Special Report

Appendix 1

Country Review: Seychelles

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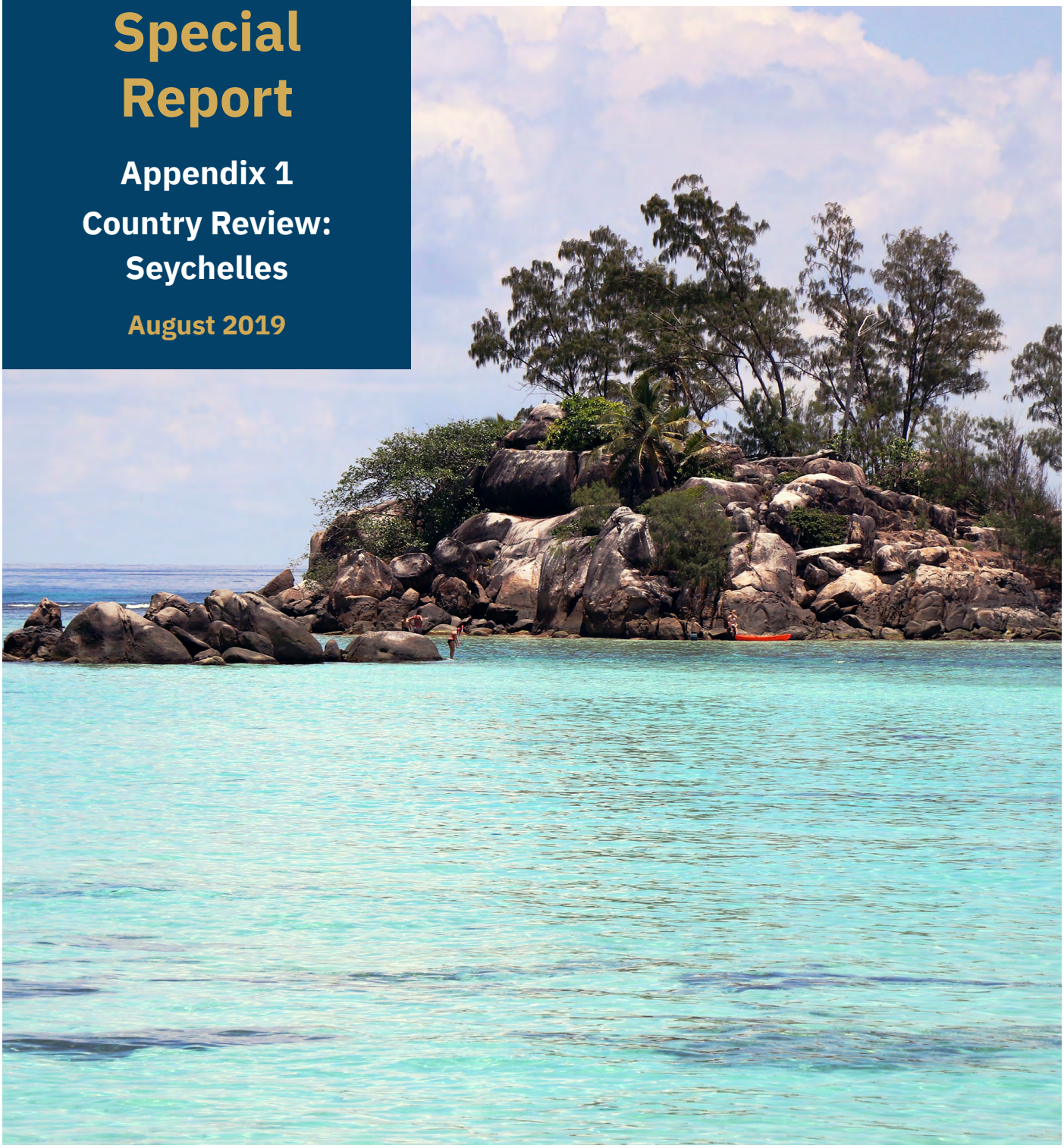

Marine and Coastal EbA for Enhanced Resilience in Southern Africa

Country Review: Seychelles

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African perspectives
Global insights

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Executive summary

The Seychelles islands lie to the north-east of Madagascar, about 1 800km east of coastal Kenya. The archipelago is often described as a small island developing state and a large ocean state due to its large 1.3 million km^2 exclusive economic zone and small 445 km^2 land area. Most of the islands that make up the Seychelles are small, isolated and uninhabited, with the majority of the population living on the two main islands of Mahe and Praslin. The climate is tropical and the weather is influenced by alternating monsoon seasons dominated by the prevailing winds.

The impacts of climate change on these islands are expected to be mostly negative, with projected increases in sea levels, storm and tidal surges, extreme sea-surface temperatures, and coastal flooding that will affect the way of life of all residents. These impacts are already being observed in various forms such as periods of extensive drought, coastal flooding, coastal erosion and repeated mass coral bleaching events. All types of marine and coastal ecosystems are being affected, with the biggest impact observed so far being on corals, which bleach and die when the sea temperature increases beyond certain points. As a result of the extreme vulnerability of coral reefs to climate change, they have been locally prioritised as one of the main candidate ecosystems for ecosystem-based adaptation (EbA). Other ecosystems on which EbA interventions have focused include mangroves, sandy beaches, coastal plateaus and freshwater wetlands. The Seychelles also puts a lot of emphasis on preserving its natural environment through the expansion of protected area networks. Approximately 50% of the country's land mass is legally protected and there are plans to designate 15% of the exclusive economic zone as no-take zones and place an additional 15% under active management, as part of the Seychelles Marine Spatial Planning Initiative.

Marine and coastal EbA initiatives in the Seychelles are being implemented by both government and non-governmental organisations. The Ministry of Environment, Energy and Climate Change (MEECC) takes the lead on EbA policy, implementation, education and enforcement. The MEECC has also set up a Project Coordination Unit, responsible for implementing most of the ministry's donor-funded projects, many of which have strong EbA components. Cognisant that many of the country's major physical risks are linked to climatic factors, the Department of Risk and Disaster Management is also an important institutional actor contributing to the efforts of the Seychelles to adapt to climate change. The Department of Blue Economy deals with issues of climate change and the ocean. In 2018 it produced the Seychelles Blue Economy Strategic Policy Framework and Roadmap (2018–2030). This roadmap provides an integrated approach to ocean-based sustainable development bringing together the economy, environment and society, consistent with the Sustainable Development Agenda 2030, Aichi Target 11 of the Convention on Biological Diversity and the 2015 Paris Agreement on Climate Change.

The Seychelles government is in the process of drafting a Seychelles Climate Change Policy to provide the general framework for climate change adaptation and mitigation. For

now, the Seychelles National Climate Change Strategy (2009) remains the main national document addressing climate change adaptation. The EbA approach is firmly rooted in this strategy through one of its supporting principles, which states that 'ecosystem-based adaptation needs to be further developed to decrease [Seychelles'] vulnerability to climate change'. The Seychelles Sustainable Development Strategy (2012–2020) deals with climate change as a thematic area with its own action plan, but also as a cross-cutting theme in all of the other thematic areas. In August 2015 Seychelles submitted its first Intended Nationally Determined Contribution (INDC) to the UN Framework Convention on Climate Change. As part of the INDC, Seychelles pledged to reduce its economy-wide absolute greenhouse gas emissions by 122.5 $ktCO_{2e}$ (21.4%) in 2025 and an estimated 188 $ktCO_{2e}$ in 2030 (29.0%) relative to baseline emissions. The projected contributions are in line with the Seychelles Energy Policy (2010–2030), which plans to have 5% of the country's energy needs coming from renewables by 2020 and 15% by 2030. The INDC also pledges the government's commitment to mainstream climate change adaptation into all new developments and identifies priority actions in all major sectors, including health, disaster risk management, food, water and energy security, as well as in tourism, agriculture and fisheries. Several priority activities and processes of the INDC are identified as forming part of the EbA approach.

There are a number of large, purely EbA projects or projects with EbA components that have recently been completed, are underway or planned in the Seychelles. These projects are working in a number of different habitats, including coral reefs, mangrove forests, sandy beaches, coastal forests, freshwater wetlands and mountain forests. Many of these projects are externally financed by financing mechanisms such as the Global Environment Facility, the Adaptation Fund and the International Climate Finance Fund of the EU. There are, however, also local funding mechanisms that support EbA approaches, such as the Seychelles Conservation and Climate Adaptation Trust, private sector companies through the donation of part of their corporate and social responsibility tax and direct government budget support to ministries and agencies.

Capacity building to address climate change adaptation remains a major concern for the Seychelles and is required at all levels – from developing expertise in implementing EbA in the field, to integrating EbA into the policy and legal framework. In order to encourage buy-in and policy uptake for EbA over more traditional approaches, it is important to continue to collect a wide range of data on the costs and impacts of different approaches so that the monetary, environmental and societal values of EbA approaches can be adequately quantified. There is also a need to reach a broad agreement on how best to measure the effectiveness of EbA measures for ecosystem health and community risk reduction.

To be effective in climate change adaptation and the use of EbA, it is necessary to have strong coordination. A comprehensive assessment of adaptation readiness in Seychelles is a first step for prioritising programmes and funds for integrated management and attaining synergy with other development priorities. Assessing the benefits of EbA approaches over other types of approaches remains a challenge, mostly because of a lack of human capacity to undertake the evaluation and a lack of candidate projects for comparison

purposes. It is therefore imperative that good quality data is collected on the different approaches that Seychelles takes in adapting to climate change, those that involve EbA and others that do not, so that sufficient data exists to allow for comparisons. At this stage, it is also essential for Seychelles to start thinking about moving beyond policy and finding ways to translate policies into legislation so that there is strong legal footing to support and encourage EbA. This could be done through a Climate Change Act, which would provide legal support for the country's climate change response. A Climate Change Act for the Seychelles would be beneficial in terms of legislating the country's climate change response, measures and actions, as well as detailing the process for public consultation, participation, gender integration and poverty alleviation. A Climate Change Act could also improve transparency, effectiveness and efficiency in the national climate change institutional landscape by legislating financial provisions for climate change adaptation and mitigation, as well as legislating climate tracking and accounting.

Indeed, the Seychelles islands have no choice but to adapt to the effects of climate change. As one part in a combination of adaptation approaches EbA will remain an important tool. It is vital that lessons learnt are appropriately captured and disseminated locally and internationally. It is through these lessons that EbA projects can be strengthened and their overall environmental, social and economic benefits better understood. Continuous and coordinated climate change awareness and capacity building is required if the country is to keep abreast of developments in this sector. At the end of the day, climate change adaptation should be about arming the community with the necessary skills and knowledge to effectively function within a world with more climate variability.

Abbreviations & acronyms

CBD	Convention on Biological Diversity
DRDM	Department of Risk and Disaster Management
EbA	ecosystem-based adaptation
EEZ	exclusive economic zone
GCCA+	Seychelles Global Climate Change Alliance +
GEF	Global Environment Facility
GDP	gross domestic product
GHG	greenhouse gas
INDC	Intended Nationally Determined Contribution
IOC	Indian Ocean Commission
$ktCO_{2e}$	kilotonnes of carbon dioxide equivalent
MCSS	Marine Conservation Society of Seychelles
MEECC	Ministry of Environment, Energy and Climate Change
MFF	Mangroves for the Future
NBSAP	National Biodiversity Strategy and Action Plan 2015–2020
NGO	non-governmental organisation
PA	protected area
PCU	Project Coordination Unit
SFA	Seychelles Fishing Authority
SGP	Small Grants Programme
SIDS	small island developing state
SNPA	Seychelles National Parks Authority
SSDS	Seychelles Sustainable Development Strategy
UniSey	University of Seychelles
WIOSAP	Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities

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About SAIIA

SAIIA is an independent, non-government think tank whose key strategic objectives are to make effective input into public policy, and to encourage wider and more informed debate on international affairs, with particular emphasis on African issues and concerns.

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Cover image

Mahe, Seychelles. These iconic islets are protected for the conservation of marine biodiversity (Romy Chevallier)

Contents

Background, contextual and situation analysis

The Seychelles islands lie 1 000km to the north-east of Madagascar and about 1 800km east of coastal Kenya. The country has a large exclusive economic zone (EEZ) of 1.34 million km^2, which stretches between latitudes 4° and 10° south and longitudes 46° and 56° east, but small land mass (445 km^2) (see Figure 1). Despite the fact that the Seychelles is made up of 115 islands, most are small, isolated and uninhabited, with the majority of the population living on the three main islands of Mahe (81.8%), Praslin (8.9%) and La Digue (3.9%). The climate is tropical, and the weather is influenced by alternating monsoon seasons dominated by prevailing winds. The generally calmer and wetter north-west monsoon prevails from November to March while the stronger and drier south-east trade winds prevail from May to October.

Figure 1 Map showing the location of the Seychelles and the extent of its exclusive economic zone

The Seychelles gained its independence from the UK in 1976. From 1977 to 1993, a one-party state was imposed after the country's first president was overthrown in a military coup. Multiparty democracy was re-introduced in 1993. The current president, Danny

Faure, was elected in 2016 and is serving a five-year term. The National Assembly is currently controlled by the opposition, which won 15 of the 25 electoral districts in the last parliamentary elections in 2016.

The population at the last national census, undertaken in 2016, was estimated at 94 677, with a male to female sex ratio of 1:1 and an annual growth rate of 1.34%. The Seychelles is projected to reach a population of 100 000 by 2025. The population is aging, with an increase in the median age from 29 years in 2008 to 36 years in 2016, with 34.4% of the population over 45 years old.[1] The islands have a relatively high Human Development Index (0.797), with a life expectancy of 74.8 years, a high literacy rate and free primary healthcare. Nevertheless, the Gini coefficient (46.8) for 2017 suggests that the country's wealth is not equitably distributed, with 39.3% of the population living below the national income poverty line.[2] This is despite the fact that the country has undergone a robust period of growth that allowed it to reach the World Bank's 'high-income status' in 2015 with a per capita gross domestic product (GDP) of $15,076 in 2016, very low levels of unemployment and a moderate medium-term outlook with real GDP projected to grow by 3.3% in 2018.[3]

Considering that tourism and fisheries are the main economic pillars of the Seychelles, people remain highly dependent on the goods and services provided by nature

The islands' economy predominantly depends on tourism and tuna fisheries. The annual number of tourist arrivals in 2016 was 300 000, and this number increased by 15% in 2017.[4] Earnings from tourism for 2016 were estimated at around $398 million.[5] The export value of fish and fish products in 2014 was estimated at around $307 million, with the industrial tuna fisheries landing a total of 290 000 metric tonnes of tuna that year.[6] The artisanal fishery generates an annual catch of around 4 000 metric tonnes[7] and is important for food security, accounting for most of the fish that is consumed locally. Considering that tourism and fisheries are the main economic pillars of the Seychelles, people remain highly dependent on the goods and services provided by nature. Owing to concerns about the sustainability of Yellowfin tuna (*Thunnus albacares*), annual catch quotas were introduced

1 NBS (National Bureau of Statistics), 'Seychelles in Figures'. Victoria: NBS, 2017, p. 32.
2 UNDP (UN Development Programme), 'Assessment of Development Results: Evaluation of UNDP Contribution: Seychelles'. New York: UNDP Evaluation Office, 2018, p. 113.
3 OECD (Organisation for Economic Co-operation and Development), 'African Economic Outlook 2017: Entrepreneurship and Industrialization'. Paris: OECD, 2017, p. 314.
4 NBS, *op. cit.*
5 *Ibid.*
6 SFA (Seychelles Fishing Authority), 'Seychelles Fishing Authority Annual Report 2014'. Victoria: SFA, 2017, p. 108.
7 Assan CN & JL Lucas, 'Seychelles Artisanal Fisheries Statistics for 2015', Technical Report (SFA/R & D/ 078). Victoria: SFA, 2016, p. 86.

in 2016. In 2018 the stock was still overfished,[8] illustrating the need to further reduce catch to allow the stock to recover. The same is true for artisanal fishery, which remains largely open access[9] and is heavily overcapitalised with declining catch rates observed for certain demersal stocks, some of which are overfished or at risk of overfishing.[10] A new management plan for the artisanal fin fish fishery was implemented in 2018 and contains measures to reduce fishing efforts and help stocks to recover.

The Seychelles forms part of a recognised global biodiversity hotspot.[11] Much of its known marine biodiversity is associated with shallow marine ecosystems such as coral reefs, mangroves, macro-algae and seagrass beds.[12] Coral reefs and mangroves are estimated to cover an area of approximately 1 690km^2 and 29km^2 respectively.[13] On the other hand, the distribution and coverage of seagrass beds is extensive but is yet to be accurately quantified. On the terrestrial side, the isolation of the islands in the middle of the Indian Ocean has favoured relatively high levels of endemism, especially among plants and land birds.[14] Approximately 50% of the country's land mass is legally protected and there are plans to designate 15% of the EEZ as no-take zones and place an additional 15% under active management, as part of the Seychelles Marine Spatial Planning initiative.[15]

The effects of climate change in the Seychelles are expected to be mostly negative[16] with projected increases in sea levels, storm and tidal surges, extreme sea surface temperatures, variability in rainfall patterns and coastal flooding,[17] which will affect the way of life of all residents. Trends in temperatures over the past 40 years show that both maximum and minimum temperatures are increasing,[18] with average warming trend of 0.33˚C and 0.82˚C respectively.[19] Climate change is also affecting the two seasons. Greater rain intensity but of a shorter duration is expected during the rainy season, while the dry season is expected

8 IOTC (Indian Ocean Tuna Commission), 'Status of the Indian Ocean Yellowfin Tuna (YFT: *Thunnus albacares*) Resource'. Victoria: OITC, 2018, p. 4.

9 Catanzano J & J de Lestang, 'Statement of Intent to Support National Fisheries Priorities for the Seychelles Fishing Policy', Programme for the Implementation of a Regional Fisheries Strategy for the Eastern and Southern Africa – Indian Ocean Region. Ebène: IOC (Indian Ocean Commission), 2013, p. 81.

10 Gutierrez NL, 'Risk Assessment to Identify Threats to Demersal Stocks and Stock Assessments for Key Demersal Fish Stocks'. Victoria: GoS-UNDP-GEF (Government of Seychelles, UNDP & Global Environment Facility) Project Coordination Unit, 2014, p. 70.

11 Spalding MD *et al.*, 'Marine ecoregions of the world: A bioregionalization of coastal and shelf areas', *BioScience*, 57, 2007, pp. 573–83.

12 Bijoux JP *et al.*, 'Marine biodiversity of the Seychelles archipelago: The known and unknown', in *Census of Marine Life Programme in sub-Saharan Africa*. Cape Town: Census of Marine Life Secretariat, 2013.

13 Spalding MD, Ravilious C & EP Green, *World Atlas of Coral Reefs*. California: University of California Press, 2001; Spalding M, *World Atlas of Mangroves*. London: Routledge, 2010.

14 Government of Seychelles, 'Seychelles National Biodiversity Strategy and Action Plan'. Victoria: Ministry of Environment and Energy, 2014a, p. 107.

15 Government of Seychelles, 'National Marine Spatial Planning Policy'. Victoria: Seychelles Marine Spatial Planning Initiative, 2017, p. 42.

16 SNCCC (Seychelles National Climate Change Committee), 'Seychelles National Climate Change Strategy'. Victoria: SNCCC, 2009, p. 96.

17 Government of Seychelles, 'State of Environment Outlook Report'. Victoria: Ministry of Environment and Energy, 2014b, p. 111.

18 Spalding M, *op. cit.*

19 Vincent Amelie, Chief Executive Officer, National Meteorological Services (Seychelles).

to be longer and wetter.[20] Increases in the frequency of heavy precipitation events are consistent with warming and observed increases of atmospheric water vapour.[21] The frequency of extreme weather events such as heavy rainfall and storm surges is expected to increase and will affect mainly the coastal areas. Analysis of sea-level rise shows an upward trend of 0.66cm per year. If the trend continues it will have a considerable impact on coastal areas.[22]

The changes and variability in climate are already being observed in periods of extensive droughts, coastal flooding, coastal erosion and repeated mass coral bleaching events

The changes and variability in climate are already being observed in periods of extensive droughts, coastal flooding, coastal erosion and repeated mass coral bleaching events. All types of marine and coastal ecosystems are being affected, with the biggest impact thus far observed on coral reefs.[23] As a result of the extreme vulnerability of coral reefs to climate change they have been prioritised as one of the main candidate ecosystems for ecosystem-based adaptation (EbA). Other ecosystems on which EbA interventions have focused include mangroves, sandy beaches, coastal plateaus and freshwater wetlands. The risks are expected to increase with further economic and physical development and the Seychelles needs to strengthen its efforts to adapt to and mitigate climate change.

This paper focuses on marine and coastal EbA in the Seychelles and its role in enhancing climate resilience. It details the institutional, policy and regulatory context of EbA and delves into marine and coastal EbA initiatives that have been undertaken, are on-going or being planned. It synthesises information on funding mechanisms that support EbA and looks at challenges and opportunities in implementing, replicating and up-scaling EbA. From the perspective of the Seychelles, EbA can be defined as the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change.

20 Government of Seychelles, 2014a, *op. cit.*; Chang-Seng D, 'Climate Variability and Climate Change: Change Assessment for the Seychelles'. Victoria: Ministry of Environment, 2007a; Chang-Seng D, 'Seychelles Climate Change Scenarios for Vulnerability and Adaptation Assessments'. Victoria: Ministry of Environment, 2007b

21 Gregory J *et al.*, 'Climate Change 2007: The Physical Science Basis', Summary for Policymakers. Cambridge, UK & New York: Cambridge University Press, 2007, p. 21.

22 SNCCC, 2009, *op. cit.*; JICA (Japan International Cooperation Agency), 'The Study for Coastal Erosion and Flood Control Management in the Republic of Seychelles; Final Summary Report'. Victoria: JICA, 2014, p. 98.

23 Graham NAJ *et al.*, 'Dynamic fragility of oceanic coral reef ecosystems', *Proceedings of the National Academy of Sciences*, 103, 2006, pp. 8425–8429; Grandcourt EM & HS Cesar, 'The bio-economic impact of mass coral mortality on the coastal reef fisheries of the Seychelles', *Fisheries Research*, 60, 2003, pp. 539–550; Spencer T *et al.*, 'Coral bleaching in the southern Seychelles during the 1997–1998 Indian Ocean warm event', *Marine Pollution Bulletin*, 40, 2000, pp. 569–586.

Institutional arrangements

The Ministry of Environment, Energy and Climate Change (MEECC) has taken the lead in promoting EbA in the Seychelles. The MEECC has two departments – the Department of Environment and the Department of Energy and Climate Change – in addition to several divisions that work to varying extents on EbA at the policy, implementation, education and enforcement level. The MEECC is responsible for drawing up policies and strategies and translating them into legislation. Recent work on the legal side includes updating the Environment Protection Act,[24] and drafting the Nature Reserve and Conservancy Bill to replace the now outdated National Parks and Nature Conservancy Act.[25] This is aimed at strengthening management of protected areas in the Seychelles in line with the Seychelles' Protected Areas Policy (2013),[26] which has as one of its specific objectives to minimise and mitigate the impacts of climate change by maintaining the integrity and functions of ecosystems.

The MEECC is also responsible for implementing practical EbA projects. The Coastal Adaptation and Management Section deals directly with issues related to climate change adaptation, with some aspects of its intervention focused on EbA approaches in conjunction with other engineering techniques. This section works on issues concerning coastal management, including the management of sandy beach habitats, mangroves, other types of wetlands and drainage. The MEECC has also set up a Project Coordination Unit (PCU), responsible for implementing most of the ministry's donor-funded projects, many of which have strong EbA components.

The Department of Risk and Disaster Management (DRDM) in the Office of the Designated Minister is another important institutional actor contributing to the Seychelles' adaptation to climate change, since many of the country's major physical risks are related to climatic factors in addition to bad planning or maladaptation techniques. As part of disaster prevention, the DRDM has been a strong advocate of EbA and the use of natural ecosystems as defences against climate change-related disasters.

The Department of Fisheries and the Seychelles Fishing Authority (SFA) within the Ministry of Fisheries and Agriculture deal with the issue of climate change in the fisheries sector, with the department mostly working on policy and regulatory concerns while the SFA works on policy execution. The fisheries sector has adopted an ecosystem approach to both fisheries and aquaculture, which also considers the impact of climate change on the ecosystem and on targeted and non-targeted species.

24 Government of Seychelles, 'Act 18 of 2016: Environment Protection Act', in *Supplement to the Official Gazette*. Victoria: Office of the Attorney General, 2016, pp. 493–550.

25 Government of Seychelles, 'Chapter 141: National Parks and Nature Conservancy Act', in *Laws of Seychelles*, *op. cit.*, pp. 50.

26 Government of Seychelles, 'Seychelles' Protected Areas Policy'. Victoria: Ministry of Environment and Energy, 2013, p. 44.

The Department of Blue Economy under the Office of the Vice President deals with issues of climate change and the ocean. In 2018 it produced the Seychelles Blue Economy Strategic Policy Framework and Roadmap (2018–2030). This roadmap provides an integrated approach to ocean-based sustainable development that brings together the economy, environment and society, consistent with the Sustainable Development Agenda 2030, Aichi Target 11 of the Convention on Biological Diversity (CBD) and the Paris Agreement on Climate Change (2015). Strategic priorities of the roadmap include measures to address climate resilience and climate risks to ecosystem services, and enhance the integrity of marine habitats.

The Seychelles National Parks Authority (SNPA) has been at the forefront of piloting many of the EbA approaches within the Seychelles system of terrestrial and marine national parks, given that many of these sites are of high biodiversity value.[27] The SNPA is currently involved with various EbA-related projects undertaking restoration in coral reefs, mangrove, freshwater wetlands, sandy beaches, coastal plateau and in mountain forest ecosystems.

As Seychelles is small, most of the planning is usually done at the national government level. However, at the district and regional level the district administrators, regional councils and members of the National Assembly are involved in identifying issues related to climate change and risks. These issues are normally brought forward by inhabitants of the districts. Priority adaptation projects to address identified issues are usually discussed with those ministries responsible for implementation, which is customarily done in conjunction with the districts, non-governmental organisations (NGOs) and private sector organisations with funds coming from government or donors.

On the education, research and capacity-building level, the University of Seychelles (UniSey) has an important role in furthering EbA approaches. The university offers a bachelor's in Environmental Science and, from 2019, a Master of Science in Climate Change and Marine Science. EbA and mangrove restoration have been integrated into the courses of the BSc Environmental Sciences. UniSey has been undertaking research on various coastal and marine ecosystems alongside the Blue Economy Research Institute. The university is also responsible for the 'long-term research and monitoring' of EbA interventions in mangrove areas of Anse Royale (southern Mahe).

EbA is also being undertaken by environmental NGOs. Several EbA approaches are being spearheaded by NGOs and private sector companies.[28] For example, since 2010 Nature Seychelles has been involved in a project to restore 5 225m^2 of coral reefs within the Cousin Special Reserve.[29] Coral reef restoration programmes are also being implemented

27 Jennings S, Marshall SS & NV Polunin, 'Seychelles' marine protected areas: Comparative structure and status of reef fish communities', *Biological Conservation*, 75, 1996, pp. 201–209; Senterre B *et al.*, 'Seychelles Key Biodiversity Areas: Output 6: Patterns of Conservation Value in the Inner Islands', Mainstreaming Biodiversity Management into Production Sector Activities. Victoria: GOS-UNDP-GEF Project Coordination Unit, 2013.

28 SGP (Small Grants Programme), 'GEF SGP in the Seychelles 2009 – 2017'. Victoria: GEF, 2017, p. 34.

29 Montoya-Maya PHM *et al.*, 'Large-scale coral reef restoration could assist natural recovery in Seychelles, Indian Ocean', *Nature Conservation*, 16, 2016, p. 1.

by other NGOs such as the Marine Conservation Society of Seychelles (MCSS), with some partnering with hotels and other local companies.

At the regional level, the Nairobi Convention to which Seychelles is a contracting party provides the legal framework for addressing emerging issues in the Eastern Africa region, of which climate change adaptation has been identified as highly relevant for all member countries. The convention addresses EbA in a number of its protocols and action plans. As a party to the Nairobi Convention, the Seychelles has endorsed the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities (WIOSAP). The goal of the WIOSAP project is to improve and maintain the environmental health of the region's coastal and marine ecosystems through improved management of land-based stresses. The Indian Ocean Commission (IOC) groups the island states of the Western Indian Ocean. The IOC has a work programme that specifically focuses on environmental sustainability and climate change, and has implemented a number of regional projects that have components dealing with marine and coastal EbA. In 2012 the IOC prepared the Regional Strategy for Adaptation to Climate Change for the Western Indian Ocean islands[30] with priority sectors identified as integrated water management, environment (terrestrial and marine), public health and food security.

Policy and regulatory landscape

The Seychelles government is currently in the process of preparing the Seychelles Climate Change Policy to provide the general framework for climate change adaptation and mitigation. Extensive public and inter-sectoral consultation is planned as part of this process and the completion date has been set for the end of 2019. For now, the Seychelles National Climate Change Strategy (2009) remains the main national document that addresses climate change adaptation. The EbA approach is firmly recognised in this strategy through one of its supporting principles, which states that 'ecosystem-based adaptation needs to be further developed to decrease [Seychelles'] vulnerability to climate change'.[31]

As the Seychelles realised that the biggest impact of climate change would be on its natural environment, particularly the low-lying coastal zones, the country started to integrate climate change as a cross-cutting issue in many of its other national documents.

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30 IOC, 'Regional Strategy for Adaptation to Climate Change for the Western Indian Ocean Islands'. Quatre Bornes: IOC, 2012, p. 12.
31 SNCCC, 2009, *op. cit.*

The Seychelles Sustainable Development Strategy (SSDS, 2012–2020) deals with climate change as a thematic area with its own action plan but also as a cross-cutting theme in all of the other thematic areas. Even though climate change is addressed in the SSDS and within its action plans, the coordination mechanism to steer and evaluate the implementation of the action plans was never put in place and the implementation of the strategy is not actively followed.

Despite being more concerned with the need to adapt to climate change, the Seychelles is also playing its part in climate change mitigation. In August 2015 it submitted its first Intended Nationally Determined Contribution (INDC) to the UN Framework Convention on Climate Change.[32] As part of the INDC Seychelles pledged to reduce its economy-wide absolute greenhouse gas (GHG) emissions by 122.5 $ktCO_{2e}$ (21.4%) by 2025 and an estimated 188 $ktCO_{2e}$ in 2030 (29.0%) relative to baseline emissions. The contributions are considered fair but ambitious, since the country emits less than 0.003% of global emissions and is a net sink of GHG. The Seychelles contribution is in line with the Seychelles Energy Policy (2010–2030), which plans to have 5% of its energy needs coming from renewables by 2020 and 15% by 2030.[33] The INDC also pledges the government's commitment to mainstream climate change adaptation into all new developments. It identifies priority actions in all major sectors, including health, disaster risk management, food, water and energy security, as well as in tourism, agriculture and fisheries.[34]

Another important strategic document is the National Biodiversity Strategy and Action Plan 2015–2020 (NBSAP).[35] The preparation of a NBSAP is a requirement of Article 6 of the CBD. The NBSAP is the main guiding document on biodiversity conservation in the Seychelles. It addresses the threats of climate change to local biodiversity and includes many cross-sectoral projects with climate change adaptation implications in the field of sustainable tourism, watershed management, sustainable agriculture and fisheries, disaster planning, and research. It supports a shift towards EbA approaches to biodiversity conservation. Most projects identified under the NBSAP are being implemented, including EbA projects dealing with coral reef, mangrove and freshwater marsh restoration and management.

Another way that the Seychelles is promoting EbA is through the designation of protected areas (PAs) to protect and conserve sensitive marine and terrestrial ecosystems. At the policy level, marine and coastal EbA is addressed as part of the Seychelles Protected Areas Policy 2013.[36] The policy provides a framework for the elaboration of legislation and associated guidelines for the establishment, coordination, guidance and management of PAs in Seychelles. One of its main objectives is to create the conditions to effectively conserve 50% of national terrestrial areas and effectively manage 20% of marine areas

32 Government of Seychelles, 'Intended Nationally Determined Contribution (INDC) for Submission to the UNFCCC'. Victoria: Ministry of Environment, Energy and Climate Change, 2015, p. 18.

33 Government of Seychelles, 'Energy Policy of the Republic of Seychelles, 2010–2030'. Victoria: Seychelles Energy Commission, 2010, pp. 26.

34 Government of Seychelles, 2015, *op. cit.*

35 Government of Seychelles, 2014a, *op. cit.*

36 Government of Seychelles, 2013, *op. cit.*

within the EEZ, thereby reducing anthropogenic stressors to ensure that marine and terrestrial habitats within these protected areas are better able to cope with climate-induced changes. One of the policy objectives directly tackles the issue of EbA as it seeks to minimise and mitigate the impacts of climate change by maintaining the integrity and functions of ecosystems. This is in line with the EbA definition of the CBD in terms of recognising that healthy ecosystems offer multiple benefits to society and are vital for effective adaptation to climate change. Terrestrial protected areas presently account for 47.06% of Seychelles' land cover. New sites identified for protection in the Inner and Outer islands by 2022 will bring the total to 50.59%.

Another way that the Seychelles is promoting EbA is through the designation of protected areas to protect and conserve sensitive marine and terrestrial ecosystems

Recognising that the protection of marine areas is lagging far behind that of terrestrial areas, the Seychelles government embarked on a marine spatial planning initiative in 2014. The aim of the initiative is to designate 30% (about 410 000km^2) of the Seychelles EEZ and territorial waters as protected areas by 2020. The Marine Spatial Plan that is in the pipeline will also support the implementation of the Seychelles Blue Economy Roadmap and address marine EbA. The Marine Spatial Planning Policy was approved in 2018.[37] The policy puts a lot of emphasis on safeguarding marine and coastal ecosystem processes and ecosystem-based management. For terrestrial ecosystems, Seychelles' strategic response came in the form of the Seychelles Strategic Land Use and Development Plan (2015),[38] which provides a framework for guiding development to 2040. While this plan puts a great deal of emphasis on the need to undertake a high-level assessment of ecosystems services, it does not specifically make reference to EbA approaches.

To better support the Protected Areas Policy and EbA in PAs, PA legislation is being strengthened through the Nature Reserves and Conservancy Bill. Once this bill is enacted, it will allow government to enter into co-management arrangements with individuals or groups, providing greater possibilities for citizens to get more involved in protected area management. It will also increase penalties for breaching PA legislations, such as anchoring on corals and killing other marine creatures. It is also necessary to strengthen the management of sensitive marine ecosystems found outside the boundaries of PAs. The vast majority of Seychelles coral reefs and associated habitats like seagrass meadows and mangroves are found outside PAs, but as yet there is no clear policy, action plan or

37 Government of Seychelles, 2017, *op. cit.*

38 Government of Seychelles, 'Seychelles Strategic Land Use and Development Plan (2015)'. Victoria: Planning Authority, 2015, p. 449.

regulations for their protection.[39] It is imperative that new legislation is drawn up to protect these habitats, especially since coral reefs in the Seychelles are among the most affected in the world as a result of repeated climate change-induced mass coral bleaching events. At many sites, coral reefs have shifted from a state of coral domination to macro-algae and rubble domination after the 1998 mass coral bleaching event.[40] This has had a negative impact on other reef-associated marine biodiversity and the livelihoods of people who are dependent on reef-associated resources.

Being a small island developing state (SIDS), all of the Seychelles islands are considered coastal zones and as such overall management is considered a form of integrated coastal zone management. There is therefore no specific legislation for the management of the coastal zone specifically, but there are various legislative frameworks and policies dealing with different components of land management, including the Environmental Protection Act (2016), Town and Country Planning Act (1972) and Land Reclamation Act (1961).

Marine and coastal EbA in practice

There are a number of purely EbA projects and other programmes of action with EbA components that have recently been completed, are underway or planned in the Seychelles. A recently completed EbA project is the EU-funded Building Capacity for Coastal Ecosystem-Based Adaptation in SIDS project (2014–2017),[41] which was implemented in the Seychelles and Grenada by UN Environment as part of its Africa Regional Climate Change Programme. The project was carried out by the SNPA. The long-term goal of the project was to strengthen the resilience and adaptive capacity of communities that depend on coastal ecosystem services provided by coral reefs and associated ecosystems. The biggest component of this project was dedicated to piloting coral reef restoration within the Curieuse Marine National Park. A coral nursery was set up with a capacity of producing 8 000 coral colonies per cycle. Coral produced in the nurseries was to be used to restore degraded reef sites within the park. However, during the course of implementation, a wide-scale mass coral bleaching event caused 97% of coral fragments in the nurseries to bleach and die and reduced coral cover to around 10% across most reefs in the area. The corals that were still alive on the reefs after the event were considered to be more resilient to ocean warming and fragments from them were sourced for growing out in the nursery and propagation. It is expected that these specific coral types will be less vulnerable to future warm water episodes. Another activity of the project was the institutional strengthening of the SNPA through training in marine habitat mapping, monitoring and management of coastal erosion, coral reef rehabilitation and assessment of marine habitats.

39 Thérésine P *et al.* (eds), *Coral Reef Status Report for the Western Indian Ocean (2017).* Ebène: IOC, 2017, p. 171.

40 Graham NAJ *et al.*, 2006, *op. cit.*; Graham NA *et al.*, 'Predicting climate-driven regime shifts versus rebound potential in coral reefs', *Nature*, 518, 2015, p. 94.

41 UN Environment, 'Building Capacity for Coastal Ecosystem-Based Adaptation in SIDS', Project Document. Nairobi: UN Environment, 2014, p. 52.

Ecosystem Based Adaptation through South–South Cooperation is a Global EbA project (2013–2019) funded by the Global Environment Facility (GEF) through the Special Climate Change Fund. It is implemented by UN Environment and executed by the National Development and Reform Commission of China. Three countries – Seychelles, Mauritania and Nepal – are part of the project.[42] The MEECC was one of the executing partners of the project, supported by UniSey, NGOs and local communities. The project's overall goal is to build the climate resilience of vulnerable local communities by increasing the capacity of developing countries to plan and implement EbA by providing on-the-ground interventions, increasing institutional capacity, mobilising knowledge and transferring appropriate best-practice adaptation technologies. In the Seychelles the project is focused on demonstrating EbA intervention in mangrove ecosystems, while in Mauritania and Nepal, dryland and mountain ecosystems have been selected respectively.

Several targets are expected, including the establishment of a long-term monitoring field site at Anse Royale (southern Mahe), for measuring the effects of EbA interventions on relevant ecosystem services and where mangrove monitoring is ongoing. UniSey is responsible for the long-term research and monitoring component of this project. The main bulk of the project focused on the implementation of several EbA interventions to improve mangroves and wetlands. These included enhancement and re-profiling to improve hydrological flow through 300ha of artificially fragmented mangroves and wetlands, plus channel desilting to improve the water storage capacity of wetlands (hence reducing flooding of nearby vulnerable households, businesses and agricultural lands); mangrove replanting; and the removal of invasive species encroaching onto the mangroves and marshes. Most of the mangrove replanting was done by community members on a voluntary basis. Several organisations from the private sector, including tourism, were involved in the rehabilitation activities as part of social and team-building exercises and corporate social responsibility to the environment and the community at large. In addition, the project had a substantial component related to capacity building of government staff, as well as other relevant organisations and local communities, on techniques of mangrove ecosystem rehabilitation. This was done through on-the-ground interventions, including seedling collection techniques, plant propagation in nurseries and planting methodologies. Public awareness activities were also carried out to reach the general population.[43] The project was an excellent tool to promote the importance of mangrove ecosystems, their role and the need for mangrove rehabilitation to protect against the impacts of climate change.

Ecosystem Based Adaptation to Climate Change in Seychelles is a national EbA project financed by the Adaptation Fund, which is currently being implemented (2014–2020)[44] on Mahe and Praslin islands. The project is run by the MEECC through the PCU. The overall

42 GEF (Global Environment Facility), 'Enhancing Capacity, Knowledge and Technology Support to Build Climate Resilience of Vulnerable Developing Countries', Project Document. Washington DC: GEF, 2013, p. 361.

43 Henriette E, 'Progress Reports 2017–2018: Enhancing Capacity, Knowledge and Technology Support to Build Climate Resilience of Vulnerable Developing Countries', Seychelles Pilot Project, Ecosystem-based Adaptation through South-South Corporation (EbA South). Victoria: Government of Seychelles, 2018.

44 Adaptation Fund, 'Ecosystem Based Adaptation to Climate Change in Seychelles', Project Document. Washington DC: Adaptation Fund, 2014, p. 128.

goal is to reduce the vulnerability of the Seychelles to climate change by focusing on water scarcity and flooding. Climate change projections in the Seychelles show that rainfall, while increasing in overall terms, will become even more irregular. Much of the precipitation occurs in sharp bursts, creating heavy flooding in the wet season and an extended period of drought during the dry season. As the country does not have a large water storage capacity, and the topography of the islands constrains such infrastructure, water supplies are heavily dependent on rainfall. Furthermore, the coastal zone is vulnerable to flooding as a consequence of rising sea surface levels and increased storm surges from cyclonic activity in the western Indian Ocean. The project is reducing these vulnerabilities by spearheading EbA as a climate change risk management tool – restoring ecosystem functionality and enhancing ecosystem resilience in order to secure critical water provisioning and flood attenuation ecosystem services from watersheds and coastal areas. EbA activities implemented to date have focused on rehabilitating coastal and upland freshwater wetlands, enhancing rivers and creating wetlands, improving water flow and water retention capacity, and assessing the recovery potential of coral reef sites.

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The rehabilitation of degraded water catchments is a major component of this project on Praslin Island, where local NGOs and communities are involved in rehabilitation activities. The project also established watershed committees comprising local community members to implement some of the activities and gain a sense of ownership of EbA interventions. The project components include capacity-building initiatives such as training for forestry management, plant identification, safe chainsaw operation and safe herbicide use for the control of invasive alien species. Beneficiaries of this training can participate in the eventual implementation of on-the-ground EbA activities. The project also aims to develop the policy framework for watershed management that is needed to support EbA measures to address water scarcity and flooding problems, and increase the awareness, skills and responsibilities of a wide range of stakeholders, including district authorities and community organisations in EbA for water catchments and coastal areas.

The Global Climate Change Alliance+ (GCCA+) Seychelles Climate Change Project (supporting adaptation to climate change in coastal areas) is currently being implemented by the MEECC through the PCU. 'Component A' of the project focuses on strengthening the climate change sector policy framework, while 'Component B' targets the direct implementation of measures for the adaptation to climate change on la Digue, the third-largest permanently inhabited island of the Seychelles. The overall objective of the project

is to increase coastal and flood protection in the vulnerable areas on the coastal plateau of the island. The project is using a combination of EbA and hard engineering approaches to address site-specific issues and create opportunities to enhance climate change resilience to coastal flooding. EbA activities being implemented include wetland rehabilitation, which also incorporates embankment stabilisation, de-silting and the deepening of channels. Beach-berm rehabilitation is also planned and will be done by artificially augmenting beach berms with natural sand from the coastal plateau and stabilising them with native coastal plants. Dedicated access pathways to the beach will also be constructed to reduce the trampling of sensitive beach vegetation. Healthy beach berms act as a barrier and prevent the spill over of saltwater onto the coastal plateau through storm surges or large waves during high-water spring tides, thereby preventing salt intrusion and contamination of the water table.

Innovative funding mechanisms and partnerships

Most of the current EbA programmes under implementation are funded by multilateral donors such as the GEF, the EU or the Adaptation Fund. These are usually large, multi-year projects, costing several hundred thousand dollars, run at the national level. On-the-ground activities are mostly implemented by NGOs and private companies. This approach, which makes use of non-state actors and local companies in project implementation, has ensured community involvement and a sense of environmental stewardship in adaptation activities. Voluntary community participation in project implementation is also a way to reduce costs related to the execution of the project. Large EbA projects are usually co-funded by government and other project implementers, which include NGOs and the private sector. The GCCA+ of the EU has also been a financial supporter of adaptation projects in Seychelles. Projects funded so far have focused on climate change adaptation in general, and not just EbA. This is a good approach, as EbA also has limitations and there are certain adaptation options that require hard engineering approaches or a combination of the two.

There are other funding mechanisms that support environmental conservation and EbA approaches that are locally available. The GEF Small Grants Programme (SGP) is one such mechanism. The programme provides grants directly to local communities of up to $50,000 for projects in biodiversity, climate change mitigation and adaptation, land degradation and sustainable forest management, international waters and chemicals. Since the programme started in 2011, 33 projects have been funded at a cost of $1.5 million, with at least 12 of them having components addressing EbA. On a few occasions, the GEF SGP has partnered with the Australian Agency for International Development and the Common Market for Eastern and Southern Africa on EbA project financing. Other financial support for EbA is available as part of the Mangroves for the Future (MFF) initiative implemented by the International Union for Conservation of Nature. The MFF awards grants of different sizes, from less than $10,000 to $200,000, targeting organisations with different project implementation capabilities. The MFF has been very active in the Seychelles with the implementation of several small projects by an array of organisations, particularly NGOs in association with schools and environment clubs.

The Seychelles Conservation and Climate Adaptation Trust is a local trust fund that has set up a revolving Blue Grants Fund, which is being used to fund competitive local grants of around $750,000 per year.[45] Fundable projects must address issues concerned with marine conservation, sustainable fisheries, ecosystem rehabilitation, climate adaptation and blue economy business models. The funds originate from a debt-restructuring agreement between the Seychelles and the Paris Club. As part of the debt restructuring, the Seychelles will designate 30% of its territorial waters and EEZ as PAs. This is the first time a debt-swap initiative has been used specifically for environmental protection.

In the past there has also been funding from regional projects implemented by the IOC that had EbA components. These programmes had grants of varying sizes, from $25,000 to $100,000, which were competitively made available to non-state actors based in the Seychelles and the western Indian Ocean to implement local conservation projects such as the rehabilitation of various types of marine and coastal ecosystems.

Private sector companies have also been involved in the financing of environmental action at the community level either through direct project support or through the donation of part of their corporate and social responsibility tax. Direct support has taken many shapes and includes activities such as the restoration of coastal freshwater wetlands, beach-berm restoration and coral reef restoration. This has been financed principally by hotels in the project areas, for example the rehabilitation of the coastal wetland at Banyan Tree Hotel through a partnership between the hotel and the MCSS.

Government budgets have also been used to support the EbA work of government institutions that are directly involved in environmental management and climate adaptation, such as the work of the MEECC and SNPA. Government funding is usually used to provide the administrative assistance that is important to support EbA, as well as for direct implementation of certain activities. Government funds are also used as sources of co-financing for many of the donor-funded projects and are thus extremely important, as the level of co-financing required is often several times more than the value of the grant. The government's annual spending on climate change adaptation and mitigation is presently not known. In response to this, a Climate Public Expenditure and Institutional Review is being undertaken by the GCCA+ Project to provide estimates across different sectors.

Analysis

The government of Seychelles considers adaptation to climate change a priority to reduce the country's intrinsic vulnerabilities.[46] Undeniably, there is considerable will and visibility at both the government and community level to embrace EbA approaches. The Seychelles National Climate Change Strategy (2009) makes special mention of the need

45 SeyCCAT (Seychelles Conservation and Climate Adaptation Trust), https://seyccat.org/, accessed 17 April 2019.

46 SNCCC, 2009, *op. cit.*; Government of Seychelles, 2015, *op. cit.*

to further develop and use EbA approaches to decrease the country's vulnerability to climate change.[47] It is expected the role of EbA will be further entrenched in the Seychelles National Climate Change Policy, which is presently being prepared by the Department of Energy and Climate Change in collaboration with the Seychelles National Climate Change Committee..

There are many opportunities for developing marine and coastal EbA in the Seychelles, as well as certain challenges. There are ample opportunities to specifically access dedicated funds for EbA projects, such as the Adaptation Fund, the Green Climate Fund, the Special Climate Change Fund and the Africa Climate Change Fund. For instance, the Seychelles is currently developing its project as part of funding under the seventh cycle of GEF funding. The project will focus on the conservation of Seychelles' globally significant biodiversity and the promotion of nature-based solutions as pillars of the Blue Economy, in which EbA will take a central role. This will allow the country to build on past EbA experiences and upscale successful practices, thus enhancing the effectiveness of biodiversity conservation and management in the Seychelles.

There are nevertheless challenges in accessing climate finance. The 'graduation' of the country in 2015 from middle- to high-income status could make it more difficult to access some of these funds owing to eligibility criteria related to its developing country status. Capacity building to address climate change adaptation remains another major concern for the Seychelles. Capacity building is required at all levels – from developing expertise

Capacity building is required at all levels – from developing expertise in designing, planning and implementing EbA in the field, to integrating EbA into the policy and legal framework

in designing, planning and implementing EbA in the field, to integrating EbA into the policy and legal framework. There is a need to expand capacity-building initiatives so that community members can also be trained and educated – despite their enthusiasm, members are often ill equipped and lack competence in addressing specific issues. There seems to be little understanding of how EbA can be applied comprehensively, including insufficient ability to identify the underlying factors that need to be taken into consideration in the application of EbA approaches, the ability to distinguish between climatic and non-climatic stressors, and ways to effectively engage stakeholders and communities from the onset of the project; as well as a lack of monitoring, proper documentation and evaluation of outcomes. A well-informed and knowledgeable team

47 SNCCC, 2009, *op. cit.*

on EbA should be put together for project design, management and implementation. The development of an EbA protocol or guidelines (produced in a local context with local case studies) is vital to guide proper and effective EbA interventions in the Seychelles.

In a recent climate change capacity needs assessment done by the GCCA+ Seychelles Project, several government institutions identified modelling impacts that could result from climate change as an opportunity to better prepare and support adaptation measures.[48] There is a strong demand for capacity building for organisations to be able to model the effects of climate change in different sectors. This is especially pertinent in the field of fisheries and tourism, which are both at high risk of climate change impacts.[49] Furthermore, capacity-building initiatives should make use of existing local capabilities and expertise when they are available, otherwise partnerships with regional and international institutions with strong backgrounds in EbA should be encouraged. There is a need to reconsider the way capacity building is integrated into projects. Training and capacity building should be a cross-cutting theme through all project components and activities, but also used as a tool for skills development. For example, people who are trained in ways to identify corals, propagate corals in nurseries and eventually plant them on a reef, should be the ones who are later contracted in coral restoration initiatives. Hence, the project will not only implement its activities but will also be a conduit for the development of skills and knowledge needed to improve project effectiveness, community livelihoods, awareness of and preparedness for climate change impacts.

Effective EbA interventions rely on proper design, planning, implementation, monitoring and the selection of targets that are relevant and realistic within local context. The EbA process should be clearly laid out. The collation of adequate information to advise the process is very important. Thus, an assessment of sites that are vulnerable to the effects of climate change and where vulnerabilities could be reduced through EbA approaches should be undertaken. The assessment should include both climatic and non-climatic stressors on humans, vulnerable groups, livelihoods and ecosystems. It should further establish the current state of the environment and human aspects, as well as a baseline, prior to any interventions. Relevant stakeholders and communities should be identified, and a dialogue initiated with them from the initiation of the EbA process. The next step is to identify, prioritise and design EbA options that strengthen the resilience of ecosystems and human communities. An important aspect that is often overlooked in EbA planning is to assess the feasibility of implementing the EbA option. The cost-effectiveness of EbA options can aid in decision-making and to make the case for such approaches. Finally, monitoring and evaluation should be integrated into the EbA project. Monitoring EbA actions provides vital information on the success or failure of the intervention and allows for timely adaptive management.

In order to encourage buy-in and policy uptake for EbA over more traditional approaches,

48 Government of Seychelles, 'Climate Change Capacity Needs Assessment', Technical Assistance to the Republic of Seychelles for the GCCA Seychelles Global Climate Change Alliance+. Victoria: STANTEC, 2018, p. 45.

49 Khan A & V Amelie, 'Assessing climate change readiness in Seychelles: Implications for ecosystem-based adaptation mainstreaming and marine spatial planning', *Regional Environmental Change*, 15, 2015, pp. 721–733.

it is important to continue to collect a wide range of data on the cost, benefits and impacts of different approaches so that the monetary, environmental and societal values of EbA approaches can be adequately quantified. This approach stresses the need for better documentation and monitoring of EbA interventions. The lack of monitoring and adequate documentation is a weakness of some EbA projects that had made it difficult to assess the effectiveness of EbA approaches. Documentation and monitoring need to be properly addressed at the project design stage and thereafter at the execution level.

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Furthermore, assessing the benefits of EbA approaches over other approaches remains a challenge due mostly to a lack of human capacity to undertake the evaluation and a lack of candidate projects for comparison. It is therefore imperative that high quality data is collected on the different approaches that Seychelles takes in adapting to climate change, those that involve EbA and those that do not, so that sufficient data exist to allow for comparison. This is especially required since evidence of the social, environmental and economic benefits of EbA interventions has mostly come from reports on isolated anecdotal case studies.[50]

There is also the need to reach a broad agreement on how best to measure the effectiveness of EbA measures for ecosystem health and community risk reduction. Quantification of the positive results of EbA approaches and the promotion of opportunities to share experiences at local, regional and international level would raise the level of awareness about climate change and the role of marine and coastal ecosystems in the adaptation framework and build the critical mass of activities, activism and successes required for impact. At the same time it is also important to document failures of EbA approaches since they could provide opportunities for adaptive management.

There is also the need to reach a broad agreement on how best to measure the effectiveness of EbA measures for ecosystem health and community risk reduction

50 Munroe R *et al.*, 'Review of the evidence base for ecosystem-based approaches for adaptation to climate change', *Environmental Evidence*, 1, 2012, p. 13.

To be effective, it is important that there is a strong, coordinating mechanism to ensure that relevant conventions, protocols, policies, strategies and plans are implemented in a coordinated and cost-effective manner. Coordination and tracking of climate change action, including EbA approaches, could be done through the newly revamped Seychelles National Climate Change Committee. A comprehensive assessment of adaptation readiness in Seychelles is a first step in prioritising programmes and funds for integrated management and attaining synergy with other development priorities.[51]

It is also important for Seychelles to start thinking about moving beyond policy and find ways to translate policies into legislation and enforcement so that there is a strong legal background to support and encourage EbA. One option would be to explore the incorporation of EbA approaches into existing legislation such as the Environment Protection Act, the Environment Impact Assessment Regulation, and the Town and Country Planning Act. Linking EbA approaches to development and environmental protection may ensure better integration rather than its being treated in silos. Alternatively, this could be done through a Climate Change Act, which would also provide legal support for the country's climate change response. Such an act could stipulate that EbA approaches need to be given priority over other approaches, especially when measures are being implemented in sensitive ecosystems.

A Climate Change Act for the Seychelles is vital, as it would clearly outline the government's climate change-related coordination and oversight, and the linkages between central government and district administration

A Climate Change Act for the Seychelles is vital, as it would clearly outline the government's climate change-related coordination and oversight, and the linkages between central government and district administration. It would also be beneficial in terms of legislating the country's climate change response, measures and actions, as well as detailing the processes for public consultation, participation, gender integration and poverty alleviation. A Climate Change Act could also improve transparency, effectiveness and efficiency in the national climate change institutional landscape by legislating financial provisions for climate change adaptation and mitigation, and climate tracking and accounting. Despite the fact that Seychelles remains a net sink for carbon, it is important that the country is seen to be playing its role in the area of climate change mitigation. A Climate Change Act would strengthen climate change mitigation action by legislating the emission targets set forth in the INDC. It would also allow the central government to introduce measures to reduce climate-forcing gases and set up the reporting mechanisms for energy intensive

51 Khan A & V Amelie, 2015, *op. cit.*

industries to report on their emissions and efforts to move towards greener forms of energy. In addition, it would put in place financial mechanisms to support climate action such as a Climate Change Fund.

There is, however, a general lack of public awareness of climate change. Future support should be targeted at raising public awareness of the possible effects of climate change, and of the way in which Seychelles can address climate change by ensuring that ecosystems remain healthy and intact, and are able to provide the goods and services upon which the islanders' livelihoods depend. There is a need to reconsider how awareness campaigns are implemented. Passive awareness campaigns are not enough to change human behaviour. Awareness programmes that actively engage public participation in activities in a hands-on, minds-on approach have a greater chance of ensuring transformative changes.

Synthesis and closing remarks

The Seychelles islands have no choice but to adapt to the effects of climate change. As part of this adaptation, EbA approaches are important tools. There is now greater recognition of the need to shift management of natural resources away from particular species or habitats to ecosystems as a whole, in the face of climate change. Interestingly, the government dedicates a certain amount of funds each year towards the implementation of EbA activities. At present, it is difficult to get an overall idea of how much of the government's budget is being spent on climate change adaptation, as there are no tracking mechanisms in place. Better tracking of government expenditure on climate adaptation would help to better quantify the amount of resources that are being dedicated towards adaptation and those that specifically target EbA approaches. This would allow for a comparison over time and among other SIDS.

To strengthen EbA, the Seychelles should begin translating its climate change-orientated policies into legislation and effective enforcement, not necessarily to have penalties in place but to set out requirements that EbA approaches are explored ahead of other options. EbA is a relatively new approach, but one that builds upon key elements of classic environmental conservation and management. As constituents start to understand and adopt EbA approaches it is important that lessons learnt are appropriately captured, documented and disseminated locally and internationally. It is through these lessons that EbA projects can continually be strengthened and their overall environmental, social and economic benefits be better understood, and valorised. The PCU set up by the MEECC has been a good way of ensuring effective implementation of environmental and climate change-related projects and has played an important role in ensuring a certain level of coordination and sharing of experience among projects. The use of this structure should be encouraged for the management of future projects, whenever possible.

The implementation of most EbA-related initiatives in the Seychelles has involved the participation of NGOs and community-based groups. This is a good approach, as EbA should form an integral part of life at the community level. Continuous and coordinated climate change awareness and capacity building is required if the country is to keep abreast of developments in this sector. At the end of the day, climate change adaptation should be about empowering the community with the necessary skills and knowledge to effectively function within a world with more climate variability and development challenges.

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