impact of the grant portfolio on ecosystem services

The establishment of a baseline situation is always essential for the implementation of EbA activities at the start of the project. This baseline information will include geographic, bioecological, biophysical including climate change, and socioeconomic contexts.

Once the baseline situation has been established, the availability and quality of ecosystem services following CEPF investments will be monitored to measure and verify the impact of the grant portfolio. As the natural ecosystems of the hotspot remain under extreme threat from human activities, with disturbances to biodiversity and ecosystem services exacerbated by climate change, the implementation of additional measures needed to achieve EbA activities, such as infrastructure, techniques, policies, and regulations, will be assessed while measuring the reduction in vulnerability of target populations.

Particular priority will be given to applied research that improve the efficiency and/or effectiveness of the grant portfolio in achieving EbA. Projects under this investment priority may focus on one or more priority KBAs in one or more countries. Research should concentrate on the indicators defined in the logical framework in Chapter 15, and evaluate the results achieved in terms of measures of efficiency and return on investment.

Investment Priority 4.3: Support civil society to promote public awareness and education on biodiversity, conservation priorities, climate resilience, ecosystem services and EbA

Beyond training and knowledge generation, the stakeholder consultations carried out during the update of the ecosystem profile identified the need to strengthen "knowledge translation" i.e., communication about the importance of ecosystem services and EbA to multisectoral stakeholders at all levels, especially policymakers, the private sector, and the development sector. Even when information exists, it is unused, misunderstood, misinterpreted, or ignored by a large majority of stakeholders, with immediate consequences for ecosystems. This observation was shared by stakeholders throughout the hotspot. Consequently, under this investment priority, CEPF will support civil society to educate and promote awareness among key stakeholder groups about biodiversity, conservation priorities, climate resilience, ecosystem services and EbA.

Strategic Direction 5: Provide strategic leadership and effective coordination of CEPF investment across the hotspot through a regional implementation team

In each hotspot approved for investment, CEPF works with a regional implementation team (RIT) to convert the investment strategy in the ecosystem profile into a coherent portfolio of grants that exceeds in impact the sum of its parts. The RIT will consist of one or more CSOs active in conservation in the hotspot. The RIT will be selected by the CEPF Donor Council based on approved terms of reference. The team will operate in a transparent and open manner, consistent with the CEPF mission and all provisions of the CEPF Operational Manual. RIT member organizations will not be eligible to apply for other CEPF grants in the same hotspot. Grant applications from official affiliates of those organizations that have an independent board of directors will be accepted, subject to further review.

Investment Priority 5.1: Build a broad constituency of civil society groups that work across institutional and political boundaries to achieve the shared conservation goals outlined in the Ecosystem Profile

The RIT will provide strategic leadership and local knowledge to build a broad constituency of civil society groups working across institutional and political boundaries to achieve the conservation goals outlined in the ecosystem profile. It will implement a number of functions, as defined in the RIT terms of reference, including:

- Act as an extension service to help civil society groups design, implement, and replicate successful conservation activities.
- Review all grant applications and manage external reviews with technical experts and advisory committees.
- Make small grants up to an agreed threshold amount and decide jointly with the CEPF Secretariat on all other applications.
- Lead the monitoring and evaluation of individual projects using standard tools, site visits and meetings with grantees, and assist the CEPF Secretariat in monitoring and evaluation.
- Strengthen the institutional capacity of beneficiaries to ensure efficient and effective project implementation.
- Communicate widely about CEPF’s objectives, grant opportunities, lessons learned, and results.

The RIT will directly support the strategic development of the grant portfolio and contribute in its own right to the achievement of critical conservation outcomes that relate to the overall portfolio benefits. These activities may include facilitating learning exchanges among grantees and other stakeholders, identifying opportunities for leverage at the grant or portfolio level, or collaborating with other donors to align support for CSOs and their projects.

Investment Priority 5.2: Improve operational and monitoring processes and coordination of CEPF grant resource allocation to ensure effective implementation and strategic guidance in an accountable and transparent manner that is fit for purpose on a country-by-country basis

To do this, a good planning basis must be established. A multi-year operational plan with clear indicators will be established by the RIT, both at the country and regional levels, as a derivative of the logical framework. The multi-year plan should include the scheduling of monitoring, annual reviews and evaluations of portfolio implementation. Regular evaluations of the RIT performance of the project portfolio will be planned, conducted and documented on an annual basis. Good practices, weaknesses, success factors and bottlenecks will be clearly identified in order to adjust the investment guidelines, if necessary. As a further requirement, the RIT will ensure the execution of strategic directions in a balanced manner.

For each country, the RIT will involve stakeholders, including local communities, CSOs, researchers, local governments, and key private sector actors, in development, implementation and monitoring of the grant portfolio, including by organizing participatory workshops to assess progress at the mid-point and end of the investment phase.

From the outset, learning from the past (see Section 3.3), potential delay factors for the operational and monitoring process will be identified and assessed, and proactive measures to address them will be implemented.

The strategic directions and investment priorities for the next five years of CEPF investment in the MADIO Hotspot, over the period 2022 to 2027, are summarized in Table 67.

Table 67 Strategic directions and investment priorities

Strategic direction	Investment priorities
1- Empower communities and civil society to implement actions to improve the resilience of species, ecosystems, and human populations to climate change in priority KBAs	1.1 Implement EbA actions, including agroforestry, "climate smart agriculture", eradication of IAS, restoration of degraded watersheds and coastal ecosystems (including wetlands, mangroves, reefs and seagrass beds), and promotion of sustainable management of coastal and terrestrial ecosystems. Priority will be given to the following approaches: i. Promoting resilient agroforestry and developing "Climate Smart Agriculture"; ii. Promoting the sustainable management of freshwater, wetlands, and marine and coastal ecosystems (mangroves, coral reefs, seagrass beds); iii. Strengthening management of intact watershed forest ecosystems through the implementation of protected area management plans in collaboration with local communities; iv. Enhancing resilience and adaptation of ecosystems; v. Restoring degraded coastal ecosystems (wetlands, mangroves, coral reefs, sea grass beds); vi. Restoring degraded watershed forest ecosystems; vii. Promoting control and eradication of invasive alien species; viii. Strengthening the capacity of local communities in participatory ecological monitoring of KBA target species and their habitats.
	1.2 Support the establishment and development of economic models that improve the resilience of local communities to climate change and support value chains for natural products, while strengthening ecosystem services that contribute to EbA
2- Support local communities and civil society to strengthen the integration of the EbA approach, ecosystem resilience and biodiversity conservation into political and economic decision-making processes and education	2.1 Develop engagement strategies with private sector actors for the integration of EbA into their activities, and also for the conservation and sustainable use of biodiversity and renewable natural resources
	2.2 Support civil society to disseminate information and influence political and economic decision-making processes in favor of biodiversity conservation priorities, ecosystem services and EbA
	2.3 Support civil society in the development and implementation of disaster risk reduction measures

Strategic direction	Investment priorities
3- Strengthen the capacities of local communities and civil society at regional and local levels to enhance adaptive capacity and reduce exposure to climate change risks	3.1 Strengthen the technical, administrative and financial capacities of local CSOs with missions related to the environment and the fight against climate change
	3.2 Promote exchanges and partnerships (at the national and regional levels) among CSOs working in priority KBAs, to strengthen technical, organizational, management and fundraising capacities
	3.3 Support the emergence of a new generation of conservation professionals and organizations specializing in biodiversity conservation, ecosystem services and climate change by supporting, with small grants, technical and practical training and exchange visits
4- Support research and ensure the dissemination of results for the promotion and improvement of knowledge on EbA actions and related good practices	4.1 Support applied research activities that improve understanding of the role of specific ecosystems and test the effectiveness of promising EbA techniques
	4.2 Support research activities that measure and verify the impact of the grant portfolio on ecosystem services
	4.3 Support civil society to promote public awareness and education on biodiversity, conservation priorities, climate resilience, ecosystem services and EbA
5- Provide strategic leadership and effective coordination of CEPF investment across the hotspot through a regional implementation team	5.1 Build a broad constituency of civil society groups that work across institutional and political boundaries to achieve the shared conservation goals outlined in the Ecosystem Profile
	5.2 Improve operational and monitoring processes and coordination of CEPF grant resource allocation to ensure effective implementation and strategic guidance in an accountable and transparent manner that is fit for purpose on a country-by-country basis

15. LOGICAL FRAMEWORK FOR THE MADIO HOTSPOT

Objective	Targets	Means of Verification	Important assumption
Engage civil society in conserving biodiversity and enhancing resilience to climate change through targeted investments that impact the most important sites for biodiversity and ecosystem services.	- At least 60 CSOs, including at least 40 national organizations actively involved in conservation actions guided by the ecosystem profile. - 22,000 women and 22,000 men benefit from the adoption of climate-resilient diversified livelihood options (including fishing, agriculture, tourism, etc.). - 915,000 hectares of ecosystems protected and enhanced in response to climate variability and change. - Five grants in the CEPF global portfolio incorporate EbA techniques developed under the program (e.g., climate-resilient agroforestry, assisted regeneration of denuded watersheds with native species, coral reef restoration with seeding units, etc.).	- Extract from CEPF's tracking tools and grants database. - Results of independent socio-economic surveys disaggregated by gender. - Results of independent ecological monitoring. - Gazette notifications of PA expansion. - Verified final reports from grantees.	- The political and economic climate remains stable, allowing CSOs to implement their activities under optimal conditions.

Outcome 1: Civil society is empowered to implement EbA actions at priority KBAs.	- 16,500 women and 16,500 men with increased income as a result of ecosystem-based livelihood activities (sustainable fishing, nature-based tourism, harvesting natural products, etc.). - 152,500 women and 152,500 men with non-monetary benefits other than formal training, as a result of strengthened ecosystem service delivery. - 20 economic models to improve the resilience of local communities to climate change developed and implemented. - 610,000 hectares of intact coastal ecosystems with enhanced management. - 300,000 hectares of intact watershed forest ecosystems with enhanced management. - 2,000 hectares of degraded coastal ecosystems restored. - 1,000 hectares of degraded watershed forest ecosystems restored. - 1,000 hectares of climate-resilient agroforestry systems implemented. - 1,000 hectares of small island ecosystems where invasive alien species have been eliminated or reduced.	- Results of independent socio-economic surveys, disaggregated by gender. - Results of independent ecological monitoring. - Management Effectiveness Tracking Tools. - Verified final reports from grantees.	- Restoration of natural ecosystems leads to increased resilience and diverse livelihood opportunities. - Civil society and beneficiary communities remain motivated in the implementation of activities and adhere to the EbA approach. - The socio-economic context allows grantees to take an interest in the new economic models that have been put in place and allows their sustainability. - Governments remain committed to increasing the coverage and strengthening the management of KBAs (e.g., by ensuring that appropriate regulations are in place, that staff are qualified, that equipment and budget are sufficient, and that a management plan is developed and implemented).

Outcome 2: Civil society has improved ability to support the integration of the EbA approach into political and economic decisions.	- Six government, private sector and/or civil society actors formally adopt KBAs critically important for ecosystem services as priorities for EbA. - 12 communities, businesses and/or public sector institutions use EbA tools, techniques and/or instruments developed under CEPF grants. - Two strategies for engagement with private sector actors for mainstreaming EbA into business practices are prepared. - Three knowledge products (manuals, videos, etc.) on the theme of ecosystem services and/or EbA prepared and disseminated in the region.	- Published public and private sector policies and commitments. - CSO strategies and public commitments. - Notification of new laws, policies and regulations in official journals. - Published private sector policies and commitments. - Verified final reports from grantees.	- Governments, the private sector, and CSOs in each country recognize the KBA+ methodology as a basis for defining common priorities. - Government organizations, the private sector, and CSOs understand the value of the EbA approach and remain motivated in its integration. - The political and economic context remains stable, allowing private sector players to take an interest in EbA. - Private sector actors understand and embrace EbA.
Outcome 3: Civil society capacity is strengthened.	- 5,500 women and 5,500 men from local CSOs have benefited from technical, administrative or financial capacity building. - 12 local CSOs with an institutional capacity score of 80 percent or higher on the CEPF Civil Society Tracking Tool. - Seven CSO training courses and/or exchange visits carried out at the national or regional level.	- Verified final reports from grantees. - Civil society tracking tools.	- The political and socio-economic context allows CSOs to carry out their activities. - The public health situation allows for regional exchanges. - CSOs are interested in regional exchanges.
Outcome 4: Research on the EbA approach is conducted and results are disseminated.	- Two research activities conducted to better understand the role of ecosystems in climate change adaptation and to test the effectiveness of EbA actions. - Two research activities conducted to measure and verify the impact of the grant portfolio on ecosystem services. - Two public awareness and education events held on biodiversity, conservation priorities, climate resilience, ecosystem services and EbA.	- Records of coverage on mass media and social media. - Verified final reports from grantees.	- Research institutions are interested and convinced by the EbA approach. - The general public is receptive to the EbA approach. - The public health situation allows the organization of events with the general public.

Outcome 5: A Regional Implementation Team provides strategic leadership and effective coordination of CEPF investment in the hotspot.	- 95 projects receive CEPF funding in the hotspot. - 60 CSOs receive CEPF funding in the hotspot. - One regional civil society network on EbA is operational and active.	- CEPF grants database. - Final report from the RIT. - Mid-term and final assessment reports. - Independent evaluation report.	- The RIT team is recruited and operational from the beginning of the project. - There is little or no turnover in the RIT and CEPF Secretariat teams. - The RIT and CEPF Secretariat keeps the motivation in the management of the funds and the animation of the network of actors.

16. SUSTAINABILITY

The assessment of the sustainability of investments will be reflected in the degree to which the final objectives of the program are achieved, as well as the duration of the impacts of the actions. Strategies to ensure sustainability must be integrated into the core of the Investment Strategy itself. The approach proposed for the MADIO Hotspot has been developed with this in mind.

Some of the key factors to ensure program sustainability are:

- Integration of biodiversity issues beyond the conservation community into all approaches to sustainable development.
- Capacities of as many stakeholders as possible to understand all issues related to KBAs, ecosystem services, and the EbA approach, and to work effectively.
- Engagement of actors in conservation including researchers, policy makers, citizens, civil society, private sector.
- Sustainable funding to ensure the recurring costs of conservation.
- Partnerships to ensure ownership and synergy of actions, and to better ensure intersectorality and sustainability.
- Adaptability and resilience to pandemic diseases, such as COVID-19, and other unforeseen events.

All four countries have basic reference tools such as the NDC and/or texts, and, for Madagascar in particular, a NAP. These tools serve as a basis for reflection and action, and facilitate the identification of the stakeholders involved, as well as their respective roles. Governments and local communities hold the most crucial positions, accompanied on both sides by civil society actors. The importance of all stakeholders is recognized in the process of developing the investment strategy, which has largely involved government representatives and local CSOs. In addition, attention has been paid to ensuring that the investment strategy builds on national conservation strategies and contributes to governments' efforts to meet international commitments. This is in line with the commitments of the Paris Declaration on Aid Effectiveness.

Capacity building of stakeholders is integral to the implementation of the program and to enabling all stakeholders, according to their respective positions, to play decisive roles in achieving the objectives and expected impacts, as well as the ability to lay the foundations for the sustainability of results. The strategic directions are thus in line with this capacity building approach, targeting both actors and activities (conservation, research, development) in favor of the fight against climate change. However, it must be recognized that capacity building is a long process, especially when working at the grassroots level, and continuous and sustained efforts are required to convince politicians.

It is increasingly recognized that the key factor for success is community engagement in the conservation process. It is essential that all CEPF-funded projects reflect this approach, including adopting participatory processes from the project identification stage. Efforts will enable national, regional, and international organizations capable of providing technical and financial support to build trusting relationships at the community level and, over time, support the emergence of strong local institutions capable of implementing sustainable EbA and conservation actions.

Protecting nature will always have a cost, and sustainable financing is a key element of CEPF's investment strategy. Hence the encouragement of private sector involvement, which has the potential to make a lasting difference and has already demonstrated its value in some hotspot countries, particularly Mauritius and the Seychelles. Exploring innovative partnerships between civil society and the private sector is an ambitious goal, and one to which CEPF, with its flexible delivery mechanism, could make a significant contribution.

To ensure broad ownership of the priorities set out in the ecosystem profile and synergy of actions to achieve them, the CEPF approach has a strong focus on establishing and strengthening partnerships, both among civil society organizations and between them and public and private sector actors. This will require engaging with stakeholders beyond the direct recipients of CEPF grants and catalyzing innovative partnerships and alliances. This approach is emphasized in the investment strategy, including Investment Priorities 2.1 (develop engagement strategies with private sector actors for the integration of EbA into their activities), 2.2 (support civil society to disseminate information and influence political and economic decision-making processes) and 3.2 (promote exchanges and partnerships (at the national and regional levels) among CSOs) and, above all, Investment Priority 5.1 (build a broad constituency of civil society groups that work across institutional and political boundaries to achieve the shared conservation goals outlined in the ecosystem profile).

Learning from the experience of the previous CEPF investment phase, where implementation was disrupted by the COVID-19 pandemic, a key element of sustainability will be to build resilience and adaptability into the program. In the event of a future pandemic or other unforeseen event, it will be important to set clear expectations among grantees and maintain clear, consistent communication. In particular, CEPF and the regional implementation team must ensure that grantees are comfortable requesting amendments if needed, and that the health and safety of their teams and local stakeholders must take priority over project deliverables and deadlines. To this end, flexibility with project timelines and budgets, as well as a shift to remote working and virtual meetings, may be required.

In short, sustainability is above all based on ownership by all concerned stakeholders, and the actions to establish this ownership will consist of:

- Capacity building of local grassroots communities (training, awareness raising), so that they internalize EbA in their practices.
- Capacity building of CSOs (training, human resources, logistics), especially local ones, in developing EbA activities, so that they can effectively carry out their roles of proximity support to communities and relay information to state institutions.
- Collaboration with researchers and research institutes, in order to have and develop an up-to-date, reliable and accessible database system.
- Developing partnerships with members of the private sector, so that they integrate ecosystem protection and climate change adaptation into their investments.

17. CONCLUSION

The MADIO Hotspot is one of the richest regions in the world in terms of biodiversity, due to the high level of endemicity of the fauna and flora species it contains, as well as the diversity of its ecosystems. However, this hotspot is also among the most threatened, with the greatest number of species listed as globally threatened on the IUCN Red List; a situation that worsens with every update. As a result, Madagascar and the Indian Ocean islands have benefited for several decades from significant funding from international and (in some countries) local donors, for the conservation of natural ecosystems, the biodiversity they support and the ecosystem services they provide. Actions on the ground have targeted local communities as a priority.

Despite this scale of investment, threats to biodiversity and ecosystems persist, which are exacerbated by the impacts of climate change. In addition to the proliferation of invasive alien species, which is far from being curbed, most threats are due to human activities that destroy or degrade natural ecosystems: forestry operations; expansion of agriculture; overgrazing; mining operations; urbanization; and unsustainable fishing practices.

All countries in the hotspot have some combination of high levels of poverty, high population density and rapid population growth. Also, good environmental governance is lacking, as reflected by: gaps in legislation and regulations and/or weakness in implementation; non-application of decentralization policies; insufficient integration of conservation and the fight against climate change into spatial and sectoral plans and policies; and a lack of effective engagement of local communities as actors with agency to manage natural ecosystems, rather than just benefit passively from them. There is also a need to raise awareness and change perceptions in all sections of society, to challenge the dichotomy between economic development and conservation that exists at the community level, as well as at the level of political decision-makers and private sector actors.

If these threats continue unabated, the hotspot’s natural ecosystems will continue to degrade and disappear, their capacity to provide ecosystem services will erode, the region’s resilience to the effects of climate change will diminish, the rate of species extinctions will accelerate, and the risk of zoonotic disease emergence will increase.

Civil society is well positioned to act in an operational manner and collaborate with stakeholders at all levels, while sensitizing private sector leaders and policy makers to the imperative of directing investments toward a sustainable vision, considering the role of ecosystems in underpinning social and economic development. In this context, the opportunities for impact for CEPF and other donors supporting biodiversity conservation and climate change adaptation based on the EbA approach are considerable.

In order to focus CEPF grant making in the MADIO Hotspot, the geographic and thematic priorities for investment have been updated. Based on an extensive process of literature review, analysis and stakeholder consultation, the CEPF investment strategy has been updated, comprising 13 investment priorities grouped into five strategic directions. CEPF investments at the ground-level will focus on 70 priority sites, selected following the KBA+ methodology. The overall objective is to engage civil society in conserving biodiversity and enhancing resilience to climate change through targeted investments that impact the most important sites for biodiversity and ecosystem services.

APPENDIX 1: LIST OF ACRONYMS

AFD	French Development Agency
APRM	Ministry of Agriculture, Livestock and Fisheries
AVG	Alliance Voahary Gasy
AZE	Alliance for Zero Extinction
BAU	Business As Usual
BGCI	Botanic Gardens Conservation International
BIOPAMA	Biodiversity and Protected Areas Management Program
BNCCREDD	National Office for Climate Change and REDD
CAZ	Ankeniheny - Zahamena Corridor
CNCC	National Climate Change Committee
CBD	Convention on Biological Diversity
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CIME	Interministerial Committee for the Environment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNDRS	National Center for Documentation and Scientific Research
CNRE	National Center for Environmental Research
COBA	Basic Communities
COFAM	Fandriana - Marolambo Corridor
COFAV	Ambositra - Vondrozo Corridor
COM	Comoros
COMATSA	Marojejy - Tsaratanàna Corridor
COMESA	Common Market for Eastern and Southern Africa
CPB	Cartagena Protocol on Biosafety to the Convention on Biological Diversity
CPGU	Prevention and Support Unit for Emergency Management
CR	Critically Endangered
CSR	Corporate Social Responsibility
CSO	Civil Society Organization
DGM	General Directorate of Meteorology
DNA	Designated National Authority
EBA	Endemic Bird Area
EbA	Ecosystem-based Adaptation
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EN	Endangered
ENSO	El Nino and Southern Oscillation
ESSA	School of Agricultural Sciences
ETF	Environmental Trust Fund
EU	European Union
EW	Extinct in the wild
FAO	Food and Agriculture Organisation of the United Nations
FAPBM	Foundation for Protected Areas and Biodiversity of Madagascar

FEKRITAMA	Fivondronamben' ny Tantsaha Malagasy (Madagascar farmers confederation)
FFEM	French Global Environment Facility
FIFATA	FIkambanana FAmpivoarana ny TAntsaha
FOFIFA	National Centre for Agricultural Research applied to Rural Development
FSPI	Solidarity Fund for innovative projects
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GELOSE	Secure Local Management
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRET	Group of Research and Technological Exchanges
GSPM	Group of Madagascar Plant Specialists
HDI	Human Development Index
IAS	Invasive Alien Species
IBA	Important Bird Area
IBAT	Integrated Biodiversity Assessment Tool
IBC	Island Biodiversity Conservation Centre
ICRI	International Coral Reef Initiative
ICS	Island Conservation Society
ICZM	Integrated Coastal Zone Management
IDC	Island Development Company
IGA	Income Generating Activities
IIED	International Institute for Environment and Development
IMMA	Important Marine Mammal Areas
INRAPE	National Institute of Applied Research in Fisheries and Environment
INSTAT	National Institute of Statistics
IOC	Indian Ocean Commission
IPA	Important Plant Areas
IPCC	Intergovernmental Panel on Climate Change
IRD	Research Institute for Development
ISPRA	Instituto Superiore per la Protezione e la Ricerca Ambientale (Higher Institute for Environmental Protection and Research)
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KFW	Kreditanstalt für Wiederaufbau (German Reconstruction Bank)
KMF	Comorian Franc (Local currency in Comoros)
LDC	Least Developed Countries
MACCE	Ministry of Agriculture, Climate Change and Environment
MADIO	Madagascar and the Indian Ocean Islands
MAMABAIE	Makira - Masoala - Antongil Bay
MATP	Ministry of Land Management and Public Works
MATSF	Ministry of Land Management and Land Service

MBG	Missouri Botanical Garden
MBP	Madagascar Biodiversity Partnership
MCSS	Marine Conservation Society in Seychelles
MDG	Madagascar
MECIE	Development Compatible with Environmental Investments
MEDD	Ministry of Environment and Sustainable Development
MEEF	Ministry of Environment, Ecology and Forestry
MICET	Madagascar Institute for the Conservation of Tropical Ecosystems
MIP	Multiannual Indicative Program
MMCS	Mauritius Marine Conservation Society
MMS	Mauritius Meteorological Services
MNHN	National Museum of Natural History
MNP	Madagascar National Parks
MOI	Mauritius Oceanography Institute
MOL	Mitsui O.S.K. Lines
MPA	Marine Protected Area
MSME	Micro, Small and Medium Enterprises
MTTM	Ministry of Transport, Tourism and Meteorology
MUS	Mauritius
MWF	Mauritian Wildlife Foundation
NAP	National Adaptation Plan
NBGF	National Botanical Gardens Foundations
NbS	Nature-based Solution
NBSAP	National Biodiversity Strategy and Action Plan
NCCAPF	National Climate Change Adaptation Policy Framework
NCCC	National Climate Change Committee
NCCS	National Climate Change Strategy
NDC	Nationally Determined Contributions
NDS	National Development Strategy
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NGO	Non-governmental Organization
NP	National Park
NPCS	National Parks and Conservation Services
NSIF	National Social Inclusion Foundation
NT	Near Threatened
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PAZC	Coastal Zone Management Adaptation to Climate Change Project
PCA	Plant Conservation Action group
PCE	Emerging Comoros Plan
PEIII	Phase 3
PES	Payment for Ecosystem Services
PNFDDSA	National Platform for Women, Sustainable Development and Food Security

PNLCC	National Climate Change Policy
PNM	National Park of Mohéli
QMM	Qit Madagascar Minerals
RBG	Royal Botanical Garden
REDD	Reduced Emissions from Deforestation and Forest Degradation
RIT	Regional Implementation Team
RNAP	National Network of Protected Areas
RRA	Regional Assembly of Rodrigues
RSNC	Royal Society for Nature Conservation
RSWT	Royal Society for Wildlife Trust
SADC	Southern African Development Community
SAPM	Madagascar Protected Areas System
SDG	Sustainable Development Goals
SeyCCAT	Seychelles Conservation and Climate Adaptation Trust
SFA	Seychelles Fisheries Authority
SGP	Small Grant Program
SIDS	Small Island Developing States
SIF	Seychelles Islands Foundation
SNPA	Seychelles National Parks Authority
SPGA	Seychelles Parks and Gardens Authority
SYC	Seychelles
TPF	The Peregrine Fund
TRASS	Terrestrial Restoration Action Association of Seychelles
UNCCD	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification particularly in Africa
UNCLOS	United Nations Convention on the Law of the Sea
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNISEY	University of Seychelles
VU	Vulnerable
WCS	Wildlife Conservation Society
WHO	World Health Organization
WIOSAP	Western Indian Ocean Action Program
WWF	World Wildlife Fund

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Madagascar

Bauchot M L., and Bianchi G. (1984). FAO species identification sheets for fisheries purposes. Guide des poissons commerciaux de Madagascar (espèces marines et d'eaux saumâtres). With the support of the United Nations Development Program (Project RAF/79/065. Rome, FAO, 135p.

Beech, E., Rivers, M., Rabarimanarivo, M., Ravololomanana, N., Manjato, N., Lantoarisoa, F., Andriambololonera, S., Ramandimbisoa, B., Ralimanana, H., Rakotoarisoa, S., Razanajatovo, H., Razafiniary, V., Andriamanohera, A., Randrianasolo, V, Rakotonasolo, F., Rakotoarisoa, A., Randriamamonjy, N., Rajaovelona, L., Rakotomalala, N., Randriamboavonjy, T., Rajaonah, M., Rabehevitra, D., Ramarosandratana, A.V. Rakotoarinivo, M., B.H. Ravaomanalina and Jeannoda, V. (2021). Red List of Trees of Madagascar. Richmond: Botanic Gardens Conservation International.

Bertrand A., Rabesahala Horning A. and Montagne P. (2009). Community-based management or preservation of renewable resources: The unfinished story of environmental policy in Madagascar - In Vertigo 9(3). From http://vertigo.revues.org/9231.

BIODEV (2008). State of play at the national level, in the biological, ecological, socio-economic, political, legal and institutional fields in Madagascar, RAMP COI Final Report - 252p.

BirdLife International (2022). Country profile: Madagascar. Available from http://www.birdlife.org/datazone/country/madagascar Accessed: 2022-03-08

Brooks T. M., Mittermeier R. A,. da Fonseca G. A. B, Gerlach J., Hoffmann M., Lamoreux J. F., Mittermeier C. G., Pilgrim J. D., Rodrigue A. S. L. (2006). Global Biodiversity Conservation Priorities. - In Science 313: 1-4. Available at www.sciencemag.org

CIVICUS, UNDP Madagascar, MSIS and CNPC, (2011a), Determining the Civil Society Index - Case Study: External Environment Dimension - Policy Brief. 48pp.

CIVICUS, UNDP Madagascar, MSIS and CNPC, (2011b), Determining the Civil Society Index - Case Study: Citizen Engagement and Volunteerism. 40pp.

CIVICUS, UNDP Madagascar, MSIS and CNPC, (2011c), Determining the Civil Society Index - Case Study: Dimension: External Environment - Theme: Legal Framework for Civil Society Organizations. 48pp.

Cole, N. (2021). *Gongylomorphus fontenayi*. The IUCN Red List of Threatened Species 2021: e.T9316A13482739

Cole, N., Goder, M., Roopa, P., Bachraz, V., and Mootoocurpen, R. (2018a). *Leiolopisma telfairii*. The IUCN Red List of Threatened Species 2018: e.T11409A13482880. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T11409A13482880.en

Cole, N., Hector, A., Roopa, P., Mootoocurpen, R., et Goder, M. (2018b). *Casarea dussumieri*. The IUCN Red List of Threatened Species 2018: e.T3989A13482412. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T3989A13482412.en

Cole, N., Outlaw, L., Vencatasamy, D. and Mootoocurpen, R. (2018c). *Phelsuma guentheri*. The IUCN Red List of Threatened Species 2018.

Cole, N., Mootoocurpen, R., Roopa, P., and Ruhomaun, K. (2021). *Nactus coindemirensis*. The IUCN Red List of Threatened Species 2021: e.T40795A13482515

Compagno L. J. V. (1984). Sharks of the world. An annotated and illustrated catalog of shark species known to date. FAO Species Catalogue 4. Rome: UNDP/FAO.

Cooke A. J. (2012). A guide to marine biodiversity in Madagascar. p172.

ETOA (2008). Madagascar Environmental Threats and Opportunities Assessment 2008 Update. p. 158

Fedele, G. *et al.* (2021) 'Nature-dependent people: Mapping human direct use of nature for basic needs across the tropics', *Global Environmental Change*. Elsevier Ltd, 71, pp. 102368. doi: 10.1016/j.gloenvcha.2021.102368.

Fisher, B. L. and Peters, C. (2019) Ants of Madagascar: a guide to the 62 genera. Antananarivo: Association Vahatra.

Fricke, R., J. Mahafina, F. Behivoke, H. Jaonalison, M. Leopold and D. Ponton (2018). Annotated checklist of the fishes of Madagascar, southwestern Indian Ocean, with 158 new records. FishTaxa v. 3 (no. 1): 1-432.

Froese, R. and Pauly, D. eds. (2017). FishBase. Version 08/2017. Available at www.fishbase.org

Glaw, F. and Raselimanana A.P. (2018). Systematics of Malagasy terrestrial reptiles (orders: Squamata, Testudines and Crocodylla). In *Madagascar's terrestrial protected areas: Their history, description and biotope* eds S.M. Goodman, M.J. Raherilalao et S. Wohlhauser, pp. 225-288. Association Vahatra, Antananarivo.

Goodman, S. M. ed, (2008). Natural Landscapes and Biodiversity of Madagascar. Publication Scientifiques du Muséum Paris, WWF. 694 pp

Gough C. L. A., Dewar K. M., Godley B. J., Zafindranosy, E. and Broderick, A. C. (2020) Evidence of Overfishing in Small-Scale Fisheries in Madagascar. Front. Mar. Sci. 7:317. doi: 10.3389/fmars.2020.00317

Government of Madagascar (2016). Programme Environnemental pour le Développement Durable. Available at http://www.ecologie.gov.mg/download/document-de-pnedd/ Accessed on 12 December 2022.

GSPM (2021). Status of the flora of Madagascar. Antananarivo: Groupement des Spécialistes des Plantes de Madagascar.

Gullström, M., Torre Castro, M., Bandeira, S. O., Björk, M., Dahlberg, M., Kautsky, N., Rönnbäck, P. and Öhman, M. C. (2002). Seagrass Ecosystems in the Western Indian Ocean. pp. 588-596

Haines-Young, R. and Potschin, M. (2018) 'CICES V5. 1. Guidance on the Application of the Revised Structure', Common International Classification of Ecosystem Services (CICES), (January), p. 53. Available at: https://cices.eu/resources/.

Hantanirina J. M. O. and Benbow, S. (2013). Diversity and coverage of seagrass ecosystems in south-west Madagascar. African Journal of Marine Science. Volume 35. p291 - 297

IUCN (2016). A global standard for the identification of Key Biodiversity Areas: version 1.0.

IUCN (2022). IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Downloaded on March 2022

Jenkins R. K. B, Tognelli, M. F., Bowles, P., Cox, N., Brown, J. L., Chan, L., Andreone, F., Andriamazava, A., Andriantsimanarilafy, R. R., Anjeriniaina, M., Bora P., Brady L. D., Hantalalaina, E. F., Glaw, F., Griffiths, R. A., Hilton-Taylor, C., Hoffmann, M., Katariya V., Rabibisoa, N. H., Rafanomezantsoa, J., Rakotomalala, D., Rakotondravony, H., Rakotondrazafy, N. A., Ralambonirainy, J., Ramanamanjato, J.-B., Randriamaho, H., Randrianantoandro, J. C., Randrianasolo, H. H, Randrianirina, J. E., Randrianizahana, H., Raselimanana, A. P., Rasolohery, A., Ratsoavina, F. M., Raxworthy, C. J., Robsomanitrandrasana, E., Finoana, R., van Dijk, P. P., Yoder, A. D. and Vences, M. (2014). Extinction Risks and the Conservation of Madagascar's Reptiles. In Plos.

Le Manach F., Andrianaivojaona C., Oleson K., Clausen A. and Lange G.-M., (2013). Natural Accounting and Management of The Malagasy Fisheries Sector - A technical case study for the WAVES Global Partnership in Madagascar, 42p

Madagascar Catalogue. (2022). Flora of Madagascar. www.efloras.org/madagascar

Marline L., Andriamiarisoa R. L., Bardat J., Chuah-Petiot M., Hedderson T. A. J., Reeb C., Strasberg D., Wilding N. and Ah-Peng C. (2012). Checklist of the bryophytes of Madagascar. Cryptogamy, Bryology 2012 (3): 199-255.

MBG (2013). Contribution to status of plant conservation and identification of important gaps: report to help ecosystem profile-Madagascar, September, 2013. Antananarivo: Missouri Botanical Garden. 15pp.

MEDD (2021) National Adaptation Plan (NAP) Madagascar. Antananarivo: Ministry of Environment and Sustainable Development.

MEF (2006). National Action Plan for Adaptation to Climate Change (NAPA). Madagascar.

MEF and UNDP (n.d.) Fourth National Report of the Convention on Biological Diversity of Madagascar. Antananarivo: MEF and UNDP.

MESupRes (2013). Stratégie Nationale de la Recherche Scientifique à Madagascar, 65p

MIHARI (2022). Strategy 2022-2026. MIHARI, Madagascar, 18p.

Mittermeier R. A., Louis E. E. Jr, Langrand O., Schwitzer C., Gauthier C.-A., Rylands A. B., Rajaobelina S., Ratsimbazafy J., Rasoloarison R., Hawkins F., ROOS C., Richardson M. et Kappeler P. M. (2014). - Lemurs of Madagascar. Muséum national d'Histoire naturelle, Paris; Conservation International, Arlington, 841 pp.

Mittermeier R. A., Myers N., Thomsen J. B., Olivieri, S. and da Fonseca G.A.B. (1998). Biodiversity hotspots and major tropical wilderness areas: approaches to setting conservation priorities. Conservation Biology 12: 516-520.

Moat, J. and Smith, P. (2007). Atlas of the Vegetation of Madagascar. Royal Botanic Gardens, Kew

Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B. and Kent, J. (2000). Biodiversity hotspots for conservation priorities - In Nature 403: 853-858.

Neugarten, R., Honzák, M., Grantham, H., Koenig, K., Wright, T.M., Andriamaro, L., Rasolohery, A., Bottrill, M., Cano, C.A., Hole, D., Juhn, D., Saenz L., Steininger, M. and Turner, W., (2014). BCA+ Assessment of ecosystem service values of Key Biodiversity Areas. Framework and Pilot Demonstration: Madagascar. February 2014. Conservation International and CEPF, Antananarivo.

Norris, S. (2006) Madagascar Defiant. BioScience 56(12): 960–965. https://doi.org/10.1641/0006-3568(2006)56[960:MD]2.0.CO;2

Noss, R. F., Platt, W. J., Sorrie, B. A., Weakley, A. S., Means, D. B., Costanza, J., and Peet, R. K. (2014). How global biodiversity hotspots may go unrecognized: lessons from the North American Coastal Plain. Diversity and Distributions: A Journal of Conservation Biogeography. http://dx.doi.org/10.1111/ddi.12278

Platt, J. (2010). Losing the race: Illegal trade devastating Madagascar's radiated tortoise, Blog, American Scientist, http://blogs.scientificamerican.com/extinction-countdown/2010/04/09/losing-the-race-illegal-trade-devastatingmadagascars-radiated-tortoise/

Rabarimanarivo, M., B. Ramandimbisoa, N. Rakotoarivelo, P.B. Phillipson, S. Andriambololonera, M.W. Callmander and S. Porembski (2019). The extraordinary botanical diversity of Malagasy inselbergs. Candollea 74(1): 65- 83.

Raharimampionona, J., Andriambololonera, S., Schatz, G.E. Lowry II, P.P., Rabarimanarivo M., Ratodisoa, A. and Ravololomanana N. (2005). Identification of priority areas for plant conservation in Madagascar: using botanical data to define conservation priorities. In: S.A. Ghazanfar and H. Beentje eds., African Plants: Biodiversity, Ecology, Phytogeography and Taxonomy, pp. 00-00. Royal Botanic Gardens, Kew.

Rakotoarinivo, M., S. Andriambololonera, H.J. Beentje, T.L.P. Couvreur, V.M. Rafidison, V. Rahanitriniaina, L. Ramamonjisoa, S.H.J.V. Rapanarivo, R.D. Turk, W.J. Baker and J. Dransfield (2020). Strategy for the Conservation and Sustainanble Use of the Palms of Madagascar. 52p.

Ramananjanahary, R. H., Frasier, C. L., Lowry II, P. P., Rajaonary, F. B. and Schatz, G. E. (2010). Madagascar's Endemic Plant Families: Species Guide. Antananarivo: Missouri Botanical Garden, Madagascar Research and Conservation Program. 150pp.

Raxworthy, C. J. and Nussbaum, R. A. (1994). A review of the Madagascan snake genera *Pseudoxyrhopus*, *Pararhadinaea*, and *Heteroliodon* (Squamata: Colubridae). - In Miscellaneous Publications, Museum of Zoology, University of Michigan, 182: 1-37.

Rhodin, A. G. J., Walde, A. D., Horne, B. D., van Dijk, P. P., Blanck, T. and Hudson, R. eds. (2011). Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles. Lunenburg, MA: IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservation Fund, Turtle Survival Alliance, Turtle Conservancy, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and San Diego Zoo Global, 54pp.

Richmond M. D. (2001). The marine biodiversity of the Western Indian Ocean and its biogeography. How much do we know? pp241-262 in: Marine science development in Eastern Africa. Proceedings of the 20th anniversary conference on marine science in Tanzania 28 June - 1 July 2001.

Shapiro, A., Randriamanantena, D., Kuechle, H. and Razafindramasy, F. (2019). Les mangroves de Madagascar: superficies, condition et évolution 2000-2018. Berlin and Antananarivo: WWF Germany and WWF Madagascar. 39pp.

Tattersall, I. and Cuozzo, F. (2018). Systematics of the extant Malagasy lemurs (order Primates)/Systemématique des lémuries malgaches actuels (ordre des Primates) *in* Les Aires Protégées de Madagascar: Leur histoire, description et biote /The Terrestrial protected areas of Madagascar: Their history, description, and biota eds. S. M. Goodman, M.J. Raherilalao and S. Wolhlhauser, pp. 403-424. Association Vahatra, Antananarivo.

Tetley, M. J., Kiszka, J. J. and Hoyt E. (2012). Defining hotspots for toothed cetaceans involved in pelagic longline fishery depredation in the Western Indian Ocean: a preliminary approach in IOTC-WPEB.

Thomassin B. (1978). Les peuplements des sédiments coralliens de la région de Tuléar (SW Madagascar). Leur insertion dans le contexte côtier indo-pacifique. Thesis Doct. ès-Sci, Univ. Aix-Marseille II: 494 + Appendices.

Vasseur P. (1981). Recherches sur les peuplements sciaphiles des récifs coralliens de la région de Tuléar (SW Madagascar). Thesis Doct. ès-Sci, Univ. Aix-Marseille II : 348 p. + Appendix. 332 p

Vences, M. and Raselimanana, A. P. (2018). Systematics of Malagasy amphibians (Amphibia: Anura). In The terrestrial protected areas of Madagascar: Their history, description and biotope eds S.M. Goodman, M.J. Raherilalao et S. Wohlhauser, pp225-288. Antananarivo: Association Vahatra.

World Bank (2021). The Changing Wealth of Nations 2021: Managing Assets for the Future. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/36400

Zachos, F. E. and Habel, J. C. eds. (2011). Biodiversity hotspots - distribution and protection of conservation priority areas. XVII + 546 pp. Berlin: Springer.

Comoros

BirdLife International (2022). Country profile: Comoros. Available from http://datazone.birdlife.org/country/comoros Accessed: 2022-03-08

FAO (2016). Global Forest Resources Assessment 2015, country report, Comoros. Rome: Food et Agriculture Organization.

Union of the Comoros (2014). Drinking water supply and sanitation strategy, 2014

Union of the Comoros (2017). RNAP PROJECT Réseau National des Aires Protégées des Comores, Annual Report 2017. National Plan for Integrated Water Resources Management.

Union of the Comoros (2018). Revised Strategy for Accelerated Growth and Sustainable Development 2018-2021 (SCA2D).

Union of the Comoros (2019a). CPADC, Union of Comoros Sector Notes, 2019. CPADC, Emerging Comoros Plan.

Union of the Comoros (2019b). Water and sanitation sector note produced by the government in 2019 .

Union of the Comoros and AFD (2018). Vulnerability study to the effects of climate change in Comoros, November 2018.

Union of the Comoros and DGEF (2010). Support to the National Forest Inventory Program, Union of Comoros 2010.

Union of the Comoros and DGEF (2018a) Building Resilience to Climate Change through Watershed and Forest Restoration and Livelihood Adaptation. Preliminary Report 2018.

Union of the Comoros and DGEF (2018b) Process of defining national targets for land degradation neutrality in Comoros, 2018.

Union of the Comoros and UNS (2015). National Prioritization Plan for the Sustainable Development Goals of the Union of Comoros.

Mauritius

Albert S., O. Flores, C. Baider F. B. V. Florens, and D. Strasberg (2021). Differing severity of frugivore loss contrasts the fate of native forests on the land of the Dodo (Mascarene archipelago). Biological Conservation 257(109131).

ARDA, 2003. Premier inventaire des poisons et des macrocrustacés d’eau douce des principales rivières pérennes de l’île Maurice : rapport de résultats. Ministère de l’Aménagement du Territoire et de l’Environnement, France. 53pp.

Appadoo, C. and Steele, D. H. (1998). Swallow-water Gemmeridean amphipods of Mauritius island. *Crustaceana* 71 (6): 633-645.

Atkinson, R. and NTPTC (2007). Preliminary IUCN Redlist assessment of the Threatened plants of Mauritius. Unpublished report to National Threatened Plants Technical Committee.

Baider, C. and Florens, F. B. V. (2011). Control of invasive alien weeds averts imminent plant extinction. Biological Invasions 13 (12): 2641-2646.

Baider, C. and Florens, F. B. V. (2013). *Eugenia alletiana* (Myrtaceae), a new critically endangered species endemic to the island of Mauritius. Phytotaxa 94(1):1-12.

Baider, C., Florens, F. B. V., Baret, S., Beaver, K., Matatiken, D., Strasberg, D. and Kueffer, C. (2010). Status of plant conservation in the Western Indian Ocean island floras. Proceedings of the 4th Global Botanic Gardens Congress. 7pp. http://www.bgci.org/files/Dublin2010/papers/Baider-Claudia.pdf

Baider, C., Florens, F. B. V., Rakotoarivelo, F., Bosser, J. and Pailler, T. (2012). Two new records of *Jumellea* (Orchidaceae) for Mauritius (Mascarene Islands) and its conservation status. Phytotaxa 52: 21-28.

Bhikajee, M. (2004). The marine biodiversity of Mauritius. National Report. http://hdl.handle.net/1834/333 Accessed 16 October 2013.

BirdLife International (2013) Important Bird Areas factsheet: Cargados Carajos shoals (Saint Brandon). http://www.birdlife.org Accessed on 27 October 2013.

Bosser, J. and Marais, W. (2005). 122. Asclepiadaceae. Flore des Mascareignes: La Réunion, Maurice, Rodrigues. Paris: IRD/MSIRI/Kew.

Bosser, J. and Guého, J. (2002). Two new species of *Pandanus* (Pandanaceae) from Mauritius. Adansonia, ser. 3, 24(2): 239-242.

CEPF (2014). Ecosystem Profile: Hotspot of Madagascar and Indian Ocean Islands: Republic of Mauritius Synthesis Report. Prepared by F. B. Vincent Florens for Biotope on behalf of Critical Ecosystem Partnership Fund.

Cheke, A. S. and Hume, J. (2008). Lost land of the Dodo. London: T et AD Poyser.

Cheke, A. S. and Lawley, J. C. (1983). Biological history of Agalega with special reference to birds and other land vertebrates. Atoll Research Bulletin 273: 65-108.

Cole, N., Goder, M., Vencatasamy, D., Mootoocurpen, R., Le Flohic Gillies, A., Herbert, S., Gamble, F., Ramen, B., Ramjeeawon, D. and Nundlaul, V. (2014). Restoration of Island Ecosystems in Mauritius: The Mauritius Reptile Recovery Programme Annual Report 2014. Durrell Wildlife Conservation Trust, Jersey, Channel Islands.

Cole, N., Goder, M., Roopa, P., Bachraz, V. and Mootoocurpen, R. (2018). *Leiolopisma telfairii*. The IUCN Red List of Threatened Species 2018: e.T11409A152276731. https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T11409A152276731.en

Cole, N. (2021a). *Bolyeria multocarinata*. The IUCN Red List of Threatened Species 2021: e.T2864A13483086.

Cole, N. (2021b). *Gongylomorphus fontenayi*. The IUCN Red List of Threatened Species 2021: e.T9316A13482739.

Cole, N., Mootoocurpen, R., Roopa, P. and Ruhomaun, K. (2021) *Nactus coindemirensis*. The IUCN Red List of Threatened Species 2021: e.T40795A13482515

Coopejans, E., Leliaert, F., Verbruggen, H., de Clerck, O., Schills, T., de Vriesse, T. and Marie, D. (2004). The marine green and brown algae of Rodrigues (Mauritius, Indian Ocean). Journal of Natural History 38(23-24): 2959-3020.

De Boer, E. J., Tjallingii, R., Vélez, M. I., Rijsdijk, K. F., Vlug, A., Reichart, G.-J., Prendergast, A. L., de Louw, P. G. B., Florens, F. B. V., Baider, C. and Hooghiemstra, H. (2014). Climate variability in the SW Indian Ocean from an 8000-yr long multi-proxy record in the Mauritian lowlands shows a middle to late Holocene shift from negative IOD-state to ENSO-state. Quaternary Science Reviews 86: 175-189.

De Boer, E. J., Hooghiemstra, H., Florens, F. B. V., Baider, C., Engels, S., Dakos, V., Blaauw, M. and Bennett, K. D. (2013a). Rapid succession of plant associations during the glacial-Holocene transition in Mauritius: an alternative mechanism to climate change in a small oceanic island? Quaternary Science Reviews 68: 114-125

De Boer, E. J., Slaikovska, M., Hooghiemstra, H., Rijsdijk, K. F., Vélez, M. I., Prins, M., Baider, C. and Florens, F. B. V. (2013b). Multi-proxy reconstruction of environmental dynamics and colonization impacts in the Mauritian uplands. Palaeogeography, Palaeoclimatology, Palaeoecology 383-384: 42-51

De Clerck, O., Coopejans, E., Schills, T., Verbruggen, H., Leliaert, F., de Vriesse, T. and Marie, D. (2004). The marine green and brown algae of Rodrigues (Mauritius, Indian Ocean). Journal of Natural History 38(23-24): 3021-3057.

De Rosnay, A., Naggea, J., Le Breton, T., Seetah, K., and Iranah, P. (2021). Social Impact Assessment of the compounded impacts of COVID-19 and the Wakashio oil spill in Mauritius. Mauritius: Dynamia.

Desmet, P. (2009). Expanding coverage and strengthening management effectiveness of the terrestrial protected area network on the island of Mauritius (GEF project id 3526, GEF Agency project id 3749): Conservation planner final report - spatial conservation assessment and action plan. Report for the UNPD, Mauritius. 72 p.

Een, G. and Thingsgaard, K. (1999). Mosses from the Mascarenes - 7. A small collection from Rodrigues. Tropical Bryology 16: 3-10.

Evans, S.W., Cole, N., Kylin, H., Choong Kwet Yive, N. S., Tatayah, V., Merven, J. and Bouwman, H. (2016): Protection of marine birds and turtles at St Brandon's Rock, Indian Ocean, requires conservation of the entire atoll, African Journal of Marine Science, DOI: 10.2989/1814232X.2016.1198720

Florens, F. B. V. (2008). Ecology of tropical forests in Mauritius and impact of invasive introduced species. Ph.D. thesis, University of La Réunion, Reunion, France.

Florens, F. B. V. (2012). Going to bat for an endangered species. Science 336: 1101.

Florens, F. B. V. (2013a). Conservation in Mauritius and Rodrigues: Challenges and achievements from two ecologically devastated oceanic islands. In: Sodhi N., L. Gibson, Raven P. eds. Conservation Biology: Voices from the tropics. Wiley Blackwell. pp.40-50.

Florens, F. B. V. (2013b). Research protected areas: the important role of governments. Trends in Ecology and Evolution 28: 504-505.

Florens, F. B. V. and Baider, C. (2006). Relocation of 'extinct' *Ficus densifolia* Miq. (Moraceae) in Mauritius. Phelsuma 14: 101-103.

Florens, F. B. V. and Baider, C. (2007). Relocation of *Omphalotropis plicosa* (Pfeiffer, 1852), a Mauritius endemic landsnail believed extinct. Journal of Molluscan Studies 73(2): 205-206.

Florens, F. B. V., Baider, C. and Bosser, J. (2008). On the Mauritian origin of the hitherto believed extinct *Badula ovalifolia* (Myrsinaceae), with complementary description. Kew Bulletin 63(3): 481-483.

Florens, F.B.V. and Baider, C., Martin, G.M.N., Strasberg, D. (2012). Surviving 370 years of human impact: what remains of tree diversity and structure of the lowland wet forests of oceanic island Mauritius? Biodiversity and Conservation 21: 2139-2167.

Florens, F.B.V., Baider, C., Marday, V., Martin, G. M. N., Zmanay, Z., Oleksy, R., Krivek, G., Vincenot, C.E., and Kingston, T. (2017). Disproportionately large ecological role of a recently mass-cultivated flying fox in native forests of an oceanic island. Journal for Nature Conservation 40: 85-93.

Florens, F. B. V., Florens D. and Sevathian, J.-C. (2001). 'Extinct' species rediscovered in Mauritius. Phelsuma 9: 53-54.

Frahm, J. P., O'Shea, B. J. and Ho, B.-C. (2009). Moss flora of Mauritius. Archive for Bryology 51: 1-26.

Gallon, R. C. (2005). On a new genus and species of therapsoid spider from Serpent Island, Mauritius (Aranae, Theraphosidae, Eumenophorinae). Bulletin of the British Arachnological Society 13: 175-178.

Ganeshan, S and Madl M. (2016). Notes on Pimplinae (Hymenoptera: Ichneumonidae) from Mauritius. Linzer biologische Beiträge 48(1): 487-493.

Goodman, S. M., van Vuuren, B. J., Ratrimomanarivo, F., Probst, J.-M. and Bowie, R. C. K. (2008). Specific status of populations in the Mascarene Islands referred to *Mormopterus acetabulosus* (Chiroptera: Molossidae), with description of a new species. Journal of Mammalogy 89: 1316-1327.

Grangaud, E. (2010). Guide des fougères et plantes alliées des Mascareignes. Biotope, Museum national d'Histoire naturelle, Paris, 432pp.

Griffiths, O. L. and Florens, F. B. V. (2004). Ten new species of Mascarene land snails (Mollusca: Gastropoda) and their conservation status. Molluscan Research 24: 161-177.

Griffiths, O. L. and Florens, F. B. V. (2006). A field guide to the non-marine molluscs of the Mascarene Islands (Mauritius, Rodrigues, Réunion) and the northern dependencies of Mauritius. Bioculture Press, Mauritius.

Griffiths O L and Tatayah R V. (2006). Marine turtles of Agalega (Western Indian Ocean) including report on illegal killing of adults and harvest of eggs. Marine Turtle Newsletter 115.

Guého, J. and Staub, F. (1983). Botanical and ornithological observations - Agalega. Proceeding of Royal Society of Arts and Sciences of Mauritius 4(4) 15-110.

Hamada, S., Bijoux, J., Cauvin, B., Hagan, A., Harris, A., Koonjul, M., Mercier, S. and Quod, J. P. (2008). Status of coral reefs of the South-West Indian Ocean Island States: Comoros, Madagascar, Mauritius, Reunion, Seychelles. In: Status of Coral Reefs of the World. pp105-118.

Hammond, D.S., Gond, V., Baider, C., Florens, F.B.V., Persand, S. and Laurance, S.G.W. (2015). Threats to environmentally sensitive areas from peri-urban expansion in Mauritius. Environmental Conservation 42: 256-267.

Hansen, D. M. and Galetti, M. (2009). The forgotten megafauna. Science 324: 42-43.

Heemstra, E., Heemstra, P., Smale, M., Hooper, T. and Pelicier, D. (2004). Preliminary checklist of coastal fishes from the Mauritian island of Rodrigues. Journal of Natural History 38(23-24): 3315-3344.

Hugel, S. (2014). Grasshoppers of the Mascarene Islands: new species and new records (Orthoptera, Caelifera). Zootaxa, 3900 (3): 399-414.

Hugel, S. and Desutter-Grandcollas, L. (2021). New intertidal crickets from Comoros and Mascarene islands (Orthoptera: Trigonidiidae: Nemobiinae: Burcini). Zootaxa 4995(1): 001-026. https://doi.org/10.11646/zootaxa.4995.1.1

Hume, J. P. (2011). Systematics, morphology, and ecology of pigeons and doves (Aves: Columbidae) of the Mascarene Islands, with three new species. Zootaxa 3124: 1-62.

Hume, J.P. (2015). A new subfossil bulbul (Aves: Passerines: Pycnonotidae) from Rodrigues Island, Mascarenes, southwestern Indian Ocean. Ostrich 86(3): 247-260.

Hutson, A. M. and Racey, P. A. (2013). *Pteropus niger*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. http://www.iucnredlist.org. Accessed on 13 December 2013.

Hutson, A. M., Racey, P. A., Ravino, J., Mickleburgh, S., Bergmans, W. and Fahr, J. (2008). *Taphozous mauritianus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. www.iucnredlist.org. Accessed on 13 December 2013.

ICZM (2009). Development of an Integrated Coastal Zone Management Framework (ICZM) for the Republic of Mauritius: Strategy Part I - Introduction to ICZM and stock-take for Mauritius. Unpublished Report, 145pp.

Jones, C. G. (2008). Practical conservation on Mauritius and Rodrigues. Steps towards the restoration of devastated ecosystems. In: Cheke, A. S., Hume, J. P. eds. Lost land of the Dodo. London: T et AD Poyser. pp.226-259.

Keith, P., Marquet, G., Valade, P., Bosc, P. and Vigneux, E., (2006). Atlas des poissons et des crustacés d'eau douce des Comores, Mascareignes et Seychelles. Muséum national d'Histoire naturelle, Paris. Patrimoines naturels, 65: 250p.

Kingston, T., Florens, V., Oleksy, R., Ruhomaun, K. and Tatayah, V. (2018). *Pteropus niger*. The IUCN Red List of Threatened Species 2018: e.T18743A86475525.

Kothari, U. and Wilkinson, R. (2013). Global change, small island state response: restructuring and perpetuation of uncertainty in Mauritius and Seychelles. Journal of International Development 25: 92-107.

Laurance, W. F. (2013). Does research help to safeguard protected areas? Trends in Ecology and Evolution 28: 261-266.

Le Péchon, T., Baider, C., Ravet-Haevermans, A., Gigord, L. D. B. and Dubuisson, J.-Y. (2011). *Dombeya sevathianii* (Malvaceae): A new species of *Dombeya* endemic to Mauritius (Indian Ocean). Phytotaxa 24: 1-10.

Lorence, D. H. and Sussman, R. W. (1986). Exotic species invasion into Mauritius wet forest remnants. Journal of Tropical Ecology 2: 147-162.

Mauritius Meteorological Services (2021). http://metservice.intnet.mu/ Accessed on 4 December 2021.

MESD (2011). Mauritius Environmental Outlook Report. Port Louis: Ministry of Environment and Sustainable Development. 236pp.

Mitten, W. (1879). Botany of Rodriguez, Musci/Hepaticae. Philosophical Transactions of the Royal Society of London 168: 388-401.

Motala, S. M., Frank-Thorsten, K., Mungroo, Y. and Donovan S. E. (2007). The terrestrial arthropods of Mauritius: a neglected conservation target. Biodiversity and Conservation 16(10): 2867-2881.

MWF (2019). St Brandon (Carajos Cargados Shoals) Final Stakeholders' Consultation Report. Port Louis: Mauritian Wildlife Foundation.

MWF (2021). Annual Report 2020. Available at https://www.mauritian-wildlife.org/

NBSAP (2006). National Biodiversity Strategy and Action Plan for the Republic of Mauritius 2006-2015. National Parks and Conservation Services, Mauritius.

NBSAP (2017). National Biodiversity Strategy and Action Plan for the Republic of Mauritius 2017-2025. National Parks and Conservation Services, Mauritius.

Norder, S.J., Seijmonsbergen, A.C., Rughooputh, S.D.D.V., Dietz, T., Van Loon, E.E., Tatayah, V., Kamminga, A.T. and Rijsdijk, K.F. (2017). Assessing temporal couplings in social-ecological island systems: historical land use change and soil loss analyses on Mauritius (Indian Ocean). Ecology and Society 22(1): 29.

Oliver, P. G, Holmes, A. M., Killeen, I. J., Light, J. M. and Wood, H. (2004). Annotated checklist of the marine bivalve of Rodrigues. Journal of Natural History 38(23-24): 3229-3272.

Page, W. and D' Argent, G. A. (1997). A vegetation survey of Mauritius (Indian Ocean) to identify priority rainforest areas for conservation management. IUCN/MWF report. Port Louis, Mauritius.

Pailler, T. and Baider, C. (2012). *Polystachya jubaltii* Pailler (Orchidaceae), a new species endemic to the Mascarene Islands. The Orchidophile 195: 285-289.

Pillay *et al.* (2002). http://moi.gov.mu/research_projects.htm Accessed 17 October 2013.

Prayag, G. (2011). Rejuvenating paradise: changing products, changing markets and changing visitor behaviour in Mauritius. pp157-170 in Carlsen, J. and Butler, R. eds. Island tourism: towards a sustainable perspective. CABI.

Rakotobe, T., Holmes, C. and Ralison, H. (2012). Climate change in the Western Indian Ocean: a situation assessment and policy considerations. Africa Biodiversity Collaborative Group - Western Indian Ocean. 103pp.

Ramah, S., Etwarysing, L., Auckloo, N., Gopeechund, A., Bhagooli, R. and Bahorun, T. (2015). Prophylactic antioxidants and phenolics of seagrass and seaweed species: a seasonal variation study in a southern Indian Ocean island, Mauritius.

Republic of Mauritius (2017). Protected Area Network Expansion Strategy: 2017-2026.

Reuleaux A., Bunbury N., Villard P. and Waltert M. (2013). Status, distribution and recommendations for monitoring of the Seychelles black parrot *Coracopsis (nigra) barklyi*. Oryx 47: 561-568.

Rijsdijk, K. F., Hume, J. P., Bunnik, F., Florens, F. B. V., Baider, C., Shapiro, B., van der Plicht, J., Janoo, A., Griffiths, O., van den Hoek Ostend, L. W., Cremer, H., Vernimmen, T., De Louw, P. G. B., Bholah, A., Saumtally, S., Porch, N., Haile, J., Buckley, M., Collins, M. and Gittenberger, E. (2009). Mid-Holocene Concentration-Lagerstätte on oceanic island Mauritius provides a window into the ecosystem of the dodo (*Raphus cucullatus*). Quaternary Science Reviews 28(1-2): 14-24.

Roberts, C. M., McClean, C. J., Veron, J. F., Hawkins, J. P., Allen, G. R., McAllister, D. E., Mittermeier, C., Schueler, F. W., Spalding, M., Wells, F., Vynne C. and Werner, T. B. (2002). Marine biodiversity hotspots and conservation priorities for tropical reefs. Science 295: 1280-1284.

Roberts, D. L., Florens, F. B. V., Baider, C. and Bosser, J. (2004). *Taeniophyllum coxii* (Summerh.) Summerh. (Orchidaceae): a new record for Mauritius, Indian Ocean. Kew Bulletin 59(4): 493-494.

Rowe, F. W. E. and Richmond, M. D. (2004). A preliminary account of the shallow-water echinoderms of Rodrigues, Mauritius, western Indian Ocean. Journal of Natural History 38(23-24): 3273-3314.

Safford, R. J. (2001). Mauritius. pp583-596 in Evans, M. I. and Fishpool, L. D. C. eds. Important Bird Areas in Africa and associated islands: priority sites for conservation. Cambridge: BirdLife International.

Sharpley, R. and Naidoo, P. (2010). Tourism and poverty reduction: the case of Mauritius. Tourism and Hospitality Planning et Development 7(2): 145-162.

Staub, F. and Guého, J. (1968). The Cargados Carajos Shoals or St Brandon: resources, avifauna and vegetation. Proceeding of Royal Society of Arts and Sciences of Mauritius 3: 7-46.

Strahm, W. A. (1989). Plant Red Data Book for Rodrigues. Koeltz, Germany. 241pp.

Tatayah V. (2011) The breeding biology of the Round Island Petrel (*Pterodroma arminjoniana*) and factors determining breeding success. PhD Thesis, University of Mauritius.

Tatayah V., Goder, M. and de Chazal, D. (2022). Conservation Management Plan for Mondrain Reserve. Port Louis: Mauritian Wildlife Foundation.

Tatayah, V., Jhangeer-Khan, R. and Bégué, J. A. (2021). *Dombeya rodriguesiana*. The IUCN Red List of Threatened Species 2021: e.T164111324A164117292.

Tatayah, V., Jhangeer-Khan, R., Bégué, J. A. and Jones, C. A. (2017). *Pteropus rodricensis*. The IUCN Red List of Threatened Species 2017: e.T18755A22087057.

Tatayah, R. V. and Khadun, A. K. (2002). Survey of St Brandon. Unpublished report to Mauritian Wildlife Foundation

Tixier, P. and Guého, J. (1997). Introduction to Mauritian bryology: a check list of mosses and liverworts. Réduit: Mauritius Sugar Industry Research Institute.

Turvey, S. T. and Cheke, A. S. (2008). Dead as a dodo: the fortuitous rise to fame of an extinction icon. Historical Biology 20(2): 149-163.

Turner, J. and Klaus, R. (2005). Coral reefs of the Mascarenes, Western Indian Ocean. Philosophical Transactions of the Royal Society, ser. A, 363: 229-250.

Vaughan, R. E. and Wiehe, P. O. (1937). Studies on the vegetation of Mauritius I. A preliminary survey of the plant communities. Journal of Ecology 25: 289-343.

Walter, K. S. and Gillet, H. J. (1998). 1997 IUCN Red List of Threatened Plants. Cambridge: IUCN.

Webster, I. and Cadinouche, A. (2013). Agalega Expedition Report: summary of results with recommendations for management, research and monitoring. Report to the Outer Island Development Corporation. 27pp.

Williams, A. J. and Rowlands, B. W. (1980). Sea birds of the Cargados Carajos Shoals. Cormorant 8: 43-48.

Williams, J. R. (2000). A revision of the Mascarene weevil genus *Syzygops* Schonherr (Coleoptera: Curculionidae: Entiminae). Invertebrate Taxonomy 14b(3) 411 - 432

Williams, J. R. (2007). Butterflies of Mauritius. Bioculture Press, Mauritius.

Williams, J. R. and Cox, M. L. (2003). A contribution to the study of Mascarene weevils of the genus *Cratopus* Schonherr (Coleoptera: Curculionidae: Entiminae: Cratopini): the species of Mauritius and Rodrigues. Mauritius Institute Bulletin 12(1): 1-67.

Seychelles

Aerts, R., Dewaelheyns, V. and Achten, W. M. (2016). Potential ecosystem services of urban agriculture: a review. PeerJ Preprints. https://doi.org/10.7287/peerj.preprints.2286v1

African Development Bank (2011). Seychelles. Country Strategic Paper 2011-2015.

Bielsa, M., A'Bear, L., Bunbury, N. and Fleischer-Dogley, F. (2020). *Mops pusillus*. The IUCN Red List of Threatened Species 2020: e.T4318A22017997.

Bijoux, J. P, Adam, P-A., Alcindor, R., Bristol, R., Decommarmond, A., Mortimer, J. A., Robinson, J., Rosine, G., Talma, E. S., Wendling, B. and Zialor, V. (2003). Marine Biodiversity of the Seychelles archipelago: The known and unknown. Census of Marine Life Programme in sub-Saharan Africa. 22 p.

Bunyard, P. P. (2014). How the Biotic Pump links the hydrological cycle and the rainforest to climate: Is it for real? How can we prove it? Fondo de publicaciones Universidad Sergio Arboleda. https://doi.org/10.22518/9789588745886

Carlström, A. (1996). Areas of Special Conservation Value for the Plants of the Granitic Islands of Seychelles (Consultancy Report). Seychelles Government. Ministry of Foreign Affairs, Planning and Environment. Conservation et National Parks Section, Victoria, Seychelles.

Catling, D. C. and Stroud, S. (2012). The Greening of Green Mountain, Ascension Island. 11.

Conservation International, (2014). Ecosystem profile: Madagascar and Indian Ocean Islands. Arlington: Critical Ecosystem Partnership Fund.

Etongo *et al.* (2020). "Identifying and Overcoming Barriers to Climate Change Adaptation in the Seychelles," African Handbook of Climate Change Adaptation.

Fritz, U., Branch, W. R., Gehring, P.-S., Harvey, J., Kindler, C., Meyer, L., Du Preez, L., Siroky, P., Vieites, D. R. and Vences, M. (2013). Weak divergence among African, Malagasy and Seychellois hinged terrapins (*Pelusios castanoides*, *P. subniger*) and evidence for human-mediated oversight dispersal. Organisms Diversity et Evolution 13, 215-224.

Gerlach, J. (2014a). *Phrynichus scaber*. The IUCN Red List of Threatened Species 2014: e.T196520A2458910.

Gerlach, J. (2014b). *Sechelleptus seychellarum*. The IUCN Red List of Threatened Species 2014: e.T201481A2706807.

Gerlach, J. (2014c). *Polposipus herculeanus*. The IUCN Red List of Threatened Species 2014: e.T17902A21425713.

Gerlach, J., Rocamora, G., Gane, J., Jolliffe, K. and Vanherck, L. (2013). Giant tortoise distribution and abundance in the Seychelles Islands: past, present, and future. Chelonian Conservation and Biology 12, 70-83.

Goodman, S.M. and Ranivo, J. (2008). A new species of *Triaenops* (Mammalia, Chiroptera, Hipposideridae) from Aldabra Atoll, Picard Island (Seychelles). Zoosystema 30(3):681-693.

Goodman, S. M. and Ratrimomanarivo, F. H. (2007). The taxonomic status of *Chaerephon pumilus* from the western Seychelles: resurrection of the name *C. pusillus* for an endemic species. Acta Chiropterologica, 9: 391-399.

Government of Seychelles (2011). Fourth National Report to the United Nations Convention on Biological Diversity. Department of Environment. 117pp.

Government of Seychelles (2012) National Report Republic of Seychelles - national preparations for the UNCSD, Rio 2012, 68pp.

Government of Seychelles (2013). Seychelles' Protected Areas Policy. Ministry of Environment and Energy. 44pp.

Government of Seychelles (2014). Seychelles Biodiversity Strategy and Action Plan 2015-2020. http://seychellesbiodiversitychm.sc/wp-content/uploads/2015/07/NBSAP-2.0-Final-Revised-Version-.pdf

Government of Seychelles (2018). Seychelles tourism master plan.

Government of Seychelles (2019a). Seychelles fisheries sector policy and strategy 2019.

Government of Seychelles (2019b). Seychelles National Development Strategy 2019-2023. Ministry of Finance, Trade, Investment and Economic Planning, Seychelles.

Government of Seychelles (2019c). Seychelles Wetland Policy and Action Plan 2019-2022.

Government of Seychelles (2020a). Seychelles' National Climate Change Policy, Ministry of Environment, Energy and Climate Change, Seychelles.

Government of Seychelles (2020b). Sixth National Report to the Convention on Biological Diversity. GoS/UNEP.

Government of Seychelles (2021). Seychelles' Updated Nationally Determined Contribution.

Government of Seychelles (n.d.) Mangroves for the Future Initiative, National Strategy and Action Plan 2010-2013. 47pp.

Government of Seychelles (n.d.) Seychelles Sustainable Development Strategy 2012 – 2020. 304pp.

IFC (2012). Performance Standard 6. Biodiversity Conservation and Sustainable Management of Living Natural Resources. Washington DC: International Finance Corporation. 9pp.

Keith, P. *et al.* (2006). Atlas of the freshwater fishes and crustaceans of the Comoros, Mascarene Islands and Seychelles. Paris: Museum national d'Histore naturelle.

Khan, A. and Amélie, V. (2014) Assessing climate change readiness in Seychelles: implications for ecosystem-based adaptation mainstreaming and marine spatial planning. Regional Environmental Change 15: 721–733.

McAlpine, C. A., Johnson, A., Salazar, A., Syktus, J., Wilson, K., Meijaard, E., Seabrook, L., Dargusch, P., Nordin, H. and Sheil, D. (2018). Forest loss and Borneo's climate. Environ. Res. Lett. 13, 044009. https://doi.org/10.1088/1748-9326/aaa4ff

Neugarten, R., Honzák, M., Grantham, H., Koenig, K., Wright, T. M., Andriamaro, L., Rasolohery, A., Bottrill, M., Cano, C. A., Hole, D., Juhn, D., Saenz L., Steininger, M. and Turner, W. (2014). BCA+ Assessment of ecosystem service values of Key Biodiversity

Areas. Framework and Pilot Demonstration: Madagascar. Antananarivo: Conservation International and CEPF.

Oglesby, R. J., Sever, T. L., Saturno, W., Erickson, D. J. and Srikishen, J. (2010). Collapse of the Maya: could deforestation have contributed? J. Geophys. Res. 115, D12106. https://doi.org/10.1029/2009JD011942

Payet, R. (2006). Decision processes for large marine ecosystems management and policy. Ocean et Coastal Management 49(3-4): 110-132.

Raxworthy, C., Gray, A., Koch, B., Jean-Baptiste, M., Nussbaum, R., King, C. and Ingram, C. (in prep). Unrecognized chameleon diversity in the Seychelles.

Senterre, B., Rocamora, G., Bijoux, J., Mortimer, J. and Gerlach, J. (2010). Seychelles biodiversity metadatabase. Output 4a: Consolidated Biodiversity Data Synthesis. Consultancy Report, Ministry of Environment-UNDP-GEF project. 252pp.

Senterre, B., Henriette, E., Chong-Seng, L., Gerlach, J., Mougal, J., Vel, T. and Rocamora, G. (2013) Seychelles Key Biodiversity Areas: patterns of conservation value in the inner islands. Government of Seychelles-GEF-UNDP Biodiversity Mainstreaming Project.

Shaw, J. M. (2003). Climate change and deforestation: implications for the Maya collapse. Anc. Mesoam. 14: 157-167. https://doi.org/10.1017/S0956536103132063

Sheil, D., (2018). Forests, atmospheric water and an uncertain future: the new biology of the global water cycle. For. Ecosyst. 5: 19. https://doi.org/10.1186/s40663-018-0138-y

Sheil, D. and Murdiyarso, D. (2009). How Forests Attract Rain: An Examination of a New Hypothesis. BioScience 59: 341-347. https://doi.org/10.1525/bio.2009.59.4.12

APPENDIX 4: ADDITIONAL INFORMATION ON SPECIES PRESENT IN DIFFERENT HABITATS OF THE SEYCHELLES

Main habitats	Main species
Coastal and lowland forests (up to 200 m altitude)	**<u>Granitic islands</u>** **Flora:** Littoral: *Scaevola sericea, Cocos nucifera, Calophyllum inophyllum, Hernandia nymphaefolia, Hibiscus tiliaceus, Thespesia populnea, Cordia subcordata, Tournefortia argentea, Suriana maritima, Casuarina equisetifolia, Pisonia grandis etc.* Plain (Native): *Terminalia catappa, C. inophyllum, Heritiera littoralis, C. subcordata* etc. (Introduced:) *Cinnamoum verum, Adenanthera pavonina, Tabebuia pallida, Cocos nucifera*, various fruiting and ornamental species. **Fauna**: Endemics: *Pteropus seychellensis, Coleura seychellensis, Lycognathophis seychellensis, Trachycnemis sechellensis, Copsychus sechellarum, Terpsiphone corvina, Acrocephalus sechellensis, Foudia sechellarum, Alectroenas pulcherrima, Hypsipetes crassirostris, Falco araea, Nectarinia dussumieri, Trachylepis sechellensis, Trachylepis wrightii, Phelsuma spp*, *Grandisonia spp, Aphanoconia theobaldiana* etc. Natives: *Onychoprion fuscata, Anous stolidus, Anous tenuirostris, Gygis alba, Puffinus Pacificus, Puffinus lherminieri, Phaethon lepturus, Sterna anaethetus etc.* Introduced: *Rattus spp, Mus musculus, Acridotheres tristis, Geopelia striata, Foudia madagascariensis, Streptopelia picturata, Felis catus, Canis familiaris, Tenrec ecaudatus, Tyto alba affinis, Achatina fulica, Achatina immaculata* etc. **<u>Coral islands</u>** **Flora:** Natives: *S. sericea, Pemphis acidula, Pisonia grandis, Guettarda speciosa, Suriana maritima,* Introduced: *Cocos nucifera, Casuarina equisetifolia* **Fauna:** *Onychoprion fuscata, Anous stolidus, Anous tenuirostris, Gygis alba, Puffinus Pacificus, Puffinus lherminieri, Sterna dougalli, Sterna sumatrana, Phaethon lepturus, Phaethon rubricauda, Sula spp.* Endemic*: Dipsochelys dussumieri (Aldabrachelys gigantea/dussmieri), Cyathopoma picardense, Quickia aldabrensis, Rhachistia aldabrae* (Aldabra). Introduced: *Rattus spp, Felis catus, Capra hircus, Sus scrofa, etc.*

Main habitats	Main species
Intermediate forests (200 - 500m altitude)	**Flora:** Endemic: *Northia hornei, Dillenia ferruginea, Colea seychellarum, Campnosperma seychellarum, Aphloia seychellensis, Pandanus hornei* etc. Introduced: *Cinnamomum verum, Adenanthera pavonina, Paraserianthes falcataria, Sandoricum koetjape, Chrysobalanus icaco, Tabebuia pallida, Alstonia macrophylla, Swietenia macrophylla* etc. **Fauna:** Endemic: *Zosterops modestus, Alectroenas pulcherrima, Hypsipetes crassirostris, Falco araea, Nectarinia dussumieri, Otus insularis* (Mahé only), *Tachycnemis seychellensis, Sooglossus gardineri, S. pipilodryas, Grandisonia spp, Phelsuma spp, Trachylepsis sechellensis, Pteropus seychellensis, Aphanoconia theobaldiana, Cyathopoma blandfordi, Pachnodus niger* etc. Introduced: *Rattus* spp, *Acridotheres tristis, Geopelia striata, Foudia madagascariensis, Streptopelia picturata, Tyto alba affinis, Felis catus, Canis familiaris, Tenrec ecaudatus, Achatina fulica, A. immaculata* etc.
Mountain forests **(500 - 910m altitude)**	**Flora:** Endemic: *Northia hornei, Dillenia ferruginea, Roscheria melanochaetes, Pandanus sechellarum, P. Multispicatus, Timonius sechellensis, Randia sericea, Nepenthes pervillei, Excoecaria benthamiana, Mimusops sechellarum etc.* Introduced: *C. verum, P. falcataria, Pterocarpus indicus, A. macrophylla etc.* **Fauna:** Endemic: *Z. modestus, A. pulcherrima, H. crassrostris, F. araea, N. dussumieri, O. insularis, Aerodramus elaphrus (*roosts/breeding sites*), Sooglossus sechellensis, S. thomasseti, Grandisonia spp, Phelsuma spp, T. sechellensis, Aphanoconia theobaldiana, Edentulina moreleti, Punctum seychellarum, Pilula mahesiana, Pachnodus spp.* Introduced: *Rattus spp, A. tristis, G. striata, F. madagascariensis, T. a. affinis, F. catus, C. familiaris, T. ecaudatus* etc.
Palm forests	The islands of Praslin and Curieuse have particular climactic palm forest plant communities, including the presence of Lodoicea maldivica (endemic to both islands). Palm forest communities are also present in drier areas and on the ridges of other forest categories, such as intermediate and montane forests. **Flora:** Endemic: *L. maldivica, Verschaffeltia splendida, Roscheria melanochaetes, Phoenicophorium borsigianum, Nephrosperma vanhoutteana, Deckenia nobilis accompanied by Pandanus spp & D. ferruginea etc.* Introduced: *C. verum, Chrysobalanus icaco, Alstonia macrophylla,* various vine species etc. **Fauna:** Endemic*: Coracopsis nigra barklyi* (Praslin and Curieuse only), *A. pulcherrima, H. Crassirostris, Stylodonta studeriana* (P only), *Pachnodus praslinus* (P only), *P. niger subfuscus* (P only), *Vaginula seychellensis*, *Ailuronyx trachygaster, A. Tachyscopaeus, Phelsuma spp etc.* Introduced: *Rattus* spp, *Acridotheres tristis,* etc.

Main habitats	Main species
Inselbergs	**Flora:** Endemic: *Medusagyne oppositifolia (M only), Pandanus multispicatus, Memecylon eleagnai, Erythroxylum sechellarum, Lophoschoeneus hornei, Excoecaria benthamiana, Soulamea terminaloides, Nepenthes pervillei etc.* Introduced: *C. verum, Annas commosus*
Riparian forest	**Flora:** Endemic*: Pandanus hornei, Pandanus sechellarum, Phoenicophorium borsigianum, Verschaffeltia splendida, Pandanus balfouri and the indigenous Heritiera littoralis and Barringtonia racemosa.* Introduced: *Paraserianthes falcataria, Artocarpus* spp*, Bambusa* spp etc. **Wildlife:** Endemic: *Archaius tigris, O. insularis* etc. Introduced: *Rattus* spp. etc.
Low-lying wetlands	**Flora:** Native: *Typha javanica, Eleocharis dulcis, E. Variegata, Polygonum senegalense, Cyperus spp, Fimbristylis spp, Terminalia catappa etc.* Introduced: *Eichornia crassipes, Pistia stratiotes*, *Ludwigia octovalvis, Nymphaea lotus, Alocasia macrorrhiza* **Wildlife:** Endemic: *Pelusios castanoides intergularis, P. subniger parietalis, Hypogeophis rostratus,* Native: *Ixobrychus sinensis, Gallinula chloropus,* Introduced: *Ptychadaena mascareniensis, Rattus spp, Canis domesticus, Felis catus, A. tristis, Trachemys scripta elegans* (considered extinct), *Physella acuta, Gyraulus mauritanius etc.*
Upland wetlands	**Flora:** Endemic: *Pandanus hornei, Verschaffeltia splendida, Gynura sechellensis, Mimusops sechellarum, Randia lancifolia, Allophylus sechellensis, Campnosperma seychellarum, Canthium sechellense etc.* Introduced: *Cinnamomum verum, Chrysobalanus icaco, Paraserianthes falcataria, Alstonia macrophylla, Tabebuia pallida, Clidemia hirta etc.* **Fauna:** Endemic: *Sooglossus spp, Pachypanchax playfairii, Grandisonia spp, Trichoptera spp, Otus insularis*; *various species of mollusks, both endemic and native* * etc. Introduced: *Rattus spp, M. musculus, Tenrec ecaudatus etc.*

Main habitats	Main species
Rivers and streams	**Fauna:** Endemic: *Hypogeophis rostratus, Praslina cooperi, Tachycnemis seychellensis, Pachypanchax playfairii, Parioglossus multiradiatus, Paludomis ajanensis, Seychellum alluaudi, Allolestes maclachlanii, Leptocnemis cyanops, Zygonix luctifera, Hughscotiella auricapilla, Oxyethira sechellensis, Ecnomus maheensis* Native: *Anguilla bicolor, Sesarmops impressum, Varuna litterata, Macrobrachium spp, Caridinia spp, Neritina gagates, N. Pulligera, Septaria borbonica, Ardea cinerea, Butorides striatus, Nycticorax nycticorax* Introduced: *Poecilia reticulata, Oreochromis mossambicus, Lymnaea natalensis, Gyraulus mauritanius, etc.*
Beach ridge and beach (and open interiors or seagrass beds on coral islands)	**Flora:** i). Native: *Scaevola sericea, tournefortia argentea, Pemphis acidula, Sideroxylon inerme cryptophlebia, C. inophyllum, Cordia subcordata, T. catappa, Hernandia nymphaefolia, Guettarda speciosa* etc. ii). Introduced: *Cocos nucifera, Casuarina equisetifolia*. **Fauna:** *Atactodea striata, Coenobita spp, Donax spp, Birgus latro, Ocypode spp, Eretmochelys imbricata, Chelonia mydas* (nesting habitat), wading/coastal birds etc... Sea bird colonies: *Onychoprion fuscata, Sula dactylatra, S. Leucogaster, Anous stolidus, Puffinus pacificus, Phaethon lepturus, Hydroprogne caspia, Thalasseus bergii, Sterna dougalli, S. sumatrana, etc.*
Rocky shores	**Flora:** i). Native: *Pandanus balfouri, H. tiliaceus,* ii). Introductory: *C. nucifera, Casuarina equisetifolia*. **Fauna:** *Grapsus spp, Geograpsus spp, Littorina spp, Cellana cernica, Tetraclita spp, Nerita spp, Chitonidae, Blennidae, Sterna anaethetus, Phaethon lepturus, Puffinus pacificus*
Mudflats and mangroves	**Flora:** *Avicennia marina, Bruguieragymnorhiza, Ceriopstagal, Lumnitzeraracemosa, Rhizophoramucronata, Sonneratia alba, Xylocarpusgranatum, X. moluccensis,* etc... **Fauna:** *Terebralia palustris*, Bivalvia spp: Gafrariumtumidum & pectinatum, Ctenadivergens etc... *Littorina scabra*, *Cardisomac arnifex, Scylla serrata*, *Geograpsus spp*, *Metopograpsus spp, Sesarma spp, Uca spp* etc... *Periopthal muskalolo, P. argentilineatus, Fregata spp*, Ardeacinera, Butoridesstriatus, wading bird species.
Herbarium	**Flora:** *Cymodocea rotundata, C. serrulata, Enhalus acocroides, Halodule uninervis, Halophila ovalis, Syringodium isoetifolium, Thalassodendron ciliatum, Thalassia hemprichii.* Algae: *Caulerpa spp, Codium spp* etc. **Fauna:** Various invertebrates, e.g. polychaete worms, amphipods, molluscs, crustaceans, bivalves (e.g. *P. muricata*, Gastropods, *C. moneta, C. tigris, Strombus spp., Morula margariticola* etc... Grazing species e.g. *Siganus spp. Chelonia mydas, Eretmochelys imbricata.*
Reef flat	**Fauna:** *Bursa bufonia, B. cruentata. Cerithium zebrum, Conus leopardus, C. litteratus, C. virgo, C. betulinus, C. quercinus. Cypraea annulus, C. Lynx, C. caurca, C. helvola. Rissoina ambigua, R. plicata. Smaragdia rangiana. Strombus gibberulus,* Holothuridae, lobster, octopus.

Main habitats	Main species
Coral reefs (including: reef ridge, slope, patch reefs, etc.)	**Fauna:** 23 species of Scaridae, >30 species of Serranidae, >20 species of Lutjanidae, *Amphiprion fuscocaudatus* (endemic), Octopus, lobster spp., Eretmochelys imbricata, more than 400 coral species, numerous molluscs spp., Diverse populations of elasmobranch > 35 species.
Mahé Plateau	**Fauna:** Sea cucumber spp. (*Holothuria nobilis, H. fucogilva, H. fuscopunctata, H. atra, H. edulis, H. scabra* etc.) *Carangid spp* (Trevally and Bludger), *Lutjanid spp* (e.g. *Lutjanus sebae*,) Lethrinids, Serranids etc, elasmobranch spp: *C. leucas, C. limbatus, C. plumbeus, Galeocerdo cuvier, Sphyrna spp, Mobula specie, Aetomylaeus vespertilio* etc
Pelagic	**Fauna:** Tuna: (*Katsuwomus pelamis, Thunnus albacores, T. obesus, T.alalunga* etc.). Billfish: (*Xiphias gladius, Makaira spp, Tetrapturus audax, Istiophorus platypterus*). Shark spp : (*Prionace glauca, Carcharhinus falciformis, C. longimanus, Isurus spp, Sphyrna spp, Carcharodon carcharias, Rhincodon typus* etc.). *Manta birostris* Turtles: *Chelonia Mydas, Dermochelys coriacea, Caretta caretta, Lepidochelys olivacea*. Marine birds: *Sterna bengalensis, S. caspia, Onychoprion fuscata, Sula dactylara, S. leucogaster, Macronectes giganteus* etc... Marine mammals: 27 species of cetaceans have been recorded in the waters of the Seychelles including: *Megaptera novaeangliae, Physeter macrocephalus* etc.
Seabed	Limited data

APPENDIX 5: THREATS TO KBAS IN THE SEYCHELLES

KBA ID#	ZCB (French name)	ILE	AZE	IBA	RAMSAR	PA	(Co)-manager(s)	VU	EN	CR	TOTAL	Threat level	Main threats
SYC-1	Anse Major / Anse Jasmin (marine area of MSNP)	Mahé				no		0	1	1	2	Medium	Global warming, poaching/overharvesting, pollution, sea level rise (climate change)
SYC-2	Anse Source d'Argent-Anse Marron	La Digue	X	X		no	The Union Pty Ltd	1	1	1	3	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-3	Astove	Astove		X		no	IDC/ICS	0	0	0	0	Medium	IAS, land use change/construction development, fire, sea level rise, marine debris
SYC-4	African Banks	African Banks		X		AP	ICS/IDC	0	0	0	0	Medium	Global warming, poaching/overharvesting, pollution, sea level rise (climate change), marine debris
SYC-5	Cosmoledo	Cosmolédo		X		PROPOSED	IDC/ICS	0	0	0	0	Fort	IAS, poaching, fire, marine debris, sea level rise, climate change
SYC-6	Farquhar - South Island and islets	Farquhar		X		PROPOSED	IDC/ICS	0	0	0	0	Medium	IAS, poaching, fire, marine debris, sea level rise
SYC-7	Fond Azore southern slopes to Anse Bois de Rose	Praslin		X		PROPOSED		14	4	2	20	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-8	Fond Diable and Pointe Joséphine	Praslin				no		3	1	0	4	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-9	Fond Ferdinand	Praslin				PROPOSED		12	6	1	19	Medium	IAS, fire, fragmentation, climate change
SYC-10	L'Amitié Forest	Praslin				no		4	0	0	4	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-11	Coral Mountain-Southern Hills Dry Forests	Mahé				PROPOSED		12	1	1	14	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-12	Grand Anse-Petite Anse-Fond Piment	La Digue	X			no		3	0	1	4	Low	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-13	Grand Police wetlands	Mahé				no	Private companies	4	1	0	5	Medium	IAS, land use change/urbanization, pollution/eutrophication, climate change
SYC-14	Assumption Island	Assumption				PROPOSED	IDC/ICS	0	0	0	0	Medium	IAS, land use change/building development, fire, climate change, marine debris
SYC-15	Bird Island (Ile aux Vaches)	Vaches		X		no	Private companies	0	0	0	0	Medium	Overexploitation, climate change, IAS, rising water levels, poaching
SYC-16	Conception Island	Conception		X		no		1	1	0	2	Fort	IAS, fire, climate change
SYC-17	Cousine Island	Cousine		X		no	Private companies	2	1	0	3	Medium	IAS, fire, climate change, sea level rise
SYC-18	Curieuse Island	Curieuse				no	NAPS	9	2	1	12	Medium	IAS, fire, climate change, sea level rise, poaching
SYC-19	D'Arros Island and Saint Joseph Atoll	D'Arros/St Joseph		X		PROPOSED	Save our Seas	0	0	0	0	Medium	IAS, fire, climate change, sea level rise, poaching
SYC-20	Denis Island	Denis		X		no	Private companies	1	1	1	3	Medium	IAS, fire, climate change, sea level rise
SYC-21	Desnoeufs Island	Desnoeufs		X		PROPOSED	IDC/ICS	0	0	0	0	Medium	Climate change, sea level rise, poaching, overexploitation of resources

KBA ID#	ZCB (French name)	ILE	AZE	IBA	RAMSAR	PA	(Co)-manager(s)	VU	EN	CR	TOTAL	Threat level	Main threats
SYC-22	Desroches Island - surrounding reefs	Desroches				PROPOSED	IDC/ICS	0	0	0	0	Medium	IAS, land use change/building development, fire, overexploitation (sea cucumber), sea level rise, climate change
SYC-23	North Island (Ile du Nord)	North		X		no	Wilderness Safaris	0	1	0	1	Low	IAS, land use change/building development, fire, climate change
SYC-24	Providence Island and Bank	Providence		X		no	IDC/ICS	0	0	0	0	Medium	Global warming, poaching/overharvesting, sea level rise, marine debris
SYC-25	Alphonse Island and Lagoon	Alphonse		X		no	ICS/IDC/Hotel	0	0	0	0	Medium	Global warming, poaching/overharvesting, sea level rise, marine debris
SYC-26	Félicité Island	Félicité				no	Private companies	9	0	1	10	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-27	Frégate Island	Frégate		X		no	Private companies	1	3	1	5	Low	IAS; Land use change/urbanization; Fragmentation; Fires; Climate change
SYC-28	Marie-Louise Island	Marie-Louise		X		no	IDC/ICS	0	0	0	0	Medium	IAS, climate change, sea level rise, poaching
SYC-29	Saint-Pierre Island	Saint Pierre				no	IDC/ICS	0	0	0	0	Medium	IAS, poaching, climate change, sea level rise, marine debris
SYC-30	Sainte-Anne Island	Saint Anne				no	Private companies	3	0	0	3	Medium	IAS, land use change/building development, pollution, fire, climate change
SYC-31	Etoile and Boudeuse Islands	Etoile and Boudeuse		X		AP	ICS/IDC	0	0	0	0	Medium	IAS, poaching, climate change, sea level rise, marine debris
SYC-32	Saint-François and Bijoutier Islands	Saint François & Bijoutier		X		PROPOSED	ICS/Hotel	0	0	0	0	Medium	IAS, poaching, climate change, sea level rise, marine debris
SYC-33	Frégate Islet	Frégate		X		AP	Frégate Island	0	0	0	0	Medium	Poaching, IAS, sea level rise
SYC-34	Poivre Lagoon and surrounding reefs	Poivre				PROPOSED	IDC/ICS	0	0	0	0	Medium	Global warming, poaching/overharvesting, sea level rise, marine debris
SYC-35	Mount Signal	Mahé				no		2	0	0	2	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-36	Burnt Mountain-Piton de l'Eboulis	Mahé				PROPOSED		21	9	3	33	Medium	IAS, fragmentation, climate change
SYC-37	Glacis Mountain - When she comes	Mahé		X		no		10	0	0	10	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Mahé	X	X		PROPOSED		31	16	10	57	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-39	Nid d'Aigle (ridge and eastern slopes)	La Digue	X	X		no		6	0	0	6	Low	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-40	Recif Island National Park	Recif		X		AP	SNPA / MEE	0	0	0	0	Medium	IAS, poaching, climate change, sea level rise, marine debris
SYC-41	Praslin National Park	Praslin		X		AP	SNPA / SIF	16	7	3	26	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-42	Silhouette National Park	Silhouette		X		AP	IDC/ICS/SNPA	40	20	21	81	Low	IAS, land use change/urbanization, fragmentation, fire, climate change

KBA ID#	ZCB (French name)	ILE	AZE	IBA	RAMSAR	PA	(Co)-manager(s)	VU	EN	CR	TOTAL	Threat level	Main threats
SYC-43	Morne Seychellois National Park	Mahé	X	X		AP	NAPS	29	21	13	63	Medium	IAS, land use change/urbanization, fragmentation, fire, climate change
SYC-44	Cap Ternay / Ternay Bay Marine National Park	Mahé				APMC	NAPS	0	0	0	0	Medium	Global warming, poaching, sedimentation, pollution, sea level rise (climate change)
SYC-45	Cocos Island Marine National Park	Félicité				APMC	NAPS	0	0	0	0	Medium	Global warming, poaching, sea level rise (climate change)
SYC-46	Curieuse Island Marine National Park	Curieuse				APMC	NAPS	0	0	0	0	Medium	Global warming, sedimentation, sea level rise (climate change)
SYC-47	Port Launay Marine National Park and Coastal Wetlands	Mahé				APMC	NAPS	0	0	0	0	Medium	Global warming, poaching, sedimentation, pollution, sea level rise (climate change)
SYC-48	Sainte-Anne Marine National Park	Saint Anne				APMC	NAPS	0	0	0	0	Medium	Global warming, poaching, sedimentation, pollution, sea level rise (climate change)
SYC-49	Silhouette Marine National Park	Silhouette				APMC	NAPS	0	0	0	0	Medium	Global warming, poaching, sea level rise (climate change), marine debris
SYC-50	Aldabra Special Reserve	Aldabra	X	X	X	AP	FIS	2	2	0	4	Medium	Global warming, sea level rise (climate change), marine debris
SYC-51	Aride Island Special Reserve	Aride		X		APMC	ICS	2	2	2	6	Medium	Poaching, IAS, global warming, sea level rise
SYC-52	Cousin Island Special Reserve	Cousin		X		APMC	Nature Seychelles	2	1	0	3	Medium	Global warming, sea level rise, sedimentation, IAS
SYC-53	La Veuve Special Reserve	La Digue	X	X		AP	NAPS	0	0	1	1	Medium	IAS, fragmentation, pollution/eutrophication
SYC-54	Kerlan River	Praslin				no		7	0	0	7	Low	IAS, land use change/urbanization, water withdrawal
SYC-55	Anse Petite Cour Boulders	Praslin				no		4	1	0	5	Low	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-56	Val d'Endor	Mahé				no		5	0	0	5	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change
SYC-57	La Misère-Dauban area: La Misère	Mahé	X	X		no		6	1	1	8	Medium	IAS, fire, land use change/urbanization, fragmentation, climate change

APPENDIX 6: SELECTED CLIMATE ADAPTATION PROJECTS IN MADAGASCAR

Project title and dates	Implementing agency	Budget	Donor	Areas or regions of intervention
Building Urban Resilience to Climate Change Project [2021-2023]	Ministry of Land Management and Service (MATSF)	1.5 M Euros	AFD	173 urban centers
Strengthening Conditions and Capacities for Sustainable Adaptation to Climate Change Project PRCCC [2016-2020].	GIZ / ONE	34.7 M Euros	BMZ	Analamanga, Boeny, Diana,
Landscape Resilience to Climate Change and Improved Livelihoods FFF (Forest and Farm Facility) [2013-2018]	FAO, FIFATA, Réseau SOA, PNFDDSA, MinAE, CPM, FEKRITAMA, Tranoben'ny Tantsaha Mpamokatra	18 M USD	FAO, IIED	Boeny, Diana, Sofia,
Adapting agricultural value chains to climate change PrAda [2018-2022]	GIZ/DGM/FOFIFA/MAEP/ MEDD	17.5M Euros	BMZ	Androy, Anosy, Atsimo Atsinanana,
Strengthening Urban Climate Resilience in Southeast Africa (Madagascar, Malawi, Mozambique, Union of Comoros) [2018-2021]	APRM	14 M USD	Adaptation Fund	International
Capacity Building Project for Strengthening the Conditions and Capacities for Adaptation and Resilience of Rural Communes to Climate Change PACARC [2016-2021].	MAEP/MEEF/MinEau/MTTM	5.9 M USD	Least Developed Countries Fund	Analamanga, Androy, Anosy, Atsimo Andrefana, Atsinanana
Coastal Zone Management Adaptation to Climate Change with Ecosystems and Livelihoods Consideration Project PAZC [2014-2019]	UNEP, MEDD and partners	5.5 M USD	Least Developed Countries Fund	Atsinanana, Boeny, Menabe, Vatovavy Fitovinany
Strengthening the climatic resilience of rice farming to climate change in the Alaotra Mangoro region. [2012-2017]	APRM	4.4 M USD	Adaptation Fund	Alaotra Mangoro,
Sustainable Landscapes in Eastern Madagascar [2018-2023]	Conservation International and partners	19.3 M USD	Green Climate Fund	Analamanga, Analanjirofo, Atsimo Atsinanana
InsuResilience Project [2019-2022]	SAF-FJKM/CARE International	2 M Euros	KFW, BMZ and Frankfurt School	National

Project title and dates	Implementing agency	Budget	Donor	Areas or regions of intervention
Pilot Program for Climate Resilience in Madagascar (PPCR) [2015-2019]	CPGU	1.5 M USD	World Bank	National
Adapt'Action Facility - capacity building for climate governance and integration of adaptation into public policies	MEDD and French expertise		AFD	National
Support for the development of reference frameworks and the implementation of actions for the integration of climate change in territorial and urban planning tools	MATP/Urban Communities		AFD	National

APPENDIX 7: LIST OF TRIGGER SPECIES FOR THE PRIORITY KBAS

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MADAGASCAR				
MDG-11	Tsinjoriake-Andatabo	Mammals	*Cryptoprocta ferox*	Fossa
MDG-11	Tsinjoriake-Andatabo	Mammals	*Lemur catta*	Ring-tailed Lemur
MDG-28	Belalanda	Reptiles	*Astrochelys radiata*	Radiated Tortoise
MDG-28	Belalanda	Reptiles	*Furcifer antimena*	Antimena Chameleon
MDG-28	Belalanda	Reptiles	*Furcifer belalandaensis*	Belalanda Chameleon
MDG-28	Belalanda	Reptiles	*Matoatoa brevipes*	
MDG-28	Belalanda	Reptiles	*Pyxis arachnoides*	Spider Tortoise
MDG-34	Three Bays Complex	Fish	*Sphyrna lewini*	Scalloped Hammerhead
MDG-34	Three Bays Complex	Invertebrates	*Holothuria nobilis*	Black Teatfish
MDG-34	Three Bays Complex	Invertebrates	*Holothuria scabra*	
MDG-34	Three Bays Complex	Reptiles	*Chelonia mydas*	Green Turtle
MDG-34	Three Bays Complex	Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle
MDG-34	Three Bays Complex	Reptiles	*Lepidochelys olivacea*	Olive Ridley
MDG-54	Lake Tseny	Fish	*Paretroplus kieneri*	Kotsovato
MDG-54	Lake Tseny	Fish	*Paretroplus lamenabe*	
MDG-54	Lake Tseny	Fish	*Paretroplus menarambo*	Pinstripe Damba
MDG-54	Lake Tseny	Reptiles	*Erymnochelys madagascariensis*	Madagascar Big-headed Turtle
MDG-57	Makay	Mammals	*Cheirogaleus medius*	Western Fat-tailed Dwarf Lemur
MDG-57	Makay	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur
MDG-57	Makay	Mammals	*Lepilemur ruficaudatus*	Red-tailed Sportive Lemur
MDG-57	Makay	Mammals	*Phaner pallescens*	Pale Fork-marked Lemur
MDG-57	Makay	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-67	Amoron'i Onilahy and Onilahy River	Fish	*Paratilapia polleni*	Marakely
MDG-67	Amoron'i Onilahy and Onilahy River	Fish	*Ptychochromoides betsileanus*	Trondo Mainty
MDG-67	Amoron'i Onilahy and Onilahy River	Plants	*Euphorbia mahafalensis*	
MDG-67	Amoron'i Onilahy and Onilahy River	Reptiles	*Furcifer antimena*	Antimena Chameleon
MDG-71	Analalava Special Reserve	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-71	Analalava Special Reserve	Birds	*Bernieria apperti*	Appert's Tetraka
MDG-71	Analalava Special Reserve	Birds	*Coua coquereli*	Coquerel's Coua
MDG-71	Analalava Special Reserve	Birds	*Coua gigas*	Giant Coua

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-71	Analalava Special Reserve	Birds	*Monticola bensoni*	
MDG-71	Analalava Special Reserve	Mammals	*Cryptoprocta ferox*	Fossa
MDG-71	Analalava Special Reserve	Mammals	*Lepilemur ruficaudatus*	Red-tailed Sportive Lemur
MDG-71	Analalava Special Reserve	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-71	Analalava Special Reserve	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-71	Analalava Special Reserve	Plants	*Asteropeia labatii*	
MDG-71	Analalava Special Reserve	Plants	*Dalbergia orientalis*	
MDG-71	Analalava Special Reserve	Plants	*Dalbergia purpurascens*	
MDG-71	Analalava Special Reserve	Plants	*Dalbergia tricolor*	
MDG-71	Analalava Special Reserve	Plants	*Ehretia decaryi*	
MDG-71	Analalava Special Reserve	Plants	*Ehretia phillipsonii*	
MDG-71	Analalava Special Reserve	Plants	*Euphorbia mandravioky*	
MDG-71	Analalava Special Reserve	Plants	*Mundulea laxiflora*	
MDG-71	Analalava Special Reserve	Plants	*Oeceoclades analavelensis*	
MDG-71	Analalava Special Reserve	Plants	*Ravenea rivularis*	
MDG-71	Analalava Special Reserve	Plants	*Rhynchophora humbertii*	
MDG-71	Analalava Special Reserve	Plants	*Weinmannia louveliana*	
MDG-71	Analalava Special Reserve	Reptiles	*Brookesia ebenaui*	Northern Leaf Chameleon
MDG-71	Analalava Special Reserve	Reptiles	*Uroplatus malahelo*	
MDG-73	Analavelona	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-73	Analavelona	Birds	*Bernieria apperti*	Appert's Tetraka
MDG-73	Analavelona	Birds	*Coua coquereli*	Coquerel's Coua
MDG-73	Analavelona	Birds	*Coua gigas*	Giant Coua
MDG-73	Analavelona	Birds	*Monticola bensoni*	
MDG-73	Analavelona	Mammals	*Cryptoprocta ferox*	Fossa
MDG-73	Analavelona	Mammals	*Lepilemur ruficaudatus*	Red-tailed Sportive Lemur
MDG-73	Analavelona	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-73	Analavelona	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-73	Analavelona	Plants	*Asteropeia labatii*	
MDG-73	Analavelona	Plants	*Dalbergia orientalis*	
MDG-73	Analavelona	Plants	*Dalbergia purpurascens*	
MDG-73	Analavelona	Plants	*Dalbergia tricolor*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-73	Analavelona	Plants	*Ehretia decaryi*	
MDG-73	Analavelona	Plants	*Ehretia phillipsonii*	
MDG-73	Analavelona	Plants	*Euphorbia mandravioky*	
MDG-73	Analavelona	Plants	*Mundulea laxiflora*	
MDG-73	Analavelona	Plants	*Oeceoclades analavelensis*	
MDG-73	Analavelona	Plants	*Ravenea rivularis*	
MDG-73	Analavelona	Plants	*Rhynchophora humbertii*	
MDG-73	Analavelona	Plants	*Weinmannia louveliana*	
MDG-73	Analavelona	Reptiles	*Brookesia ebenaui*	Northern Leaf Chameleon
MDG-73	Analavelona	Reptiles	*Uroplatus malahelo*	
MDG-89	Mahafaly Plateau Forest Complex	Birds	*Calicalicus rufocarpalis*	Red-shouldered Vanga
MDG-89	Mahafaly Plateau Forest Complex	Mammals	*Galidictis grandidieri*	Giant-striped Mongoose
MDG-89	Mahafaly Plateau Forest Complex	Mammals	*Lepilemur leucopus*	White-footed Sportive Lemur
MDG-89	Mahafaly Plateau Forest Complex	Mammals	*Lepilemur petteri*	Petter's Sportive Lemur
MDG-89	Mahafaly Plateau Forest Complex	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-89	Mahafaly Plateau Forest Complex	Plants	*Dicraeopetalum mahafaliensis*	
MDG-89	Mahafaly Plateau Forest Complex	Plants	*Euphorbia biaculeata*	
MDG-89	Mahafaly Plateau Forest Complex	Plants	*Euphorbia capuronii*	
MDG-89	Mahafaly Plateau Forest Complex	Plants	*Euphorbia mahafalensis*	
MDG-89	Mahafaly Plateau Forest Complex	Plants	*Ormocarpopsis tulearensis*	
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Actophilornis albinucha*	Madagascar Jacana
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Anas bernieri*	Madagascar Teal
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Ardea humbloti*	Madagascar Heron
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Ardeola idae*	Madagascar Pond-heron
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Charadrius thoracicus*	Black-banded Plover
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Chlidonias hybrida*	Whiskered Tern
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Circus maillardi*	
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Dromas ardeola*	Crab-plover
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Falculea palliata*	Sickle-billed Vanga
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Haliaeetus vociferoides*	Madagascar Fish-eagle
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Lophotibis cristata*	Madagascar Crested Ibis

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Phoeniconaias minor*	Lesser Flamingo
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Tachybaptus pelzelnii*	Madagascar Grebe
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Tachybaptus ruficollis*	Little Grebe
MDG-90	Lake Ihotry - Mangoky Delta Complex	Birds	*Zapornia olivieri*	Sakalava Rail
MDG-90	Lake Ihotry - Mangoky Delta Complex	Fish	*Paratilapia polleni*	Marakely
MDG-90	Lake Ihotry - Mangoky Delta Complex	Invertebrates	*Astacoides crosnieri*	
MDG-90	Lake Ihotry - Mangoky Delta Complex	Plants	*Euphorbia vezorum*	
MDG-90	Lake Ihotry - Mangoky Delta Complex	Reptiles	*Erymnochelys madagascariensis*	Madagascar Big-headed Turtle
MDG-90	Lake Ihotry - Mangoky Delta Complex	Reptiles	*Furcifer antimena*	Antimena Chameleon
MDG-90	Lake Ihotry - Mangoky Delta Complex	Reptiles	*Pyxis arachnoides*	Spider Tortoise
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Ardeola idae*	Madagascar Pond-heron
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Coua coquereli*	Coquerel's Coua
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Coua cursor*	Running Coua
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Coua gigas*	Giant Coua
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Coua ruficeps*	Red-capped Coua
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Falculea palliata*	Sickle-billed Vanga
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Newtonia archboldi*	Archbold's Newtonia
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Ploceus sakalava*	Sakalava Weaver
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Tachybaptus pelzelnii*	Madagascar Grebe
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Thamnornis chloropetoides*	Thamnornis Warbler
MDG-92	Mangoky-Ankazoabo Complex	Birds	*Xenopirostris xenopirostris*	Lafresnaye's Vanga
MDG-92	Mangoky-Ankazoabo Complex	Mammals	*Cryptoprocta ferox*	Fossa
MDG-92	Mangoky-Ankazoabo Complex	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-92	Mangoky-Ankazoabo Complex	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-92	Mangoky-Ankazoabo Complex	Plants	*Euphorbia mangokyensis*	
MDG-92	Mangoky-Ankazoabo Complex	Plants	*Euphorbia rossii*	
MDG-92	Mangoky-Ankazoabo Complex	Plants	*Ravenea rivularis*	
MDG-92	Mangoky-Ankazoabo Complex	Reptiles	*Furcifer labordi*	Laborde's Chameleon
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Anodonthyla montana*	Mountain Climbing Frog

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Mantella bernhardi*	Bernhard's Mentella
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Mantella madagascariensis*	Madagascan Mantella
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Mantidactylus madecassus*	
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Plethodontohyla brevipes*	Betsileo Digging Frog
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Rhombophryne coronata*	
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Rhombophryne serratopalpebrosa*	
MDG-95	Ambositra-Vondrozo Corridor	Amphibians	*Spinomantis elegans*	Elegant Madagascar Frog
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Anas melleri*	Meller's Duck
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Neodrepanis hypoxantha*	Yellow-bellied Sunbird-asity
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Sarothrura watersi*	Slender-billed Flufftail
MDG-95	Ambositra-Vondrozo Corridor	Birds	*Tachybaptus pelzelnii*	Madagascar Grebe
MDG-95	Ambositra-Vondrozo Corridor	Fish	*Paratilapia sp. nov. 'Vevembe'*	
MDG-95	Ambositra-Vondrozo Corridor	Fish	*Ptychochromoides vondrozo*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus antiquus*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus carylae*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus culminans*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus curvifolius*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus delicatus*	
MDG-95	Ambositra-Vondrozo Corridor	Invertebrates	*Boucardicus tridentatus*	
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Cryptoprocta ferox*	Fosa
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Eliurus penicillatus*	White-tipped Tuft-tailed Rat
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Eulemur cinereiceps*	White-collared Lemur
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Hapalemur aureus*	Golden Bamboo Lemur
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Prolemur simus*	Greater Bamboo Lemur
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Propithecus edwardsi*	Milne-Edward's Sifaka
MDG-95	Ambositra-Vondrozo Corridor	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia baronii*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia chapelieri*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia chlorocarpa*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia erubescens*	Voamboanatoloho
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia maritima*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dalbergia monticola*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dypsis faneva*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dypsis fasciculata*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dypsis hovomantsina*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dypsis ifanadianae*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Dypsis mananjarensis*	Ovodaafa
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Euphorbia duranii*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Leptolaena pauciflora*	
MDG-95	Ambositra-Vondrozo Corridor	Plants	*Ravenea glauca*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Amphiglossus anosyensis*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Calumma gallus*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Calumma glawi*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Calumma hilleniusi*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Calumma oshaughnessyi*	O'Shaughnessy's Chameleon
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Furcifer balteatus*	Two-banded Chameleon
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Furcifer campani*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Madascincus macrolepis*	Rusty Skink
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Matoatoa spannringi*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Palleon nasus*	Elongate Leaf Chameleon
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Uroplatus ebenaui*	
MDG-95	Ambositra-Vondrozo Corridor	Reptiles	*Zonosaurus maximus*	
MDG-96	Ankeniheny-Zahamena Corridor	Amphibians	*Mantella crocea*	Yellow Mantella
MDG-96	Ankeniheny-Zahamena Corridor	Amphibians	*Rhombophryne coronata*	
MDG-96	Ankeniheny-Zahamena Corridor	Amphibians	*Scaphiophryne marmorata*	
MDG-96	Ankeniheny-Zahamena Corridor	Amphibians	*Spinomantis phantasticus*	
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Alectroenas madagascariensis*	Madagascar Blue-pigeon
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Atelornis crossleyi*	Rufous-headed Ground-roller

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Atelornis pittoides*	Pitta-like Ground-roller
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Bernieria cinereiceps*	Grey-crowned Tetraka
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Bernieria zosterops*	Spectacled Tetraka
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Caprimulgus enarratus*	Collared Nightjar
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Coua caerulea*	Blue Coua
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Coua reynaudii*	Red-fronted Coua
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Coua serriana*	Red-breasted Coua
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Crossleyia tenebrosa*	Dusky Tetraka
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Cryptosylvicola randrianasoloi*	Cryptic Warbler
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Dromaeocercus brunneus*	Brown Emu-tail
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Euryceros prevostii*	Helmet Vanga
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Eutriorchis astur*	Madagascar Serpent-eagle
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Foudia omissa*	Forest Fody
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Geobiastes squamiger*	Scaly Ground-roller
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Hypositta corallirostris*	Nuthatch Vanga
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Mentocrex kioloides*	Madagascar Wood-rail
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Monticola sharpei*	
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Mystacornis crossleyi*	Crossley's Babbler
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Neodrepanis coruscans*	Sunbird Asity
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Neodrepanis hypoxantha*	Yellow-bellied Sunbird-asity
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Neomixis flavoviridis*	Wedge-tailed Jery
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Neomixis viridis*	Green Jery
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Newtonia amphichroa*	Dark Newtonia
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Newtonia fanovanae*	Red-tailed Newtonia
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Oriolia bernieri*	Bernier's Vanga
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Oxylabes madagascariensis*	White-throated Oxylabes
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Philepitta castanea*	Velvet Asity
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Ploceus nelicourvi*	Nelicourvi Weaver
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Pseudobias wardi*	Ward's Flycatcher

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Randia pseudozosterops*	Rand's Warbler
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Sarothrura insularis*	Madagascar Flufftail
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Tyto soumagnei*	Madagascar Red Owl
MDG-96	Ankeniheny-Zahamena Corridor	Birds	*Xenopirostris polleni*	Pollen's Vanga
MDG-96	Ankeniheny-Zahamena Corridor	Fish	*Pachypanchax sakaramyi*	
MDG-96	Ankeniheny-Zahamena Corridor	Fish	*Paratilapia polleni*	Marakely
MDG-96	Ankeniheny-Zahamena Corridor	Fish	*Paratilapia typus*	
MDG-96	Ankeniheny-Zahamena Corridor	Fish	*Paretroplus polyactis*	
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Cryptoprocta ferox*	Fossa
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Eliurus petteri*	Petter's Tuft-tailed Rat
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Indri indri*	Indri
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Propithecus diadema*	Diademed Sifaka
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Salanoia concolor*	Brown-tailed Mongoose
MDG-96	Ankeniheny-Zahamena Corridor	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Asteropeia mcphersonii*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Eremolaena humblotiana*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Leptolaena abrahamii*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Leptolaena multiflora*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Leptolaena pauciflora*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Pentachlaena orientalis*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Rhodolaena acutifolia*	
MDG-96	Ankeniheny-Zahamena Corridor	Plants	*Schizolaena cauliflora*	
MDG-96	Ankeniheny-Zahamena Corridor	Reptiles	*Paroedura masobe*	
MDG-98	Analamay-Mantadia Forest Corridor	Amphibians	*Mantella aurantiaca*	Golden Mantella
MDG-98	Analamay-Mantadia Forest Corridor	Amphibians	*Mantella crocea*	Yellow Mantella
MDG-98	Analamay-Mantadia Forest Corridor	Amphibians	*Rhombophryne coronata*	
MDG-98	Analamay-Mantadia Forest Corridor	Amphibians	*Scaphiophryne marmorata*	
MDG-98	Analamay-Mantadia Forest Corridor	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-98	Analamay-Mantadia Forest Corridor	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-98	Analamay-Mantadia Forest Corridor	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur

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MDG-98	Analamay-Mantadia Forest Corridor	Mammals	*Indri indri*	Indri
MDG-98	Analamay-Mantadia Forest Corridor	Mammals	*Prolemur simus*	Greater Bamboo Lemur
MDG-98	Analamay-Mantadia Forest Corridor	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Amphibians	*Mantidactylus madecassus*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Birds	*Geobiastes squamiger*	Scaly Ground-roller
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Birds	*Neodrepanis hypoxantha*	Yellow-bellied Sunbird-asity
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Avahi betsileo*	Betsileo Woolly Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Lepilemur betsileo*	Betsileo Sportive Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Microgale dryas*	Dryad Shrew Tenrec
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Propithecus edwardsi*	Milne-Edward's Sifaka
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Beilschmiedia madagascariensis*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Breonia boivinii*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Chassalia betsilensis*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Dalbergia baronii*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Dypsis decipiens*	Manambe Palm

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MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Gaertnera arenaria*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Manilkara perrieri*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Melicope magnifolia*	Bilahy
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Pandanus concretus*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Stephanodaphne cremostachya*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Tambourissa trichophylla*	Ambora
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Plants	*Vepris pilosa*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Reptiles	*Calumma hilleniusi*	
MDG-99	Forest Corridor Fandriana - Marolambo National Park	Reptiles	*Calumma oshaughnessyi*	O'Shaughnessy's Chameleon
MDG-107	Vohibola Classified Forest	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-107	Vohibola Classified Forest	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-107	Vohibola Classified Forest	Birds	*Anas melleri*	Meller's Duck
MDG-107	Vohibola Classified Forest	Birds	*Ardeola idae*	Madagascar Pond-heron
MDG-107	Vohibola Classified Forest	Birds	*Coua coquereli*	Coquerel's Coua
MDG-107	Vohibola Classified Forest	Birds	*Coua cursor*	Running Coua
MDG-107	Vohibola Classified Forest	Birds	*Coua gigas*	Giant Coua
MDG-107	Vohibola Classified Forest	Birds	*Coua ruficeps*	Red-capped Coua
MDG-107	Vohibola Classified Forest	Birds	*Falculea palliata*	Sickle-billed Vanga
MDG-107	Vohibola Classified Forest	Birds	*Glareola ocularis*	Madagascar Pratincole
MDG-107	Vohibola Classified Forest	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-107	Vohibola Classified Forest	Birds	*Newtonia archboldi*	Archbold's Newtonia
MDG-107	Vohibola Classified Forest	Birds	*Ploceus sakalava*	Sakalava Weaver
MDG-107	Vohibola Classified Forest	Birds	*Rallus madagascariensis*	Madagascar Rail
MDG-107	Vohibola Classified Forest	Birds	*Tachybaptus pelzelnii*	Madagascar Grebe
MDG-107	Vohibola Classified Forest	Birds	*Thamnornis chloropetoides*	Thamnornis Warbler

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MDG-107	Vohibola Classified Forest	Birds	*Xenopirostris xenopirostris*	Lafresnaye's Vanga
MDG-107	Vohibola Classified Forest	Fish	*Paratilapia polleni*	Marakely
MDG-107	Vohibola Classified Forest	Fish	*Paratilapia typus*	
MDG-107	Vohibola Classified Forest	Fish	*Paretroplus polyactis*	
MDG-107	Vohibola Classified Forest	Mammals	*Cheirogaleus medius*	Western Fat-tailed Dwarf Lemur
MDG-107	Vohibola Classified Forest	Mammals	*Cryptoprocta ferox*	Fossa
MDG-107	Vohibola Classified Forest	Mammals	*Cryptoprocta ferox*	Fossa
MDG-107	Vohibola Classified Forest	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur
MDG-107	Vohibola Classified Forest	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur
MDG-107	Vohibola Classified Forest	Mammals	*Lepilemur ruficaudatus*	Red-tailed Sportive Lemur
MDG-107	Vohibola Classified Forest	Mammals	*Phaner pallescens*	Pale Fork-marked Lemur
MDG-107	Vohibola Classified Forest	Mammals	*Propithecus diadema*	Diademed Sifaka
MDG-107	Vohibola Classified Forest	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-107	Vohibola Classified Forest	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-107	Vohibola Classified Forest	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-107	Vohibola Classified Forest	Plants	*Aerangis fuscata*	
MDG-107	Vohibola Classified Forest	Plants	*Angraecum acutipetalum*	
MDG-107	Vohibola Classified Forest	Plants	*Angraecum crassum*	
MDG-107	Vohibola Classified Forest	Plants	*Angraecum eburneum*	
MDG-107	Vohibola Classified Forest	Plants	*Angraecum panicifolium*	
MDG-107	Vohibola Classified Forest	Plants	*Asteropeia matrambody*	
MDG-107	Vohibola Classified Forest	Plants	*Asteropeia micraster*	
MDG-107	Vohibola Classified Forest	Plants	*Beilschmiedia madagascariensis*	
MDG-107	Vohibola Classified Forest	Plants	*Breonia tayloriana*	
MDG-107	Vohibola Classified Forest	Plants	*Brexia alaticarpa*	
MDG-107	Vohibola Classified Forest	Plants	*Bulbophyllum lyperocephalum*	
MDG-107	Vohibola Classified Forest	Plants	*Calophyllum chapelieri*	Vintanona
MDG-107	Vohibola Classified Forest	Plants	*Centauropsis antanossi*	Hazombato
MDG-107	Vohibola Classified Forest	Plants	*Dichapetalum rufum*	
MDG-107	Vohibola Classified Forest	Plants	*Dillenia triquetra*	
MDG-107	Vohibola Classified Forest	Plants	*Dypsis arenarum*	
MDG-107	Vohibola Classified Forest	Plants	*Dypsis louvelii*	

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MDG-107	Vohibola Classified Forest	Plants	*Dypsis paludosa*	
MDG-107	Vohibola Classified Forest	Plants	*Dypsis saintelucei*	
MDG-107	Vohibola Classified Forest	Plants	*Elaeocarpus alnifolius*	
MDG-107	Vohibola Classified Forest	Plants	*Eulophiella roempleriana*	
MDG-107	Vohibola Classified Forest	Plants	*Euphorbia mangokyensis*	
MDG-107	Vohibola Classified Forest	Plants	*Euphorbia rossii*	
MDG-107	Vohibola Classified Forest	Plants	*Faguetia falcata*	
MDG-107	Vohibola Classified Forest	Plants	*Foetidia clusioides*	Ambakiloha
MDG-107	Vohibola Classified Forest	Plants	*Foetidia obliqua*	
MDG-107	Vohibola Classified Forest	Plants	*Gaertnera guillotii*	Kafeala
MDG-107	Vohibola Classified Forest	Plants	*Gastrorchis tuberculosa*	
MDG-107	Vohibola Classified Forest	Plants	*Gnidia danguyana*	
MDG-107	Vohibola Classified Forest	Plants	*Grammangis ellisii*	
MDG-107	Vohibola Classified Forest	Plants	*Hugonia castanea*	
MDG-107	Vohibola Classified Forest	Plants	*Intsia bijuga*	Merbau
MDG-107	Vohibola Classified Forest	Plants	*Labourdonnaisia madagascariensis*	
MDG-107	Vohibola Classified Forest	Plants	*Labramia bojeri*	
MDG-107	Vohibola Classified Forest	Plants	*Leptolaena multiflora*	
MDG-107	Vohibola Classified Forest	Plants	*Leptolaena pauciflora*	
MDG-107	Vohibola Classified Forest	Plants	*Mascarenhasia tampinensis*	Andraivola
MDG-107	Vohibola Classified Forest	Plants	*Millettia hitsika*	
MDG-107	Vohibola Classified Forest	Plants	*Monoporus paludosus*	Hazontoho
MDG-107	Vohibola Classified Forest	Plants	*Mundulea chapelieri*	Famamo
MDG-107	Vohibola Classified Forest	Plants	*Nepenthes madagascariensis*	
MDG-107	Vohibola Classified Forest	Plants	*Oeceoclades pandurata*	
MDG-107	Vohibola Classified Forest	Plants	*Pandanus concretus*	
MDG-107	Vohibola Classified Forest	Plants	*Pandanus malgassicus*	
MDG-107	Vohibola Classified Forest	Plants	*Pandanus neoleptopodus*	
MDG-107	Vohibola Classified Forest	Plants	*Pandanus platyphyllus*	Hofa
MDG-107	Vohibola Classified Forest	Plants	*Pandanus rollotii*	
MDG-107	Vohibola Classified Forest	Plants	*Phanerodiscus capuronii*	Tsilongotongotra
MDG-107	Vohibola Classified Forest	Plants	*Phyllanthus nummulariifolius*	

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MDG-107	Vohibola Classified Forest	Plants	*Prunus africana*	Red Stinkwood
MDG-107	Vohibola Classified Forest	Plants	*Ravenea rivularis*	
MDG-107	Vohibola Classified Forest	Plants	*Rhopalocarpus parvifolius*	
MDG-107	Vohibola Classified Forest	Plants	*Rhopalocarpus thouarsianus*	
MDG-107	Vohibola Classified Forest	Plants	*Sakoanala madagascariensis*	
MDG-107	Vohibola Classified Forest	Plants	*Schizolaena elongata*	
MDG-107	Vohibola Classified Forest	Plants	*Schizolaena laurina*	
MDG-107	Vohibola Classified Forest	Plants	*Schizolaena rosea*	
MDG-107	Vohibola Classified Forest	Plants	*Tachiadenus tubiflorus*	
MDG-107	Vohibola Classified Forest	Plants	*Tina thouarsiana*	Sanirana
MDG-107	Vohibola Classified Forest	Plants	*Vepris elliotii*	
MDG-107	Vohibola Classified Forest	Plants	*Xylopia buxifolia*	
MDG-107	Vohibola Classified Forest	Plants	*Xylopia humblotiana*	Robary
MDG-107	Vohibola Classified Forest	Reptiles	*Furcifer labordi*	Laborde's Chameleon
MDG-107	Vohibola Classified Forest	Reptiles	*Thamnosophis stumpffi*	Yellow-striped Water Snake
MDG-111	Sahafina Forest (Anivorano-Brickaville)	Mammals	*Microcebus gerpi*	Gerp's Mouse Lemur
MDG-129	Vohibe Ambalabe (Vatomandry)	Amphibians	*Scaphiophryne marmorata*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Birds	*Euryceros prevostii*	Helmet Vanga
MDG-129	Vohibe Ambalabe (Vatomandry)	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-129	Vohibe Ambalabe (Vatomandry)	Birds	*Oriolia bernieri*	Bernier's Vanga
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Cryptoprocta ferox*	Fossa
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Daubentonia madagascariensis*	Aye-aye
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Hapalemur griseus*	Eastern Lesser Bamboo Lemur
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Propithecus diadema*	Diademed Sifaka
MDG-129	Vohibe Ambalabe (Vatomandry)	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Aspidostemon conoideus*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Asteropeia rhopaloides*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Beilschmiedia pedicellata*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Beilschmiedia sary*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Breonia boivinii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Breonia macrocarpa*	

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MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Brexia alaticarpa*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Brexia montana*	Hetraka
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Brochoneura madagascariensis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Campnosperma lepidotum*	Antafonana mena
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Claoxylopsis purpurascens*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Coffea sambavensis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Dalbergia baronii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Decarydendron perrieri*	Ambora saha
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Diospyros pruinosa*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Diospyros squamosa*	Hazomainty
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Dypsis louvelii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Dypsis malcomberi*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Exacum humbertii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Exacum subacaule*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Gaertnera guillotii*	Kafeala
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Gaertnera hispida*	Tsitotoko
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Gaertnera pauciflora*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Haematodendron glabrum*	Rara
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Hyperacanthus ravinensis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Impatiens rudicaulis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Leptolaena abrahamii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Liparis longicaulis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Marojejya insignis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Micronychia acuminata*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Nesogordonia macrophylla*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Pandanus leptopodus*	Ankomorika
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Peperomia hildebrandtii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Peperomia trichophylla*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Phyllanthus moramangicus*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Physena madagascariensis*	Resonjo
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Plectranthus brevicaulis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias aculeata*	Vantsilana

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MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias baretiana*	Teloravina
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias chapelieri*	Taolandoha
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias cissiflora*	Voantsilana
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias heineana*	Zavaviala
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias madagascariensis*	Voantsilana madinidravina
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias pentamera*	Voantsilana
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polyscias tafondroensis*	Voantsilana
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Polysphaeria grandiflora*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Rhodolaena coriacea*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Rhopalocarpus louvelii*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Rhopalocarpus macrorhamnifolius*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Stephanodaphne pilosa*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Symphonia fasciculata*	Molompangady
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Tambourissa trichophylla*	Ambora
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Tina thouarsiana*	Sanirana
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Tricalysia analamazaotrensis*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Tricalysia boiviniana*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Vepris aralioides*	
MDG-129	Vohibe Ambalabe (Vatomandry)	Plants	*Xylopia humblotiana*	Robary
MDG-129	Vohibe Ambalabe (Vatomandry)	Reptiles	*Brookesia peyrierasi*	
MDG-131	Nosivolo Wetlands	Fish	*Bedotia sp. nov. 'Nosivola'*	
MDG-131	Nosivolo Wetlands	Fish	*Datnia elongata*	
MDG-131	Nosivolo Wetlands	Fish	*Gogo ornatus*	
MDG-131	Nosivolo Wetlands	Fish	*Katria katria*	Kataria
MDG-131	Nosivolo Wetlands	Fish	*Oxylapia polli*	
MDG-131	Nosivolo Wetlands	Fish	*Paretroplus polyactis*	
MDG-131	Nosivolo Wetlands	Fish	*Rheocles lateralis*	
MDG-131	Nosivolo Wetlands	Fish	*Teramulus kieneri*	
MDG-131	Nosivolo Wetlands	Plants	*Dicoryphe angustifolia*	
MDG-131	Nosivolo Wetlands	Plants	*Diospyros anosivolensis*	
MDG-131	Nosivolo Wetlands	Plants	*Diospyros dicorypheoides*	
MDG-131	Nosivolo Wetlands	Plants	*Hydrostachys laciniata*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-131	Nosivolo Wetlands	Plants	*Hydrostachys verruculosa*	
MDG-153	Ranomafana National Park	Amphibians	*Anodonthyla emilei*	
MDG-153	Ranomafana National Park	Amphibians	*Anodonthyla moramora*	
MDG-153	Ranomafana National Park	Amphibians	*Boophis narinsi*	
MDG-153	Ranomafana National Park	Amphibians	*Boophis piperatus*	
MDG-153	Ranomafana National Park	Amphibians	*Gephyromantis runewsweeki*	
MDG-153	Ranomafana National Park	Amphibians	*Mantella bernhardi*	Bernhard's Mentella
MDG-153	Ranomafana National Park	Amphibians	*Mantella madagascariensis*	Madagascan Mantella
MDG-153	Ranomafana National Park	Amphibians	*Mantidactylus paidroa*	
MDG-153	Ranomafana National Park	Amphibians	*Plethodontohyla brevipes*	Betsileo Digging Frog
MDG-153	Ranomafana National Park	Amphibians	*Spinomantis elegans*	Elegant Madagascar Frog
MDG-153	Ranomafana National Park	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-153	Ranomafana National Park	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-153	Ranomafana National Park	Birds	*Alectroenas madagascariensis*	Madagascar Blue-pigeon
MDG-153	Ranomafana National Park	Birds	*Amphilais seebohmi*	Grey Emu-tail
MDG-153	Ranomafana National Park	Birds	*Anas melleri*	Meller's Duck
MDG-153	Ranomafana National Park	Birds	*Atelornis crossleyi*	Rufous-headed Ground-roller
MDG-153	Ranomafana National Park	Birds	*Atelornis pittoides*	Pitta-like Ground-roller
MDG-153	Ranomafana National Park	Birds	*Bernieria cinereiceps*	Grey-crowned Tetraka
MDG-153	Ranomafana National Park	Birds	*Bernieria zosterops*	Spectacled Tetraka
MDG-153	Ranomafana National Park	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-153	Ranomafana National Park	Birds	*Caprimulgus enarratus*	Collared Nightjar
MDG-153	Ranomafana National Park	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
MDG-153	Ranomafana National Park	Birds	*Circus maillardi*	
MDG-153	Ranomafana National Park	Birds	*Coua caerulea*	Blue Coua
MDG-153	Ranomafana National Park	Birds	*Coua reynaudii*	Red-fronted Coua
MDG-153	Ranomafana National Park	Birds	*Crossleyia xanthophrys*	Madagascar Yellowbrow
MDG-153	Ranomafana National Park	Birds	*Dromaeocercus brunneus*	Brown Emu-tail
MDG-153	Ranomafana National Park	Birds	*Foudia omissa*	Forest Fody
MDG-153	Ranomafana National Park	Birds	*Gallinago macrodactyla*	Madagascar Snipe
MDG-153	Ranomafana National Park	Birds	*Geobiastes squamiger*	Scaly Ground-roller
MDG-153	Ranomafana National Park	Birds	*Glareola ocularis*	Madagascar Pratincole

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-153	Ranomafana National Park	Birds	*Hypositta corallirostris*	Nuthatch Vanga
MDG-153	Ranomafana National Park	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-153	Ranomafana National Park	Birds	*Mentocrex kioloides*	Madagascar Wood-rail
MDG-153	Ranomafana National Park	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-153	Ranomafana National Park	Birds	*Monticola sharpei*	
MDG-153	Ranomafana National Park	Birds	*Mystacornis crossleyi*	Crossley's Babbler
MDG-153	Ranomafana National Park	Birds	*Neodrepanis coruscans*	Sunbird Asity
MDG-153	Ranomafana National Park	Birds	*Neodrepanis hypoxantha*	Yellow-bellied Sunbird-asity
MDG-153	Ranomafana National Park	Birds	*Neomixis flavoviridis*	Wedge-tailed Jery
MDG-153	Ranomafana National Park	Birds	*Neomixis viridis*	Green Jery
MDG-153	Ranomafana National Park	Birds	*Newtonia amphichroa*	Dark Newtonia
MDG-153	Ranomafana National Park	Birds	*Oxylabes madagascariensis*	White-throated Oxylabes
MDG-153	Ranomafana National Park	Birds	*Philepitta castanea*	Velvet Asity
MDG-153	Ranomafana National Park	Birds	*Ploceus nelicourvi*	Nelicourvi Weaver
MDG-153	Ranomafana National Park	Birds	*Pseudobias wardi*	Ward's Flycatcher
MDG-153	Ranomafana National Park	Birds	*Rallus madagascariensis*	Madagascar Rail
MDG-153	Ranomafana National Park	Birds	*Randia pseudozosterops*	Rand's Warbler
MDG-153	Ranomafana National Park	Birds	*Sarothrura insularis*	Madagascar Flufftail
MDG-153	Ranomafana National Park	Birds	*Sarothrura watersi*	Slender-billed Flufftail
MDG-153	Ranomafana National Park	Birds	*Xenopirostris polleni*	Pollen's Vanga
MDG-153	Ranomafana National Park	Fish	*Bedotia sp. nov. 'Namorona'*	
MDG-153	Ranomafana National Park	Fish	*Paratilapia polleni*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus antiquus*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus carylae*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus culminans*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus curvifolius*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus delicatus*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus esetrae*	
MDG-153	Ranomafana National Park	Invertebrates	*Boucardicus tridentatus*	
MDG-153	Ranomafana National Park	Mammals	*Cryptoprocta ferox*	Fosa
MDG-153	Ranomafana National Park	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-153	Ranomafana National Park	Mammals	*Hapalemur aureus*	Golden Bamboo Lemur

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-153	Ranomafana National Park	Mammals	*Limnogale mergulus*	Web-footed Tenrec
MDG-153	Ranomafana National Park	Mammals	*Prolemur simus*	Greater Bamboo Lemur
MDG-153	Ranomafana National Park	Mammals	*Propithecus edwardsi*	Milne-Edward's Sifaka
MDG-153	Ranomafana National Park	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-153	Ranomafana National Park	Plants	*Dalbergia baronii*	
MDG-153	Ranomafana National Park	Plants	*Dalbergia chapelieri*	
MDG-153	Ranomafana National Park	Plants	*Dalbergia maritima*	
MDG-153	Ranomafana National Park	Plants	*Dalbergia monticola*	
MDG-153	Ranomafana National Park	Plants	*Dypsis faneva*	
MDG-153	Ranomafana National Park	Plants	*Dypsis fasciculata*	
MDG-153	Ranomafana National Park	Plants	*Dypsis hovomantsina*	
MDG-153	Ranomafana National Park	Plants	*Dypsis ifanadianae*	
MDG-153	Ranomafana National Park	Plants	*Leptolaena abrahamii*	
MDG-153	Ranomafana National Park	Reptiles	*Calumma glawi*	
MDG-153	Ranomafana National Park	Reptiles	*Compsophis zeny*	
MDG-153	Ranomafana National Park	Reptiles	*Furcifer campani*	
MDG-153	Ranomafana National Park	Reptiles	*Pseudoxyrhopus oblectator*	
MDG-155	Zombitse-Vohibasia National Park	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-155	Zombitse-Vohibasia National Park	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-155	Zombitse-Vohibasia National Park	Birds	*Ardeola idae*	Madagascar Pond-heron
MDG-155	Zombitse-Vohibasia National Park	Birds	*Bernieria apperti*	Appert's Tetraka
MDG-155	Zombitse-Vohibasia National Park	Birds	*Calicalicus rufocarpalis*	Red-shouldered Vanga
MDG-155	Zombitse-Vohibasia National Park	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
MDG-155	Zombitse-Vohibasia National Park	Birds	*Circus maillardi*	
MDG-155	Zombitse-Vohibasia National Park	Birds	*Coua coquereli*	Coquerel's Coua
MDG-155	Zombitse-Vohibasia National Park	Birds	*Coua gigas*	Giant Coua
MDG-155	Zombitse-Vohibasia National Park	Birds	*Coua ruficeps*	Red-capped Coua
MDG-155	Zombitse-Vohibasia National Park	Birds	*Falculea palliata*	Sickle-billed Vanga
MDG-155	Zombitse-Vohibasia National Park	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-155	Zombitse-Vohibasia National Park	Birds	*Monticola bensoni*	
MDG-155	Zombitse-Vohibasia National Park	Birds	*Nesillas lantzii*	Lantz's Brush-warbler
MDG-155	Zombitse-Vohibasia National Park	Birds	*Ploceus sakalava*	Sakalava Weaver

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MDG-155	Zombitse-Vohibasia National Park	Birds	*Tachybaptus pelzelnii*	Madagascar Grebe
MDG-155	Zombitse-Vohibasia National Park	Birds	*Thamnornis chloropetoides*	Thamnornis Warbler
MDG-155	Zombitse-Vohibasia National Park	Fish	*Paratilapia polleni*	Marakely
MDG-155	Zombitse-Vohibasia National Park	Mammals	*Cryptoprocta ferox*	Fossa
MDG-155	Zombitse-Vohibasia National Park	Mammals	*Lepilemur hubbardorum*	Hubbard's Sportive Lemur
MDG-155	Zombitse-Vohibasia National Park	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-155	Zombitse-Vohibasia National Park	Plants	*Euphorbia gottlebei*	
MDG-155	Zombitse-Vohibasia National Park	Plants	*Euphorbia sakarahaensis*	
MDG-155	Zombitse-Vohibasia National Park	Reptiles	*Paroedura androyensis*	Grandidier's Madagascar Ground Gecko
MDG-155	Zombitse-Vohibasia National Park	Reptiles	*Phelsuma standingi*	Standing's Day Gecko
MDG-155	Zombitse-Vohibasia National Park	Reptiles	*Trachylepis dumasi*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Boophis blommersae*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Cophyla karenae*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Gephyromantis klemmeri*	Klemmer's Madagascar Frog
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Gephyromantis rivicola*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Gephyromantis silvanus*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Gephyromantis tandroka*	
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Mantella pulchra*	Beautiful Mantella
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Plethodontohyla brevipes*	Betsileo Digging Frog
MDG-164	Betampona Strict Nature Reserve	Amphibians	*Rhombophryne coudreaui*	Betampona Digging Frog
MDG-164	Betampona Strict Nature Reserve	Birds	*Accipiter henstii*	Henst's Goshawk
MDG-164	Betampona Strict Nature Reserve	Birds	*Accipiter madagascariensis*	Madagascar Sparrowhawk
MDG-164	Betampona Strict Nature Reserve	Birds	*Alectroenas madagascariensis*	Madagascar Blue-pigeon
MDG-164	Betampona Strict Nature Reserve	Birds	*Atelornis pittoides*	Pitta-like Ground-roller
MDG-164	Betampona Strict Nature Reserve	Birds	*Bernieria zosterops*	Spectacled Tetraka
MDG-164	Betampona Strict Nature Reserve	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-164	Betampona Strict Nature Reserve	Birds	*Canirallus kioloides*	Madagascar Wood-rail
MDG-164	Betampona Strict Nature Reserve	Birds	*Caprimulgus enarratus*	Collared Nightjar
MDG-164	Betampona Strict Nature Reserve	Birds	*Coua caerulea*	Blue Coua
MDG-164	Betampona Strict Nature Reserve	Birds	*Coua reynaudii*	Red-fronted Coua
MDG-164	Betampona Strict Nature Reserve	Birds	*Coua serriana*	Red-breasted Coua
MDG-164	Betampona Strict Nature Reserve	Birds	*Euryceros prevostii*	Helmet Vanga

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-164	Betampona Strict Nature Reserve	Birds	*Foudia omissa*	Forest Fody
MDG-164	Betampona Strict Nature Reserve	Birds	*Geobiastes squamiger*	Scaly Ground-roller
MDG-164	Betampona Strict Nature Reserve	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-164	Betampona Strict Nature Reserve	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-164	Betampona Strict Nature Reserve	Birds	*Mesitornis variegatus*	White-breasted Mesite
MDG-164	Betampona Strict Nature Reserve	Birds	*Monticola sharpei*	
MDG-164	Betampona Strict Nature Reserve	Birds	*Mystacornis crossleyi*	Crossley's Babbler
MDG-164	Betampona Strict Nature Reserve	Birds	*Neodrepanis coruscans*	Sunbird Asity
MDG-164	Betampona Strict Nature Reserve	Birds	*Neomixis viridis*	Green Jery
MDG-164	Betampona Strict Nature Reserve	Birds	*Newtonia amphichroa*	Dark Newtonia
MDG-164	Betampona Strict Nature Reserve	Birds	*Oriolia bernieri*	Bernier's Vanga
MDG-164	Betampona Strict Nature Reserve	Birds	*Oxylabes madagascariensis*	White-throated Oxylabes
MDG-164	Betampona Strict Nature Reserve	Birds	*Philepitta castanea*	Velvet Asity
MDG-164	Betampona Strict Nature Reserve	Birds	*Ploceus nelicourvi*	Nelicourvi Weaver
MDG-164	Betampona Strict Nature Reserve	Birds	*Pseudobias wardi*	Ward's Flycatcher
MDG-164	Betampona Strict Nature Reserve	Birds	*Randia pseudozosterops*	Rand's Warbler
MDG-164	Betampona Strict Nature Reserve	Birds	*Sarothrura insularis*	Madagascar Flufftail
MDG-164	Betampona Strict Nature Reserve	Birds	*Xenopirostris polleni*	Pollen's Vanga
MDG-164	Betampona Strict Nature Reserve	Fish	*Bedotia sp. nov. 'Betampona'*	
MDG-164	Betampona Strict Nature Reserve	Fish	*Paratilapia typus*	
MDG-164	Betampona Strict Nature Reserve	Invertebrates	*Boucardicus antiquus*	
MDG-164	Betampona Strict Nature Reserve	Invertebrates	*Boucardicus carylae*	
MDG-164	Betampona Strict Nature Reserve	Invertebrates	*Boucardicus culminans*	
MDG-164	Betampona Strict Nature Reserve	Invertebrates	*Boucardicus curvifolius*	
MDG-164	Betampona Strict Nature Reserve	Invertebrates	*Boucardicus delicatus*	
MDG-164	Betampona Strict Nature Reserve	Mammals	*Cryptoprocta ferox*	Fosa
MDG-164	Betampona Strict Nature Reserve	Mammals	*Eulemur albifrons*	White-fronted Lemur
MDG-164	Betampona Strict Nature Reserve	Mammals	*Indri indri*	Indri
MDG-164	Betampona Strict Nature Reserve	Mammals	*Propithecus diadema*	Diademed Sifaka
MDG-164	Betampona Strict Nature Reserve	Mammals	*Salanoia concolor*	Brown-tailed Vontsira
MDG-164	Betampona Strict Nature Reserve	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-164	Betampona Strict Nature Reserve	Plants	*Asteropeia matrambody*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-164	Betampona Strict Nature Reserve	Plants	*Dypsis ceracea*	Lafaza
MDG-164	Betampona Strict Nature Reserve	Plants	*Dypsis fasciculata*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Dypsis tsaravoasira*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Marojejya insignis*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Masoala kona*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Melanophylla madagascariensis*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Phylloxylon perrieri*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Ravenea dransfieldii*	
MDG-164	Betampona Strict Nature Reserve	Plants	*Ravenea sambiranensis*	
MDG-164	Betampona Strict Nature Reserve	Reptiles	*Paroedura masobe*	
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Coua cursor*	Running Coua
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Coua gigas*	Giant Coua
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Coua ruficeps*	Red-capped Coua
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Falculea palliata*	Sickle-billed Vanga
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Newtonia archboldi*	Archbold's Newtonia
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Ploceus sakalava*	Sakalava Weaver
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Thamnornis chloropetoides*	Thamnornis Warbler
MDG-175	Beza-Mahafaly Special Reserve	Birds	*Xenopirostris xenopirostris*	Lafresnaye's Vanga
MDG-175	Beza-Mahafaly Special Reserve	Mammals	*Cryptoprocta ferox*	Fossa
MDG-175	Beza-Mahafaly Special Reserve	Mammals	*Propithecus verreauxi*	Verreaux's Sifaka
MDG-175	Beza-Mahafaly Special Reserve	Mammals	*Pteropus rufus*	Madagascan Flying Fox
MDG-175	Beza-Mahafaly Special Reserve	Plants	*Borassus sambiranensis*	
MDG-175	Beza-Mahafaly Special Reserve	Plants	*Dypsis ambanjae*	
MDG-175	Beza-Mahafaly Special Reserve	Plants	*Euphorbia hildebrandtii*	
MDG-175	Beza-Mahafaly Special Reserve	Reptiles	*Astrochelys radiata*	Radiated Tortoise
MDG-179	Mangerivola Special Reserve	Birds	*Alectroenas madagascariensis*	Madagascar Blue-pigeon
MDG-179	Mangerivola Special Reserve	Birds	*Anas melleri*	Meller's Duck
MDG-179	Mangerivola Special Reserve	Birds	*Atelornis crossleyi*	Rufous-headed Ground-roller
MDG-179	Mangerivola Special Reserve	Birds	*Atelornis pittoides*	Pitta-like Ground-roller
MDG-179	Mangerivola Special Reserve	Birds	*Bernieria cinereiceps*	Grey-crowned Tetraka
MDG-179	Mangerivola Special Reserve	Birds	*Bernieria zosterops*	Spectacled Tetraka
MDG-179	Mangerivola Special Reserve	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-179	Mangerivola Special Reserve	Birds	*Canirallus kioloides*	Madagascar Wood-rail
MDG-179	Mangerivola Special Reserve	Birds	*Caprimulgus enarratus*	Collared Nightjar
MDG-179	Mangerivola Special Reserve	Birds	*Coua caerulea*	Blue Coua
MDG-179	Mangerivola Special Reserve	Birds	*Coua reynaudii*	Red-fronted Coua
MDG-179	Mangerivola Special Reserve	Birds	*Coua serriana*	Red-breasted Coua
MDG-179	Mangerivola Special Reserve	Birds	*Euryceros prevostii*	Helmet Vanga
MDG-179	Mangerivola Special Reserve	Birds	*Eutriorchis astur*	Madagascar Serpent-eagle
MDG-179	Mangerivola Special Reserve	Birds	*Foudia omissa*	Forest Fody
MDG-179	Mangerivola Special Reserve	Birds	*Hypositta corallirostris*	Nuthatch Vanga
MDG-179	Mangerivola Special Reserve	Birds	*Lophotibis cristata*	Madagascar Crested Ibis
MDG-179	Mangerivola Special Reserve	Birds	*Mesitornis unicolor*	Brown Mesite
MDG-179	Mangerivola Special Reserve	Birds	*Monticola sharpei*	
MDG-179	Mangerivola Special Reserve	Birds	*Neodrepanis coruscans*	Sunbird Asity
MDG-179	Mangerivola Special Reserve	Birds	*Neomixis flavoviridis*	Wedge-tailed Jery
MDG-179	Mangerivola Special Reserve	Birds	*Neomixis viridis*	Green Jery
MDG-179	Mangerivola Special Reserve	Birds	*Newtonia amphichroa*	Dark Newtonia
MDG-179	Mangerivola Special Reserve	Birds	*Oriolia bernieri*	Bernier's Vanga
MDG-179	Mangerivola Special Reserve	Birds	*Oxylabes madagascariensis*	White-throated Oxylabes
MDG-179	Mangerivola Special Reserve	Birds	*Philepitta castanea*	Velvet Asity
MDG-179	Mangerivola Special Reserve	Birds	*Ploceus nelicourvi*	Nelicourvi Weaver
MDG-179	Mangerivola Special Reserve	Birds	*Pseudobias wardi*	Ward's Flycatcher
MDG-179	Mangerivola Special Reserve	Birds	*Randia pseudozosterops*	Rand's Warbler
MDG-179	Mangerivola Special Reserve	Birds	*Sarothrura insularis*	Madagascar Flufftail
MDG-179	Mangerivola Special Reserve	Birds	*Tyto soumagnei*	Madagascar Red Owl
MDG-179	Mangerivola Special Reserve	Fish	*Mesopristes elongata*	
MDG-179	Mangerivola Special Reserve	Fish	*Paratilapia typus*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus antiquus*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus carylae*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus culminans*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus curvifolius*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus delicatus*	
MDG-179	Mangerivola Special Reserve	Invertebrates	*Boucardicus mahermanae*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-179	Mangerivola Special Reserve	Mammals	*Cryptoprocta ferox*	Fossa
MDG-179	Mangerivola Special Reserve	Mammals	*Eliurus petteri*	Petter's Tuft-tailed Rat
MDG-179	Mangerivola Special Reserve	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-179	Mangerivola Special Reserve	Mammals	*Indri indri*	Indri
MDG-179	Mangerivola Special Reserve	Mammals	*Propithecus diadema*	Diademed Sifaka
MDG-179	Mangerivola Special Reserve	Mammals	*Varecia variegata*	Black-and-white Ruffed Lemur
MDG-179	Mangerivola Special Reserve	Plants	*Dalbergia monticola*	
MDG-179	Mangerivola Special Reserve	Plants	*Dypsis perrieri*	
MDG-179	Mangerivola Special Reserve	Plants	*Dypsis tsaravoasira*	
MDG-179	Mangerivola Special Reserve	Plants	*Dypsis utilis*	
MDG-179	Mangerivola Special Reserve	Plants	*Marojejya insignis*	
MDG-179	Mangerivola Special Reserve	Plants	*Orania ravaka*	
MDG-179	Mangerivola Special Reserve	Plants	*Ravenea lakatra*	
MDG-187	Pic d'Ivohibe Special Reserve	Amphibians	*Mantella madagascariensis*	Madagascan Mantella
MDG-187	Pic d'Ivohibe Special Reserve	Amphibians	*Rhombophryne serratopalpebrosa*	Guibe's Digging Frog
MDG-187	Pic d'Ivohibe Special Reserve	Birds	*Brachypteracias leptosomus*	Short-legged Ground-roller
MDG-187	Pic d'Ivohibe Special Reserve	Birds	*Neodrepanis hypoxantha*	Yellow-bellied Asity
MDG-187	Pic d'Ivohibe Special Reserve	Mammals	*Cryptoprocta ferox*	Fossa
MDG-187	Pic d'Ivohibe Special Reserve	Mammals	*Eulemur rubriventer*	Red-bellied Lemur
MDG-187	Pic d'Ivohibe Special Reserve	Mammals	*Lemur catta*	Ring-tailed Lemur
MDG-187	Pic d'Ivohibe Special Reserve	Plants	*Dalbergia erubescens*	Voamboanatoloho
MDG-199	Mangoro-Rianila Rivers	Fish	*Bedotia sp. nov. 'Lazana'*	
MDG-199	Mangoro-Rianila Rivers	Fish	*Rheocles alaotrensis*	Katrana
MDG-199	Mangoro-Rianila Rivers	Plants	*Euphorbia mangorensis*	
MDG-200	Namorona-Faraony River	Fish	*Bedotia sp. nov. 'Namorona'*	
MDG-200	Namorona-Faraony River	Fish	*Bedotia tricolor*	
MDG-200	Namorona-Faraony River	Fish	*Rheocles derhami*	
MDG-217	Faraony Headwaters			
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Bedotia sp. nov. 'Nosivola'*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Datnia elongata*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MDG-230	Nosivolo River and Tributaries Ramsar Site	Plants	*Dicoryphe angustifolia*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Plants	*Diospyros anosivolensis*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Plants	*Diospyros dicorypheoides*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Gogo ornatus*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Plants	*Hydrostachys laciniata*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Plants	*Hydrostachys verruculosa*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Katria katria*	Kataria
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Oxylapia polli*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Paretroplus polyactis*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Rheocles lateralis*	
MDG-230	Nosivolo River and Tributaries Ramsar Site	Fish	*Teramulus kieneri*	
COMORES				
COM-1	Moya forest	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
COM-1	Moya forest	Birds	*Otus capnodes*	Anjouan Scops-owl
COM-1	Moya forest	Invertebrates	*Papilio aristophontes*	
COM-1	Moya forest	Mammals	*Eulemur mongoz*	Mongoose Lemur
COM-1	Moya forest	Mammals	*Pteropus livingstonii*	Comoro Black Flying Fox
COM-1	Moya forest	Mammals	*Rousettus obliviosus*	Comoro Rousette
COM-1	Moya forest	Plants	*Jumellea anjouanensis*	
COM-1	Moya forest	Plants	*Khaya madagascariensis*	
COM-1	Moya forest	Reptiles	*Paroedura sanctijohannis*	Comoro Ground Gecko
COM-4	La Grille mountains	Birds	*Alectroenas sganzini*	Comoro Blue-pigeon
COM-4	La Grille mountains	Birds	*Cinnyris humbloti*	Humblot's Sunbird
COM-4	La Grille mountains	Birds	*Circus macrosceles*	Madagascar Marsh-harrier

KBA code	KBA name	Taxonomic group	Scientific name	Common name
COM-4	La Grille mountains	Birds	*Circus maillardi*	
COM-4	La Grille mountains	Birds	*Columba pollenii*	Comoro Olive-pigeon
COM-4	La Grille mountains	Birds	*Foudia consobrina*	Grand Comoro Fody
COM-4	La Grille mountains	Birds	*Foudia eminentissima*	Red-headed Fody
COM-4	La Grille mountains	Birds	*Hypsipetes parvirostris*	Comoro Bulbul
COM-4	La Grille mountains	Birds	*Hypsipetes parvirostris*	Grand Comoro Bulbul
COM-4	La Grille mountains	Birds	*Nesillas brevicaudata*	Grand Comoro Brush-warbler
COM-4	La Grille mountains	Birds	*Turdus bewsheri*	Comoro Thrush
COM-4	La Grille mountains	Invertebrates	*Graphium levassori*	White Graphium
COM-4	La Grille mountains	Invertebrates	*Papilio aristophontes*	
COM-4	La Grille mountains	Mammals	*Rousettus obliviosus*	Comoro Rousette
COM-4	La Grille mountains	Plants	*Dypsis lanceolata*	
COM-4	La Grille mountains	Plants	*Jumellea anjouanensis*	
COM-4	La Grille mountains	Plants	*Ravenea hildebrandtii*	
COM-4	La Grille mountains	Reptiles	*Paroedura sanctijohannis*	Comoro Ground Gecko
COM-5	Karthala mountains	Birds	*Alectroenas sganzini*	Comoro Blue-pigeon
COM-5	Karthala mountains	Birds	*Cinnyris humbloti*	Humblot's Sunbird
COM-5	Karthala mountains	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
COM-5	Karthala mountains	Birds	*Circus maillardi*	
COM-5	Karthala mountains	Birds	*Columba pollenii*	Comoro Olive-pigeon
COM-5	Karthala mountains	Birds	*Dicrurus fuscipennis*	Comoro Drongo
COM-5	Karthala mountains	Birds	*Foudia consobrina*	Grand Comoro Fody
COM-5	Karthala mountains	Birds	*Foudia eminentissima*	Red-headed Fody
COM-5	Karthala mountains	Birds	*Humblotia flavirostris*	Humblot's Flycatcher
COM-5	Karthala mountains	Birds	*Hypsipetes parvirostris*	Comoro Bulbul
COM-5	Karthala mountains	Birds	*Hypsipetes parvirostris*	Grand Comoro Bulbul
COM-5	Karthala mountains	Birds	*Nesillas brevicaudata*	Grand Comoro Brush-warbler
COM-5	Karthala mountains	Birds	*Otus pauliani*	Grand Comoro Scops-owl
COM-5	Karthala mountains	Birds	*Turdus bewsheri*	Comoro Thrush
COM-5	Karthala mountains	Birds	*Zosterops mouroniensis*	Mount Karthala White-eye
COM-5	Karthala mountains	Invertebrates	*Amauris comorana*	Comoro Friar
COM-5	Karthala mountains	Invertebrates	*Graphium levassori*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
COM-5	Karthala mountains	Invertebrates	*Papilio aristophontes*	
COM-5	Karthala mountains	Invertebrates	*Pseudagrion pontogenes*	
COM-5	Karthala mountains	Mammals	*Rousettus obliviosus*	Comoros Rousette
COM-5	Karthala mountains	Plants	*Dypsis lanceolata*	
COM-5	Karthala mountains	Plants	*Jumellea anjouanensis*	
COM-5	Karthala mountains	Plants	*Khaya madagascariensis*	
COM-5	Karthala mountains	Plants	*Ravenea hildebrandtii*	
COM-5	Karthala mountains	Plants	*Ravenea moorei*	
COM-5	Karthala mountains	Reptiles	*Paroedura sanctijohannis*	Comoro Ground Gecko
COM-7	Mount Ntringui (Ndzuani highlands)	Birds	*Circus macrosceles*	Madagascar Marsh-harrier
COM-7	Mount Ntringui (Ndzuani highlands)	Birds	*Otus capnodes*	Anjouan Scops-owl
COM-7	Mount Ntringui (Ndzuani highlands)	Invertebrates	*Papilio aristophontes*	
COM-7	Mount Ntringui (Ndzuani highlands)	Mammals	*Eulemur mongoz*	Mongoose Lemur
COM-7	Mount Ntringui (Ndzuani highlands)	Mammals	*Pteropus livingstonii*	Comoro Black Flying Fox
COM-7	Mount Ntringui (Ndzuani highlands)	Mammals	*Rousettus obliviosus*	Comoro Rousette
COM-7	Mount Ntringui (Ndzuani highlands)	Plants	*Jumellea anjouanensis*	
COM-7	Mount Ntringui (Ndzuani highlands)	Plants	*Khaya madagascariensis*	
COM-7	Mount Ntringui (Ndzuani highlands)	Reptiles	*Paroedura sanctijohannis*	Comoro Ground Gecko
COM-8	Mohéli Marine Park	Invertebrates	*Acropora aculeus*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora anthocercis*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora echinata*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora hemprichii*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora horrida*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora pharaonis*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora polystoma*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora retusa*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora solitaryensis*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora vaughani*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora verweyi*	
COM-8	Mohéli Marine Park	Invertebrates	*Acropora willisae*	
COM-8	Mohéli Marine Park	Invertebrates	*Isopora brueggemanni*	
COM-8	Mohéli Marine Park	Invertebrates	*Isopora crateriformis*	

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COM-8	Mohéli Marine Park	Invertebrates	*Isopora cuneata*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora australiensis*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora calcarea*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora friabilis*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora lobulata*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora orientalis*	
COM-8	Mohéli Marine Park	Invertebrates	*Montipora stilosa*	
COM-8	Mohéli Marine Park	Invertebrates	*Pocillopora indiania*	
COM-8	Mohéli Marine Park	Invertebrates	*Porites nigrescens*	
COM-8	Mohéli Marine Park	Invertebrates	*Porites sillimaniana*	
COM-8	Mohéli Marine Park	Invertebrates	*Turbinaria mesenterina*	
COM-8	Mohéli Marine Park	Invertebrates	*Turbinaria peltata*	
COM-8	Mohéli Marine Park	Invertebrates	*Turbinaria reniformis*	
COM-8	Mohéli Marine Park	Invertebrates	*Turbinaria stellulata*	
COM-12	Bimbini area and La Selle islet	Fish	*Latimeria chalumnae*	Coelacanth
COM-12	Bimbini area and La Selle islet	Invertebrates	*Holothuria fuscogilva*	
COM-12	Bimbini area and La Selle islet	Invertebrates	*Holothuria nobilis*	Black Teatfish
COM-12	Bimbini area and La Selle islet	Invertebrates	*Holothuria scabra*	
COM-12	Bimbini area and La Selle islet	Mammals	*Balaenoptera musculus*	Blue Whale
COM-12	Bimbini area and La Selle islet	Mammals	*Dugong dugon*	Dugong
COM-12	Bimbini area and La Selle islet	Reptiles	*Chelonia mydas*	Green Turtle
COM-12	Bimbini area and La Selle islet	Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle
COM-14	Domoni area	Reptiles	*Chelonia mydas*	Green Turtle
COM-14	Domoni area	Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle
COM-16	Moya area	Mammals	*Balaenoptera musculus*	Blue Whale
COM-16	Moya area	Reptiles	*Chelonia mydas*	Green Turtle
COM-16	Moya area	Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle
COM-19	Pomoni area	Invertebrates	*Acropora aculeus*	
COM-19	Pomoni area	Invertebrates	*Acropora anthocercis*	
COM-19	Pomoni area	Invertebrates	*Acropora echinata*	
COM-19	Pomoni area	Invertebrates	*Acropora hemprichii*	
COM-19	Pomoni area	Invertebrates	*Acropora horrida*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
COM-19	Pomoni area	Invertebrates	*Acropora pharaonis*	
COM-19	Pomoni area	Invertebrates	*Acropora polystoma*	
COM-19	Pomoni area	Invertebrates	*Acropora retusa*	
COM-19	Pomoni area	Invertebrates	*Acropora solitaryensis*	
COM-19	Pomoni area	Invertebrates	*Acropora vaughani*	
COM-19	Pomoni area	Invertebrates	*Acropora verweyi*	
COM-19	Pomoni area	Invertebrates	*Acropora willisae*	
COM-19	Pomoni area	Invertebrates	*Isopora brueggemanni*	
COM-19	Pomoni area	Invertebrates	*Isopora crateriformis*	
COM-19	Pomoni area	Invertebrates	*Isopora cuneata*	
COM-19	Pomoni area	Invertebrates	*Montipora australiensis*	
COM-19	Pomoni area	Invertebrates	*Montipora calcarea*	
COM-19	Pomoni area	Invertebrates	*Montipora friabilis*	
COM-19	Pomoni area	Invertebrates	*Montipora lobulata*	
COM-19	Pomoni area	Invertebrates	*Montipora orientalis*	
COM-19	Pomoni area	Invertebrates	*Montipora stilosa*	
COM-19	Pomoni area	Invertebrates	*Pocillopora indiania*	
COM-19	Pomoni area	Invertebrates	*Porites nigrescens*	
COM-19	Pomoni area	Invertebrates	*Porites sillimaniana*	
COM-19	Pomoni area	Invertebrates	*Turbinaria mesenterina*	
COM-19	Pomoni area	Invertebrates	*Turbinaria peltata*	
COM-19	Pomoni area	Invertebrates	*Turbinaria reniformis*	
COM-19	Pomoni area	Invertebrates	*Turbinaria stellulata*	
COM-19	Pomoni area	Mammals	*Balaenoptera musculus*	Blue Whale
COM-19	Pomoni area	Mammals	*Physeter macrocephalus*	Sperm Whale
COM-20	Coelacanth area	Fish	*Latimeria chalumnae*	Coelacanth
COM-20	Coelacanth area	Fish	*Makaira nigricans*	Blue Marlin
COM-20	Coelacanth area	Invertebrates	*Holothuria fuscogilva*	
COM-20	Coelacanth area	Invertebrates	*Holothuria nobilis*	Black Teatfish
COM-20	Coelacanth area	Invertebrates	*Holothuria scabra*	
COM-20	Coelacanth area	Mammals	*Balaenoptera musculus*	Blue Whale
COM-20	Coelacanth area	Mammals	*Dugong dugon*	Dugong

KBA code	KBA name	Taxonomic group	Scientific name	Common name
COM-20	Coelacanth area	Reptiles	*Chelonia mydas*	Green Turtle
COM-20	Coelacanth area	Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle
MAURICE				
MUS-2	Bamboo Mountain Range	Invertebrates	*Dupontia levis*	
MUS-2	Bamboo Mountain Range	Invertebrates	*Dupontia perlucida*	
MUS-2	Bamboo Mountain Range	Invertebrates	*Dupontia poweri*	
MUS-2	Bamboo Mountain Range	Invertebrates	*Gonospira holostoma*	
MUS-2	Bamboo Mountain Range	Invertebrates	*Gonospira striaticostus*	
MUS-2	Bamboo Mountain Range	Invertebrates	*Omphalotropis hieroglyphica*	
MUS-2	Bamboo Mountain Range	Plants	*Canarium paniculatum*	
MUS-2	Bamboo Mountain Range	Plants	*Coffea macrocarpa*	
MUS-2	Bamboo Mountain Range	Plants	*Coffea myrtifolia*	
MUS-2	Bamboo Mountain Range	Plants	*Colea colei*	
MUS-2	Bamboo Mountain Range	Plants	*Cynanchum staubii*	
MUS-2	Bamboo Mountain Range	Plants	*Diospyros boutoniana*	Bois d'ébène marbre à grosses feuilles
MUS-2	Bamboo Mountain Range	Plants	*Diospyros chrysophyllos*	Bois d'ébène blanc
MUS-2	Bamboo Mountain Range	Plants	*Diospyros leucomelas*	Bois d'ébène marbre feuilles
MUS-2	Bamboo Mountain Range	Plants	*Diospyros melanida*	Bois d'ébène blanc feuilles
MUS-2	Bamboo Mountain Range	Plants	*Diospyros pterocalyx*	Bois d'ébène à calice ailé feuilles
MUS-2	Bamboo Mountain Range	Plants	*Diospyros revaughanii*	Bois D'ébène Feuilles
MUS-2	Bamboo Mountain Range	Plants	*Diospyros tessellaria*	Black Ebony
MUS-2	Bamboo Mountain Range	Plants	*Erythroxylum macrocarpum*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia bojeri*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia crassipetala*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia elliptica*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia neofasciculata*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia orbiculata*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia pollicina*	
MUS-2	Bamboo Mountain Range	Plants	*Eugenia tinifolia*	
MUS-2	Bamboo Mountain Range	Plants	*Fernelia decipiens*	
MUS-2	Bamboo Mountain Range	Plants	*Gymnosporia pyria*	
MUS-2	Bamboo Mountain Range	Plants	*Hederorkis scandens*	

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MUS-2	Bamboo Mountain Range	Plants	*Homalium integrifolium*	
MUS-2	Bamboo Mountain Range	Plants	*Labourdonnaisia glauca*	Bois de natte
MUS-2	Bamboo Mountain Range	Plants	*Labourdonnaisia revoluta*	Bois de natte a petites feuilles
MUS-2	Bamboo Mountain Range	Plants	*Memecylon laxiflorum*	
MUS-2	Bamboo Mountain Range	Plants	*Ochna mauritiana*	
MUS-2	Bamboo Mountain Range	Plants	*Pandanus glaucocephalus*	
MUS-2	Bamboo Mountain Range	Plants	*Pandanus iceryi*	
MUS-2	Bamboo Mountain Range	Plants	*Pandanus prostratus*	
MUS-2	Bamboo Mountain Range	Plants	*Pilea cuneiformis*	
MUS-2	Bamboo Mountain Range	Plants	*Pisonia costata*	
MUS-2	Bamboo Mountain Range	Plants	*Pleurostylia leucocarpa*	
MUS-2	Bamboo Mountain Range	Plants	*Polyscias dichroostachya*	
MUS-2	Bamboo Mountain Range	Plants	*Polyscias gracilis*	Bois Papaye
MUS-2	Bamboo Mountain Range	Plants	*Protium obtusifolium*	Bois colophane batard
MUS-2	Bamboo Mountain Range	Plants	*Sideroxylon boutonianum*	Bois de fer
MUS-2	Bamboo Mountain Range	Plants	*Sideroxylon cinereum*	Manglier vert
MUS-2	Bamboo Mountain Range	Plants	*Sideroxylon sessiliflorum*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium bijouxii*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium coriaceum*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium glomeratum*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium latifolium*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium populifolium*	
MUS-2	Bamboo Mountain Range	Plants	*Syzygium vaughanii*	
MUS-2	Bamboo Mountain Range	Plants	*Tambourissa amplifolia*	Bois de tambour
MUS-2	Bamboo Mountain Range	Plants	*Tambourissa ficus*	Bois tambour
MUS-2	Bamboo Mountain Range	Plants	*Tambourissa peltata*	Bois tambour
MUS-2	Bamboo Mountain Range	Plants	*Turraea rigida*	
MUS-3	Chamarel - Le Morne	Birds	*Collocalia francica*	Mascarene Swiftlet
MUS-3	Chamarel - Le Morne	Birds	*Falco punctatus*	Mauritius Kestrel
MUS-3	Chamarel - Le Morne	Birds	*Hypsipetes olivaceus*	Mauritius Bulbul
MUS-3	Chamarel - Le Morne	Birds	*Terpsiphone bourbonnensis*	Mascarene Paradise-flycatcher
MUS-3	Chamarel - Le Morne	Birds	*Zosterops borbonicus*	Mascarene Grey White-eye

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-3	Chamarel - Le Morne	Birds	*Zosterops mauritianus*	Mauritius Grey White-eye
MUS-3	Chamarel - Le Morne	Invertebrates	*Gonospira holostoma*	
MUS-3	Chamarel - Le Morne	Invertebrates	*Gonospira madgei*	
MUS-3	Chamarel - Le Morne	Invertebrates	*Gonospira striaticostus*	
MUS-3	Chamarel - Le Morne	Invertebrates	*Gonospira teres*	
MUS-3	Chamarel - Le Morne	Plants	*Badula crassa*	
MUS-3	Chamarel - Le Morne	Plants	*Chassalia boryana*	
MUS-3	Chamarel - Le Morne	Plants	*Coffea myrtifolia*	
MUS-3	Chamarel - Le Morne	Plants	*Cynanchum staubii*	
MUS-3	Chamarel - Le Morne	Plants	*Cyphostemma mappia*	bois mapou
MUS-3	Chamarel - Le Morne	Plants	*Diospyros boutoniana*	Bois d'ébène marbre à grosses feuilles
MUS-3	Chamarel - Le Morne	Plants	*Diospyros chrysophyllos*	Bois d'ébène blanc
MUS-3	Chamarel - Le Morne	Plants	*Diospyros hemiteles*	Bois d'ébène feuilles
MUS-3	Chamarel - Le Morne	Plants	*Diospyros leucomelas*	Bois d'ébène marbre feuilles
MUS-3	Chamarel - Le Morne	Plants	*Diospyros melanida*	Bois d'ébène blanc feuilles
MUS-3	Chamarel - Le Morne	Plants	*Diospyros neraudii*	Bois d'ébène feuilles
MUS-3	Chamarel - Le Morne	Plants	*Diospyros tessellaria*	Black Ebony
MUS-3	Chamarel - Le Morne	Plants	*Distephanus populifolius*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia crassipetala*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia kanakana*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia lucida*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia neofasciculata*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia orbiculata*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia pollicina*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia sieberi*	
MUS-3	Chamarel - Le Morne	Plants	*Eugenia tinifolia*	
MUS-3	Chamarel - Le Morne	Plants	*Faujasiopsis reticulata*	Oreille de souris
MUS-3	Chamarel - Le Morne	Plants	*Helichrysum caespitosum*	Immortelle du Pouce
MUS-3	Chamarel - Le Morne	Plants	*Helichrysum mauritianum*	
MUS-3	Chamarel - Le Morne	Plants	*Hibiscus fragilis*	Mandrinette
MUS-3	Chamarel - Le Morne	Plants	*Memecylon laxiflorum*	
MUS-3	Chamarel - Le Morne	Plants	*Memecylon ovatifolium*	

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MUS-3	Chamarel - Le Morne	Plants	*Mimusops petiolaris*	Makak
MUS-3	Chamarel - Le Morne	Plants	*Molinaea laevis*	
MUS-3	Chamarel - Le Morne	Plants	*Nesocodon mauritianus*	
MUS-3	Chamarel - Le Morne	Plants	*Ochna mauritiana*	
MUS-3	Chamarel - Le Morne	Plants	*Ocotea laevigata*	
MUS-3	Chamarel - Le Morne	Plants	*Pisonia costata*	
MUS-3	Chamarel - Le Morne	Plants	*Pleurostylia leucocarpa*	
MUS-3	Chamarel - Le Morne	Plants	*Polyscias dichroostachya*	
MUS-3	Chamarel - Le Morne	Plants	*Polyscias maraisiana*	Bois de boeuf
MUS-3	Chamarel - Le Morne	Plants	*Poupartia pubescens*	Bois De Poupart
MUS-3	Chamarel - Le Morne	Plants	*Protium obtusifolium*	Bois colophane batard
MUS-3	Chamarel - Le Morne	Plants	*Psiadia lithospermifolia*	
MUS-3	Chamarel - Le Morne	Plants	*Senecio lamarckianus*	Bois De Chèvre
MUS-3	Chamarel - Le Morne	Plants	*Sideroxylon boutonianum*	Bois de fer
MUS-3	Chamarel - Le Morne	Plants	*Sideroxylon cinereum*	Manglier vert
MUS-3	Chamarel - Le Morne	Plants	*Syzygium contractum*	
MUS-3	Chamarel - Le Morne	Plants	*Syzygium coriaceum*	
MUS-3	Chamarel - Le Morne	Plants	*Syzygium glomeratum*	
MUS-3	Chamarel - Le Morne	Plants	*Syzygium latifolium*	
MUS-3	Chamarel - Le Morne	Plants	*Syzygium mauritianum*	
MUS-3	Chamarel - Le Morne	Plants	*Tambourissa amplifolia*	Bois de tambour
MUS-3	Chamarel - Le Morne	Plants	*Tambourissa quadrifida*	Bois tambour
MUS-3	Chamarel - Le Morne	Plants	*Trochetia boutoniana*	
MUS-3	Chamarel - Le Morne	Plants	*Trochetia parviflora*	
MUS-3	Chamarel - Le Morne	Plants	*Turraea trichopoda*	
MUS-3	Chamarel - Le Morne	Reptiles	*Phelsuma guimbeaui*	Lowland Forest Day Gecko
MUS-5	Relict Forests of the Central Plateau	Birds	*Aerodramus francicus*	Mascarene Swiftlet
MUS-5	Relict Forests of the Central Plateau	Birds	*Anas melleri*	Meller's Duck
MUS-5	Relict Forests of the Central Plateau	Birds	*Foudia rubra*	Mauritius Fody
MUS-5	Relict Forests of the Central Plateau	Birds	*Hypsipetes olivaceus*	Mauritius Bulbul
MUS-5	Relict Forests of the Central Plateau	Birds	*Lalage typica*	Mauritius Cuckooshrike
MUS-5	Relict Forests of the Central Plateau	Birds	*Psittacula eques*	Echo Parakeet

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-5	Relict Forests of the Central Plateau	Birds	*Terpsiphone bourbonnensis*	Mascarene Paradise-flycatcher
MUS-5	Relict Forests of the Central Plateau	Birds	*Zosterops borbonicus*	Mascarene Grey White-eye
MUS-5	Relict Forests of the Central Plateau	Birds	*Zosterops chloronothos*	Mauritius Olive White-eye
MUS-5	Relict Forests of the Central Plateau	Birds	*Zosterops mauritianus*	Mauritius Grey White-eye
MUS-5	Relict Forests of the Central Plateau	Mammals	*Mormopterus acetabulosus*	Natal Free-tailed Bat
MUS-5	Relict Forests of the Central Plateau	Mammals	*Pteropus niger*	Greater Mascarene Flying Fox
MUS-5	Relict Forests of the Central Plateau	Plants	*Tectiphiala ferox*	Palmiste Bouglé
MUS-6	Rodrigues Islets	Plants	*Pisonia grandis*	
MUS-6	Rodrigues Islets	Plants	*Sesuvium ayresii*	
MUS-6	Rodrigues Islets	Plants	*Terminalia bentzoe*	
MUS-8	Mauritius Island's South-Eastern Islets	Birds	*Falco punctatus*	Mauritius Kestrel
MUS-8	Mauritius Island's South-Eastern Islets	Birds	*Nesoenas mayeri*	Pink Pigeon
MUS-8	Mauritius Island's South-Eastern Islets	Reptiles	*Gongylomorphus bojerii*	Bojer's Skink
MUS-8	Mauritius Island's South-Eastern Islets	Reptiles	*Nactus coindemirensis*	Lesser Night Gecko
MUS-11	Corps de Garde Mountain	Invertebrates	*Eurymorphopus dubius*	
MUS-11	Corps de Garde Mountain	Invertebrates	*Omphalotropis hieroglyphica*	
MUS-11	Corps de Garde Mountain	Plants	*Barleria observatrix*	
MUS-11	Corps de Garde Mountain	Plants	*Coffea myrtifolia*	
MUS-11	Corps de Garde Mountain	Plants	*Croton tiliifolius*	
MUS-11	Corps de Garde Mountain	Plants	*Diospyros boutoniana*	Bois d'ébène marbre à grosses feuilles
MUS-11	Corps de Garde Mountain	Plants	*Diospyros leucomelas*	Bois d'ébène marbre feuilles
MUS-11	Corps de Garde Mountain	Plants	*Diospyros melanida*	Bois d'ébène blanc feuilles
MUS-11	Corps de Garde Mountain	Plants	*Diospyros neraudii*	Bois d'ébène feuilles
MUS-11	Corps de Garde Mountain	Plants	*Diospyros revaughanii*	Bois D'ébène Feuilles
MUS-11	Corps de Garde Mountain	Plants	*Diospyros tessellaria*	Black Ebony
MUS-11	Corps de Garde Mountain	Plants	*Distephanus populifolius*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia elliptica*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia lucida*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia neofasciculata*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia orbiculata*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia sieberi*	
MUS-11	Corps de Garde Mountain	Plants	*Eugenia tinifolia*	

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MUS-11	Corps de Garde Mountain	Plants	*Faujasiopsis reticulata*	Oreille de souris
MUS-11	Corps de Garde Mountain	Plants	*Fernelia obovata*	
MUS-11	Corps de Garde Mountain	Plants	*Gymnosporia pyria*	
MUS-11	Corps de Garde Mountain	Plants	*Helichrysum caespitosum*	Immortelle du Pouce
MUS-11	Corps de Garde Mountain	Plants	*Hibiscus fragilis*	Mandrinette
MUS-11	Corps de Garde Mountain	Plants	*Ixora nitens*	
MUS-11	Corps de Garde Mountain	Plants	*Mimusops erythroxylon*	
MUS-11	Corps de Garde Mountain	Plants	*Mimusops petiolaris*	Makak
MUS-11	Corps de Garde Mountain	Plants	*Molinaea laevis*	
MUS-11	Corps de Garde Mountain	Plants	*Ochna mauritiana*	
MUS-11	Corps de Garde Mountain	Plants	*Pilea trilobata*	
MUS-11	Corps de Garde Mountain	Plants	*Pleurostylia leucocarpa*	
MUS-11	Corps de Garde Mountain	Plants	*Polyscias dichroostachya*	
MUS-11	Corps de Garde Mountain	Plants	*Poupartia pubescens*	Bois De Poupart
MUS-11	Corps de Garde Mountain	Plants	*Protium obtusifolium*	Bois colophane batard
MUS-11	Corps de Garde Mountain	Plants	*Psiadia lithospermifolia*	
MUS-11	Corps de Garde Mountain	Plants	*Psiadia viscosa*	Baume de l'ile plate
MUS-11	Corps de Garde Mountain	Plants	*Sideroxylon boutonianum*	Bois de fer
MUS-11	Corps de Garde Mountain	Plants	*Sideroxylon cinereum*	Manglier vert
MUS-11	Corps de Garde Mountain	Plants	*Syzygium mauritianum*	
MUS-11	Corps de Garde Mountain	Plants	*Tambourissa amplifolia*	Bois de tambour
MUS-11	Corps de Garde Mountain	Plants	*Tambourissa peltata*	Bois tambour
MUS-11	Corps de Garde Mountain	Plants	*Trochetia parviflora*	
MUS-11	Corps de Garde Mountain	Plants	*Xylopia lamarckii*	
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Aerodramus francicus*	Mascarene Swiftlet
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Falco punctatus*	Mauritius Kestrel
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Foudia rubra*	Mauritius Fody
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Hypsipetes olivaceus*	Mauritius Bulbul

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MUS-12	Black River Gorges National Park and surrounding area	Birds	*Lalage typica*	Mauritius Cuckooshrike
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Nesoenas mayeri*	Pink Pigeon
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Psittacula eques*	Echo Parakeet
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Terpsiphone bourbonnensis*	Mascarene Paradise-flycatcher
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Zosterops borbonicus*	Mascarene Grey White-eye
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Zosterops chloronothos*	Mauritius Olive White-eye
MUS-12	Black River Gorges National Park and surrounding area	Birds	*Zosterops mauritianus*	Mauritius Grey White-eye
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Creolandreva brachyptera*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Creolandreva cocottensis*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Creolandreva crepitans*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Ctenophila caldwelli*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Dupontia levis*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Dupontia perlucida*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Dupontia poweri*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Erepta odontina*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Gonospira duponti*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Gonospira holostoma*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Gonospira madgei*	

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MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Gonospira striaticostus*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Gonospira teres*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Microstrophia modesta*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Microstrophia nana*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Nepheliphila raptor*	
MUS-12	Black River Gorges National Park and surrounding area	Invertebrates	*Omphalotropis hieroglyphica*	
MUS-12	Black River Gorges National Park and surrounding area	Mammals	*Mormopterus acetabulosus*	Natal Free-tailed Bat
MUS-12	Black River Gorges National Park and surrounding area	Mammals	*Pteropus niger*	Greater Mascarene Flying Fox
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Badula insularis*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Badula multiflora*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Badula reticulata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Calophyllum eputamen*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Calophyllum parviflorum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Canarium paniculatum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Casearia mauritiana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Chassalia capitata*	Bois Corail
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Chassalia coriacea*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Chassalia grandifolia*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Chassalia lanceolata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Chassalia petrinensis*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Claoxylon linostachys*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Coffea macrocarpa*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Colea colei*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Diospyros boutoniana*	Bois d'ébène marbre à grosses feuilles
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Diospyros neraudii*	Bois d'ébène feuilles
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Diospyros pterocalyx*	Bois d'ébène à calice ailé feuilles
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Diospyros revaughanii*	Bois D'ébène Feuilles
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Diospyros tessellaria*	Black Ebony
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Dracaena floribunda*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Elaeocarpus integrifolius*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Erythroxylum macrocarpum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Eugenia bojeri*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Eugenia kanakana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Eugenia orbiculata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Eugenia pyxidata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Fernelia decipiens*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Gaertnera cuneifolia*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Gaertnera edentata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Gaertnera pendula*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Hederorkis scandens*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Helichrysum proteoides*	Immortelle du Pouce
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Helichrysum yuccifolium*	Immortelle
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Homalium integrifolium*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Hugonia tomentosa*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Ixora vaughanii*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Labourdonnaisia glauca*	Bois de natte
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Macaranga mauritiana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Melicope chapelieri*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Memecylon ovatifolium*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Mimusops erythroxylon*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Mimusops petiolaris*	Makak
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Ochna mauritiana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Ocotea laevigata*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Ocotea mascarena*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Orfilea neraudiana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pandanus glaucocephalus*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pandanus sphaeroideus*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Phyllanthus lanceolatus*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Phyllanthus pileostigma*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pilea cocottei*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pilea cuneiformis*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pilea verbascifolia*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Pleurostylia leucocarpa*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Polyscias mauritiana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Protium obtusifolium*	Bois colophane batard
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Psiadia terebinthina*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Roussea simplex*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Sideroxylon grandiflorum*	Tambalacoque
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Sideroxylon puberulum*	Manglier rouge
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Sideroxylon sessiliflorum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium commersonii*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium contractum*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium coriaceum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium glomeratum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium latifolium*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium mamillatum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium mauritianum*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium petrinense*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Syzygium populifolium*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa cocottensis*	Bois Tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa ficus*	Bois tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa pedicellata*	Bois Tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa peltata*	Bois tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa sieberi*	Bois tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa tau*	Bois tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tambourissa tetragona*	Bois tambour
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Tectiphiala ferox*	Palmiste Bouglé
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Trochetia blackburniana*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Trochetia triflora*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Trochetia uniflora*	

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MUS-12	Black River Gorges National Park and surrounding area	Plants	*Turraea rigida*	
MUS-12	Black River Gorges National Park and surrounding area	Plants	*Xylopia amplexicaulis*	
MUS-12	Black River Gorges National Park and surrounding area	Reptiles	*Gongylomorphus bojerii*	Macchabé Skink
MUS-12	Black River Gorges National Park and surrounding area	Reptiles	*Phelsuma rosagularis*	Upland Forest Day Gecko
MUS-14	Plaine des Roches - Bras d'Eau	Birds	*Collocalia francica*	Mascarene Swiftlet
MUS-14	Plaine des Roches - Bras d'Eau	Birds	*Terpsiphone bourbonnensis*	Mascarene Paradise-flycatcher
MUS-14	Plaine des Roches - Bras d'Eau	Birds	*Zosterops borbonicus*	Mascarene Grey White-eye
MUS-14	Plaine des Roches - Bras d'Eau	Mammals	*Mormopterus acetabulosus*	Natal Free-tailed Bat
MUS-16	South Slopes of Grande Montagne	Invertebrates	*Tropidophora articulata*	
MUS-16	South Slopes of Grande Montagne	Mammals	*Pteropus rodricensis*	Rodrigues Flying Fox
MUS-16	South Slopes of Grande Montagne	Plants	*Allophylus borbonicus*	
MUS-16	South Slopes of Grande Montagne	Plants	*Aloe lomatophylloides*	
MUS-16	South Slopes of Grande Montagne	Plants	*Carissa spinarum*	Num-num
MUS-16	South Slopes of Grande Montagne	Plants	*Cassine orientalis*	
MUS-16	South Slopes of Grande Montagne	Plants	*Diospyros diversifolia*	Bois d'Ebene
MUS-16	South Slopes of Grande Montagne	Plants	*Fernelia buxifolia*	
MUS-16	South Slopes of Grande Montagne	Plants	*Hyophorbe verschaffeltii*	Palmiste Marron
MUS-16	South Slopes of Grande Montagne	Plants	*Latania verschaffeltii*	Latanier de Rodrigues
MUS-16	South Slopes of Grande Montagne	Plants	*Lobelia vagans*	
MUS-16	South Slopes of Grande Montagne	Plants	*Obetia ficifolia*	
MUS-16	South Slopes of Grande Montagne	Plants	*Securinega durissima*	
MUS-16	South Slopes of Grande Montagne	Plants	*Terminalia bentzoe*	
MUS-17	Yemen-Takamaka	Birds	*Falco punctatus*	Mauritius Kestrel
MUS-17	Yemen-Takamaka	Invertebrates	*Gonospira teres*	
MUS-17	Yemen-Takamaka	Plants	*Badula crassa*	
MUS-17	Yemen-Takamaka	Plants	*Chloris filiformis*	
MUS-17	Yemen-Takamaka	Plants	*Cynanchum glomeratum*	
MUS-17	Yemen-Takamaka	Plants	*Cyphostemma mappia*	bois mapou
MUS-17	Yemen-Takamaka	Plants	*Diospyros melanida*	Bois d'ébène blanc feuilles

KBA code	KBA name	Taxonomic group	Scientific name	Common name
MUS-17	Yemen-Takamaka	Plants	*Eugenia neofasciculata*	
MUS-17	Yemen-Takamaka	Plants	*Eugenia orbiculata*	
MUS-17	Yemen-Takamaka	Plants	*Eugenia sieberi*	
MUS-17	Yemen-Takamaka	Plants	*Eugenia tinifolia*	
MUS-17	Yemen-Takamaka	Plants	*Eugenia vaughanii*	
MUS-17	Yemen-Takamaka	Plants	*Gymnosporia pyria*	
MUS-17	Yemen-Takamaka	Plants	*Hornea mauritiana*	Arbre a l'huile
MUS-17	Yemen-Takamaka	Plants	*Memecylon laxiflorum*	
MUS-17	Yemen-Takamaka	Plants	*Ochna mauritiana*	
MUS-17	Yemen-Takamaka	Plants	*Polyscias maraisiana*	Bois de boeuf
MUS-17	Yemen-Takamaka	Plants	*Poupartia pubescens*	Bois De Poupart
MUS-17	Yemen-Takamaka	Plants	*Sideroxylon boutonianum*	Bois de fer
MUS-17	Yemen-Takamaka	Plants	*Tambourissa quadrifida*	Bois tambour
SEYCHELLES				
SYC-3	Astove			
SYC-5	Cosmoledo	Birds	*Arenaria interpres*	Ruddy Turnstone
SYC-5	Cosmoledo	Birds	*Dromas ardeola*	Crab-plover
SYC-5	Cosmoledo	Birds	*Phaethon rubricauda*	Red-tailed Tropicbird
SYC-5	Cosmoledo	Birds	*Sterna bergii*	Greater Crested Tern
SYC-5	Cosmoledo	Birds	*Sterna fuscata*	Sooty Tern
SYC-5	Cosmoledo	Birds	*Sterna sumatrana*	Black-naped Tern
SYC-5	Cosmoledo	Birds	*Sula dactylatra*	
SYC-5	Cosmoledo	Birds	*Sula sula*	Red-footed Booby
SYC-6	Farquhar - South Island and islets	Birds	*Sterna fuscata*	Sooty Tern
SYC-6	Farquhar - South Island and islets	Birds	*Sterna sumatrana*	Black-naped Tern
SYC-9	Fond Ferdinand	Birds	*Coracopsis barklyi*	Seychelles Parrot
SYC-9	Fond Ferdinand	Birds	*Falco araea*	Seychelles Kestrel
SYC-9	Fond Ferdinand	Invertebrates	*Pachnodus niger*	
SYC-9	Fond Ferdinand	Invertebrates	*Pachnodus ornatus*	
SYC-9	Fond Ferdinand	Invertebrates	*Stylodonta studeriana*	
SYC-9	Fond Ferdinand	Plants	*Colea seychellarum*	
SYC-9	Fond Ferdinand	Plants	*Craterispermum microdon*	

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SYC-9	Fond Ferdinand	Plants	*Dillenia ferruginea*	Bwa Rouz
SYC-9	Fond Ferdinand	Plants	*Drypetes riseleyi*	Bwa Mare Pti Fey
SYC-9	Fond Ferdinand	Plants	*Lodoicea maldivica*	Double Coconut Palm
SYC-9	Fond Ferdinand	Plants	*Martellidendron hornei*	Horne's Pandanus
SYC-9	Fond Ferdinand	Plants	*Nephrosperma van-houtteanum*	
SYC-9	Fond Ferdinand	Plants	*Northia hornei*	
SYC-9	Fond Ferdinand	Plants	*Polyscias sechellarum*	Bwa Bannann
SYC-9	Fond Ferdinand	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-9	Fond Ferdinand	Plants	*Roscheria melanochaetes*	
SYC-9	Fond Ferdinand	Plants	*Verschaffeltia splendida*	Latannyen Lat
SYC-15	Bird Island (Ile aux Vaches)	Birds	*Anous stolidus*	Brown Noddy
SYC-15	Bird Island (Ile aux Vaches)	Birds	*Sterna fuscata*	Sooty Tern
SYC-18	Curieuse Island	Invertebrates	*Pachnodus fregatensis*	
SYC-18	Curieuse Island	Invertebrates	*Priodiscus costatus*	
SYC-18	Curieuse Island	Invertebrates	*Teinobasis alluaudi*	Seychelles Fineliner
SYC-18	Curieuse Island	Plants	*Dillenia ferruginea*	Bwa Rouz
SYC-18	Curieuse Island	Plants	*Lodoicea maldivica*	Double Coconut Palm
SYC-18	Curieuse Island	Plants	*Northia hornei*	
SYC-18	Curieuse Island	Plants	*Polyscias sechellarum*	Bwa Bannann
SYC-18	Curieuse Island	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-18	Curieuse Island	Plants	*Secamone schimperiana*	Lalyann Dile
SYC-19	D'Arros Island and Saint Joseph Atoll	Birds	*Foudia sechellarum*	Seychelles Fody
SYC-20	Denis Island	Birds	*Acrocephalus sechellensis*	Seychelles Warbler
SYC-20	Denis Island	Birds	*Copsychus sechellarum*	Seychelles Magpie-robin
SYC-20	Denis Island	Birds	*Terpsiphone corvina*	Seychelles Paradise-flycatcher
SYC-32	Saint-François and Bijoutier Islands			
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Augustula braueri*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Enoplotettix gardineri*	Seychelles Palm Grasshopper
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Pachnodus becketti*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Pachnodus niger*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Pachnodus ornatus*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Priodiscus costatus*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-36	Burnt Mountain-Piton de l'Eboulis	Invertebrates	*Stylodonta unidentata*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Campnosperma seychellarum*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Canthium carinatum*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Canthium sechellense*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Colea seychellarum*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Craterispermum microdon*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Dillenia ferruginea*	Bwa Rouz
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Disperis tripetaloides*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Drypetes riseleyi*	Bwa Mare Pti Fey
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Excoecaria benthamiana*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Ixora pudica*	Ikzora Blan
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Nepenthes pervillei*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Nephrosperma van-houtteanum*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Northia hornei*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Platylepis occulta*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Polyscias crassa*	Bwa Bannann
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Roscheria melanochaetes*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Soulamea terminalioides*	Colophant
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Vateriopsis seychellarum*	
SYC-36	Burnt Mountain-Piton de l'Eboulis	Plants	*Verschaffeltia splendida*	Latannyen Lat
SYC-36	Burnt Mountain-Piton de l'Eboulis	Reptiles	*Archaius tigris*	Tiger Chameleon
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Birds	*Aerodramus elaphrus*	Seychelles Swiftlet
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Birds	*Falco araea*	Seychelles Kestrel
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Birds	*Otus insularis*	Seychelles Scops-owl
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Birds	*Zosterops modestus*	Seychelles White-eye
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Acanthennea erinacea*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Allolestes maclachlani*	

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Augustula braueri*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Careoradula perelegans*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Enoplotettix gardineri*	Seychelles Palm Grasshopper
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Glabrennea gardineri*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Imperturbatia constans*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Nesokaliella subturritula*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Pachnodus becketti*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Pachnodus ornatus*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Priodiscus costatus*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Punctum seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Invertebrates	*Stylodonta unidentata*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Achyrospermum seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Campnosperma seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Canthium carinatum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Canthium sechellense*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Colea seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Craterispermum microdon*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Dillenia ferruginea*	Bwa Rouz

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Drypetes riseleyi*	Bwa Mare Pti Fey
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Excoecaria benthamiana*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Glionnetia sericea*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Grisollea thomassetii*	Bwa Mare, Bwa Gro La Po
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Hederorkis seychellensis*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Hypoxidia maheensis*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Ixora pudica*	Ikzora Blan
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Martellidendron hornei*	Horne's Pandanus
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Medusagyne oppositifolia*	Jellyfish Tree
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Nepenthes pervillei*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Nephrosperma van-houtteanum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Northia hornei*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Phaius tetragonus*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Pittosporum senacia*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Platylepis occulta*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Polyscias crassa*	Bwa Bannann
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Polyscias sechellarum*	Bwa Bannann
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Psathura sechellarum*	Bwa Kasan Pti Fey

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Rapanea seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Roscheria melanochaetes*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Schefflera procumbens*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Secamone schimperiana*	Lalyann Dile
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Soulamea terminalioides*	Colophant
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Tournefortia puberula*	Manakobongo
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Vateriopsis seychellarum*	
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)	Plants	*Verschaffeltia splendida*	Latannyen Lat
SYC-41	Praslin National Park	Birds	*Coracopsis barklyi*	Seychelles Parrot
SYC-41	Praslin National Park	Invertebrates	*Careoradula perelegans*	
SYC-41	Praslin National Park	Invertebrates	*Nesokaliella minuta*	
SYC-41	Praslin National Park	Invertebrates	*Pachnodus niger*	
SYC-41	Praslin National Park	Invertebrates	*Pachnodus praslinus*	
SYC-41	Praslin National Park	Invertebrates	*Stylodonta studeriana*	
SYC-41	Praslin National Park	Plants	*Campnosperma seychellarum*	
SYC-41	Praslin National Park	Plants	*Craterispermum microdon*	
SYC-41	Praslin National Park	Plants	*Dillenia ferruginea*	Bwa Rouz
SYC-41	Praslin National Park	Plants	*Disperis tripetaloides*	
SYC-41	Praslin National Park	Plants	*Drypetes riseleyi*	Bwa Mare Pti Fey
SYC-41	Praslin National Park	Plants	*Excoecaria benthamiana*	
SYC-41	Praslin National Park	Plants	*Martellidendron hornei*	Horne’s Pandanus
SYC-41	Praslin National Park	Plants	*Nephrosperma van-houtteanum*	
SYC-41	Praslin National Park	Plants	*Northia hornei*	
SYC-41	Praslin National Park	Plants	*Polyscias crassa*	Bwa Bannann

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-41	Praslin National Park	Plants	*Polyscias lionnetii*	
SYC-41	Praslin National Park	Plants	*Polyscias sechellarum*	Bwa Bannann
SYC-41	Praslin National Park	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-41	Praslin National Park	Plants	*Roscheria melanochaetes*	
SYC-41	Praslin National Park	Plants	*Secamone schimperiana*	Lalyann Dile
SYC-41	Praslin National Park	Plants	*Verschaffeltia splendida*	Latannyen Lat
SYC-41	Praslin National Park	Reptiles	*Archaius tigris*	Tiger Chameleon
SYC-42	Silhouette National Park			
SYC-43	Morne Seychellois National Park	Birds	*Aerodramus elaphrus*	Seychelles Swiftlet
SYC-43	Morne Seychellois National Park	Birds	*Otus insularis*	Seychelles Scops-owl
SYC-43	Morne Seychellois National Park	Invertebrates	*Acanthennea erinacea*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Allolestes maclachlani*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Augustula braueri*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Careoradula perelegans*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Enoplotettix gardineri*	Seychelles Palm Grasshopper
SYC-43	Morne Seychellois National Park	Invertebrates	*Euploea mitra*	Seychelles Crow
SYC-43	Morne Seychellois National Park	Invertebrates	*Imperturbatia constans*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Nesokaliella minuta*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Pachnodus kantilali*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Pachnodus niger*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Pachnodus ornatus*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Pilula mahesiana*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Priodiscus costatus*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Punctum seychellarum*	
SYC-43	Morne Seychellois National Park	Invertebrates	*Stylodonta unidentata*	
SYC-43	Morne Seychellois National Park	Plants	*Campnosperma seychellarum*	
SYC-43	Morne Seychellois National Park	Plants	*Canthium carinatum*	
SYC-43	Morne Seychellois National Park	Plants	*Canthium sechellense*	
SYC-43	Morne Seychellois National Park	Plants	*Colea seychellarum*	
SYC-43	Morne Seychellois National Park	Plants	*Craterispermum microdon*	
SYC-43	Morne Seychellois National Park	Plants	*Dillenia ferruginea*	Bwa Rouz
SYC-43	Morne Seychellois National Park	Plants	*Drypetes riseleyi*	Bwa Mare Pti Fey

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-43	Morne Seychellois National Park	Plants	*Excoecaria benthamiana*	
SYC-43	Morne Seychellois National Park	Plants	*Garnotia sechellensis*	
SYC-43	Morne Seychellois National Park	Plants	*Glionnetia sericea*	
SYC-43	Morne Seychellois National Park	Plants	*Grisollea thomassetii*	Bwa Mare, Bwa Gro La Po
SYC-43	Morne Seychellois National Park	Plants	*Hederorkis seychellensis*	
SYC-43	Morne Seychellois National Park	Plants	*Hypoxidia maheensis*	
SYC-43	Morne Seychellois National Park	Plants	*Impatiens gordonii*	Seychelles Bizzie Lizzie
SYC-43	Morne Seychellois National Park	Plants	*Ixora pudica*	Ikzora Blan
SYC-43	Morne Seychellois National Park	Plants	*Martellidendron hornei*	Horne’s Pandanus
SYC-43	Morne Seychellois National Park	Plants	*Medusagyne oppositifolia*	Jellyfish Tree
SYC-43	Morne Seychellois National Park	Plants	*Nepenthes pervillei*	
SYC-43	Morne Seychellois National Park	Plants	*Nephrosperma van-houtteanum*	
SYC-43	Morne Seychellois National Park	Plants	*Northia hornei*	
SYC-43	Morne Seychellois National Park	Plants	*Phaius tetragonus*	
SYC-43	Morne Seychellois National Park	Plants	*Pisonia sechellarum*	
SYC-43	Morne Seychellois National Park	Plants	*Pittosporum senacia*	
SYC-43	Morne Seychellois National Park	Plants	*Platylepis occulta*	
SYC-43	Morne Seychellois National Park	Plants	*Polyscias crassa*	Bwa Bannann
SYC-43	Morne Seychellois National Park	Plants	*Polyscias lionnetii*	
SYC-43	Morne Seychellois National Park	Plants	*Polyscias sechellarum*	Bwa Bannann
SYC-43	Morne Seychellois National Park	Plants	*Psathura sechellarum*	Bwa Kasan Pti Fey
SYC-43	Morne Seychellois National Park	Plants	*Psychotria pervillei*	Bwa Koulev
SYC-43	Morne Seychellois National Park	Plants	*Rapanea seychellarum*	
SYC-43	Morne Seychellois National Park	Plants	*Roscheria melanochaetes*	
SYC-43	Morne Seychellois National Park	Plants	*Secamone schimperiana*	Lalyann Dile
SYC-43	Morne Seychellois National Park	Plants	*Soulamea terminalioides*	Colophant
SYC-43	Morne Seychellois National Park	Plants	*Tournefortia puberula*	Manakobongo
SYC-43	Morne Seychellois National Park	Plants	*Vateriopsis seychellarum*	
SYC-43	Morne Seychellois National Park	Plants	*Vernonia sechellensis*	
SYC-43	Morne Seychellois National Park	Plants	*Verschaffeltia splendida*	Latannyen Lat
SYC-43	Morne Seychellois National Park	Reptiles	*Archaius tigris*	Tiger Chameleon
SYC-50	Aldabra Special Reserve	Birds	*Alectroenas sganzini*	Comoro Blue-pigeon

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-50	Aldabra Special Reserve	Birds	*Ardeola idae*	Madagascar Pond-heron
SYC-50	Aldabra Special Reserve	Birds	*Arenaria interpres*	Ruddy Turnstone
SYC-50	Aldabra Special Reserve	Birds	*Dicrurus aldabranus*	Aldabra Drongo
SYC-50	Aldabra Special Reserve	Birds	*Dromas ardeola*	Crab-plover
SYC-50	Aldabra Special Reserve	Birds	*Egretta dimorpha*	
SYC-50	Aldabra Special Reserve	Birds	*Foudia aldabrana*	Aldabra Fody
SYC-50	Aldabra Special Reserve	Birds	*Foudia eminentissima*	Red-headed Fody
SYC-50	Aldabra Special Reserve	Birds	*Fregata ariel*	Lesser Frigatebird
SYC-50	Aldabra Special Reserve	Birds	*Fregata minor*	Great Frigatebird
SYC-50	Aldabra Special Reserve	Birds	*Nesillas aldabrana*	Aldabra Warbler
SYC-50	Aldabra Special Reserve	Birds	*Phaethon lepturus*	White-tailed Tropicbird
SYC-50	Aldabra Special Reserve	Birds	*Phaethon rubricauda*	Red-tailed Tropicbird
SYC-50	Aldabra Special Reserve	Birds	*Sterna sumatrana*	Black-naped Tern
SYC-50	Aldabra Special Reserve	Birds	*Sula sula*	Red-footed Booby
SYC-50	Aldabra Special Reserve	Invertebrates	*Kaliella aldabra*	
SYC-50	Aldabra Special Reserve	Mammals	*Pteropus aldabrensis*	Aldabra Flying-fox
SYC-51	Aride Island Special Reserve	Birds	*Acrocephalus sechellensis*	Seychelles Warbler
SYC-51	Aride Island Special Reserve	Birds	*Anous stolidus*	Brown Noddy
SYC-51	Aride Island Special Reserve	Birds	*Anous tenuirostris*	Lesser Noddy
SYC-51	Aride Island Special Reserve	Birds	*Copsychus sechellarum*	Seychelles Magpie-robin
SYC-51	Aride Island Special Reserve	Birds	*Gygis alba*	Common White Tern
SYC-51	Aride Island Special Reserve	Birds	*Phaethon lepturus*	White-tailed Tropicbird
SYC-51	Aride Island Special Reserve	Birds	*Puffinus lherminieri*	
SYC-51	Aride Island Special Reserve	Birds	*Puffinus pacificus*	Wedge-tailed Shearwater
SYC-51	Aride Island Special Reserve	Birds	*Sterna dougallii*	Roseate Tern
SYC-51	Aride Island Special Reserve	Birds	*Sterna fuscata*	Sooty Tern
SYC-51	Aride Island Special Reserve	Plants	*Pandanus balfourii*	Balfour’s Pandanus
SYC-51	Aride Island Special Reserve	Plants	*Rothmannia annae*	Wright's Gardenia
SYC-51	Aride Island Special Reserve	Reptiles	*Lycognathophis seychellensis*	Seychelles Wolf Snake
SYC-52	Cousin Island Special Reserve	Birds	*Acrocephalus sechellensis*	Seychelles Warbler
SYC-52	Cousin Island Special Reserve	Birds	*Anous tenuirostris*	Lesser Noddy
SYC-52	Cousin Island Special Reserve	Birds	*Copsychus sechellarum*	Seychelles Magpie-robin

KBA code	KBA name	Taxonomic group	Scientific name	Common name
SYC-52	Cousin Island Special Reserve	Birds	*Foudia sechellarum*	Seychelles Fody
SYC-52	Cousin Island Special Reserve	Birds	*Gygis alba*	Common White Tern
SYC-52	Cousin Island Special Reserve	Birds	*Phaethon lepturus*	White-tailed Tropicbird
SYC-52	Cousin Island Special Reserve	Birds	*Puffinus pacificus*	Wedge-tailed Shearwater
SYC-52	Cousin Island Special Reserve	Plants	*Pandanus balfourii*	Balfour's Pandanus

APPENDIX 8: SELECTED CONSERVATION INVESTMENTS AT PRIORITY SITES

Selected conservation investments at priority sites in Madagascar

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
MDG-199	Mangoro-Rianila Rivers				
MDG-111	Sahafina Forest (Anivorano-Brickaville)				
MDG-98	Analamay-Mantadia Forest Corridor	Analamay-Mantadia Forest Corridor Biodiversity Offset [2016 onward]	GERP	Not available	Ambatovy
MDG-131	Nosivolo Wetlands				
MDG-67	Amoron'i Onilahy and Onilahy River				
MDG-99	Forest Corridor Fandriana - Marolambo National Park				
MDG-95	Ambositra Vondrozo Corridor	Evaluation of Natural Capital to Support Land Use Planning, Improved Management Effectiveness of Terrestrial Protected Areas, Deployment of SLM practices and Creation of Eco-villages in Central Madagascar [2022-2027] Carbon Emissions Reduction Project in the Forest Corridor Ambositra-Vondrozo [2007-2037]	Ministry of Environment and Sustainable Development Ministry of Environment and Sustainable Development / CI	US$ 5,653,425 [across several sites] Not available	UNEP/GEF REDD+ carbon credits
MDG-179	Mangerivola Special Reserve				
MDG-164	Betampona Strict Nature Reserve	Diverse Agroforestry Protects Natural Capital around Betampona and Vohibe, Madagascar [2021-2024]	Madagascar Fauna and Flora Group	GBP 314,523 [across several sites]	UK Darwin Initiative

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
MDG-96	Ankeniheny-Zahamena Corridor				
MDG-230	Nosivolo River and Tributaries Ramsar Site				
MDG-28	Belalanda				
MDG-155	Zombitse-Vohibasia National Park and extension				
MDG-11	Tsinjoriake-Andatabo				
MDG-129	Vohibe Ambalabe (Vatomandry)	Diverse Agroforestry Protects Natural Capital around Betampona and Vohibe, Madagascar [2021-2024]	Madagascar Fauna and Flora Group	GBP 314,523 [across several sites]	UK Darwin Initiative
MDG-90	Lake Ihotry-Mangoky Delta Complex	Improving Landscape Management Using Spatial Tools and Sustainable Agricultural Practices in Madagascar [2019-2022]	Young Progress Association	US$ 185,382	CEPF
MDG-73	Analavelona	Community-based Conservation of Priority Areas for Plant Conservation in Madagascar [2008 onward]	Missouri Botanical Garden	Not available	Own sources
MDG-153	Ranomafana National Park				
MDG-217	Faraony Headwaters				
MDG-57	Makay				
MDG-71	Analalava Special Reserve	Valorising Malagasy Protected Areas as Seed Sources for Forest Restoration [2022-2025] Community-based Conservation of Priority Areas for Plant Conservation in Madagascar [2003 onward]	Missouri Botanical Garden Missouri Botanical Garden	GBP 167,232 Not available	UK Darwin Initiative Own sources
MDG-107	Vohibola Classified Forest				
MDG-92	Mangoky-Ankazoabo Complex				
MDG-46	Toliary Great Reef				

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
MDG-200	Namorona-Faraony River				
MDG-89	Mahafaly Plateau Forest Complex				
MDG-34	Three Bays Complex				
MDG-175	Beza-Mahafaly Special Reserve				
MDG-187	Pic d'Ivohibe Special Reserve				
MDG-54	Lake Tseny	Building Wetland Resilience in Madagascar: Community-based Conservation of Lake Tseny [2021-2024]	Wildfowl and Wetlands Trust	GBP 339,943	UK Darwin Initiative

Selected conservation investments at priority sites in the Comoros

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
COM-7	Mount Ntringui (Ndzuani highlands)	Biodiversity Protection through the Effective Management of the National Network of Protected Areas [2022-2027]	Ministry of Environment, Agriculture and Fisheries	US$ 4,424,479 [across several sites]	UNDP/GEF
COM-5	Karthala mountains	Biodiversity Protection through the Effective Management of the National Network of Protected Areas [2022-2027]	Ministry of Environment, Agriculture and Fisheries	US$ 4,424,479 [across several sites]	UNDP/GEF
COM-20	Coelacanth area	Biodiversity Protection through the Effective Management of the National Network of Protected Areas [2022-2027] Protection and Development of the Moroni Mangrove Ecotourism Park [2020-2022] Effective Management of the Marine Protected Areas of the Comoros Archipelago [2021-2023]	Ministry of Environment, Agriculture and Fisheries Banda Bitsi Wildlands Conservation Trust	US$ 4,424,479 [across several sites] US$2,050,000 US$998,000 [across several sites]	UNDP/GEF UNDP/GEF Oceans 5

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
COM-1	Moya forest	Restoration of Terrestrial and Marine Ecosystems in Anjouan and Grande Comore [2022-2026] Developing a Conservation Agreements Scheme to Restore Anjouan's Forests [2021-2022]	Dahari Dahari	GBP 300,000 [across several sites] US$ 141,025	UK Darwin Initiative CEPF
COM-14	Domoni area				
COM-4	La Grille mountains	Restoration of Terrestrial and Marine Ecosystems in Anjouan and Grande Comore [2022-2026]	Dahari	GBP 300,000 [across several sites]	UK Darwin Initiative
COM-8	Mohéli Marine Park	Biodiversity Protection through the Effective Management of the National Network of Protected Areas [2022-2027] Effective Management of the Marine Protected Areas of the Comoros Archipelago [2021-2023]	Ministry of Environment, Agriculture and Fisheries Wildlands Conservation Trust	US$ 4,424,479 [across several sites] US$998,000 [across several sites]	UNDP/GEF Oceans 5
COM-12	Bimbini area and La Selle islet	Biodiversity Protection through the Effective Management of the National Network of Protected Areas [2022-2027] Effective Management of the Marine Protected Areas of the Comoros Archipelago [2021-2023]	Ministry of Environment, Agriculture and Fisheries Wildlands Conservation Trust	US$ 4,424,479 [across several sites] US$998,000 [across several sites]	UNDP/GEF Oceans 5
COM-19	Pomoni area				
COM-16	Moya area	Restoration of Terrestrial and Marine Ecosystems in Anjouan and Grande Comore [2022-2026]	Dahari	GBP 300,000 [across several sites]	UK Darwin Initiative

Selected conservation investments at priority sites in Mauritius

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
MUS-2	Bamboo Mountain Range				
MUS-5	Relict Forests of the Central Plateau				
MUS-14	Plaine des Roches - Bras d'Eau				
MUS-12	Black River Gorges National Park and surrounding areas				
MUS-3	Chamarel - Le Morne	Restoring Forest and Conserving Threatened Birds in Mauritius [2019-2022] Building Local Conservation Capacity in Mauritius [2019-2022]	Ebony Forest Ltd Ebony Forest Ltd	US$ 201,193 US$ 178,081	CEPF CEPF
MUS-8	Mauritius Island's South-Eastern Islets	Restoring the Integrated Native Terrestrial Habitat and Seabird Community of Ile aux Aigrettes, Mauritius [2020-2022]	Mauritian Wildlife Foundation	US$ 69,791	UNEP WIO-SAP
MUS-16	South Slopes of Grande Montagne	Mitigating Climate Change through Reforestation in the Grande Montagne and Anse Quitor Nature Reserves, Rodrigues [2021-2025] Mainstreaming IAS Prevention, Control and Management [2020-2025]	Mauritian Wildlife Foundation Ministry of Agro-Industry and Food Security	EUR 808,635 [across several sites] US$ 3,888,265 [across several sites]	EU UNDP/GEF
MUS-17	Yemen-Takamaka				
MUS-11	Corps de Garde Mountain				
MUS-6	Rodrigues' Islets	Mainstreaming IAS Prevention, Control and Management [2020-2025]	Ministry of Agro-Industry and Food Security	US$ 3,888,265 [across several sites]	UNDP/GEF

Selected conservation investments at priority sites in the Seychelles

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
SYC-43	Morne Seychellois National Park				
SYC-38	Planneau Mountain (Grand Bois-Varigault-Cascade)				
SYC-41	Praslin National Park	Management of Vallée de Mai [1979 onward]	Seychelles Islands Foundation	Not available	Own sources
SYC-42	Silhouette National Park	Operation of a conservation center [2011 onward]	Island Conservation Society	Not available	Islands Development Company Ltd
SYC-36	Burnt Mountain-Piton de l'Eboulis				
SYC-50	Aldabra Special Reserve	Management of Aldabra Atoll Special Reserve [1979 onward]	Seychelles Islands Foundation	Not available	Own sources
SYC-47	Port Launay Marine National Park and coastal wetlands				
SYC-15	Bird Island (Ile aux Vaches)				
SYC-5	Cosmoledo				
SYC-51	Aride Island Special Reserve	Conservation of Aride Island [2004 onward]	Island Conservation Society	Not available	Aride Endowment Fund
SYC-52	Cousin Island Special Reserve	Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future [2020-2025]	MACCE; Seychelles National Park Authority; Nature Seychelles; Marine Conservation Society of Seychelles	US$ 2.5 million [across several sites]	UNDP Adaptation Fund

KBA code	KBA name	Project title and dates	Implementing agency	Budget	Donor
SYC-48	Sainte-Anne Marine National Park	Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future [2020-2025]	MACCE; Seychelles National Park Authority; Nature Seychelles; Marine Conservation Society of Seychelles	US$ 2.5 million [across several sites]	UNDP Adaptation Fund
SYC-20	Denis Island	Conservation of Denis Island [2006 onward]	Green Island Foundation	Not available	Denis Private Island
SYC-46	Curieuse Island Marine National Park	Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future [2020-2025]	MACCE; Seychelles National Park Authority; Nature Seychelles; Marine Conservation Society of Seychelles	US$ 2.5 million [across several sites]	UNDP Adaptation Fund
SYC-32	Saint-François and Bijoutier Islands				
SYC-3	Astove				
SYC-18	Curieuse Island				
SYC-19	D’Arros Island and Saint Joseph Atoll				
SYC-6	Farquhar - South Island and islets	Operation of a conservation center [2015 onward]	Island Conservation Society	Not available	Islands Development Company Ltd
SYC-9	Fond Ferdinand				

CRITICAL ECOSYSTEM PARTNERSHIP FUND

The Critical Ecosystem Partnership Fund (CEPF) is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan and the World Bank.

Offices located at:
Conservation International
2011 Crystal Drive, Suite 600
Arlington, VA 22202 USA
www.cepf.net

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