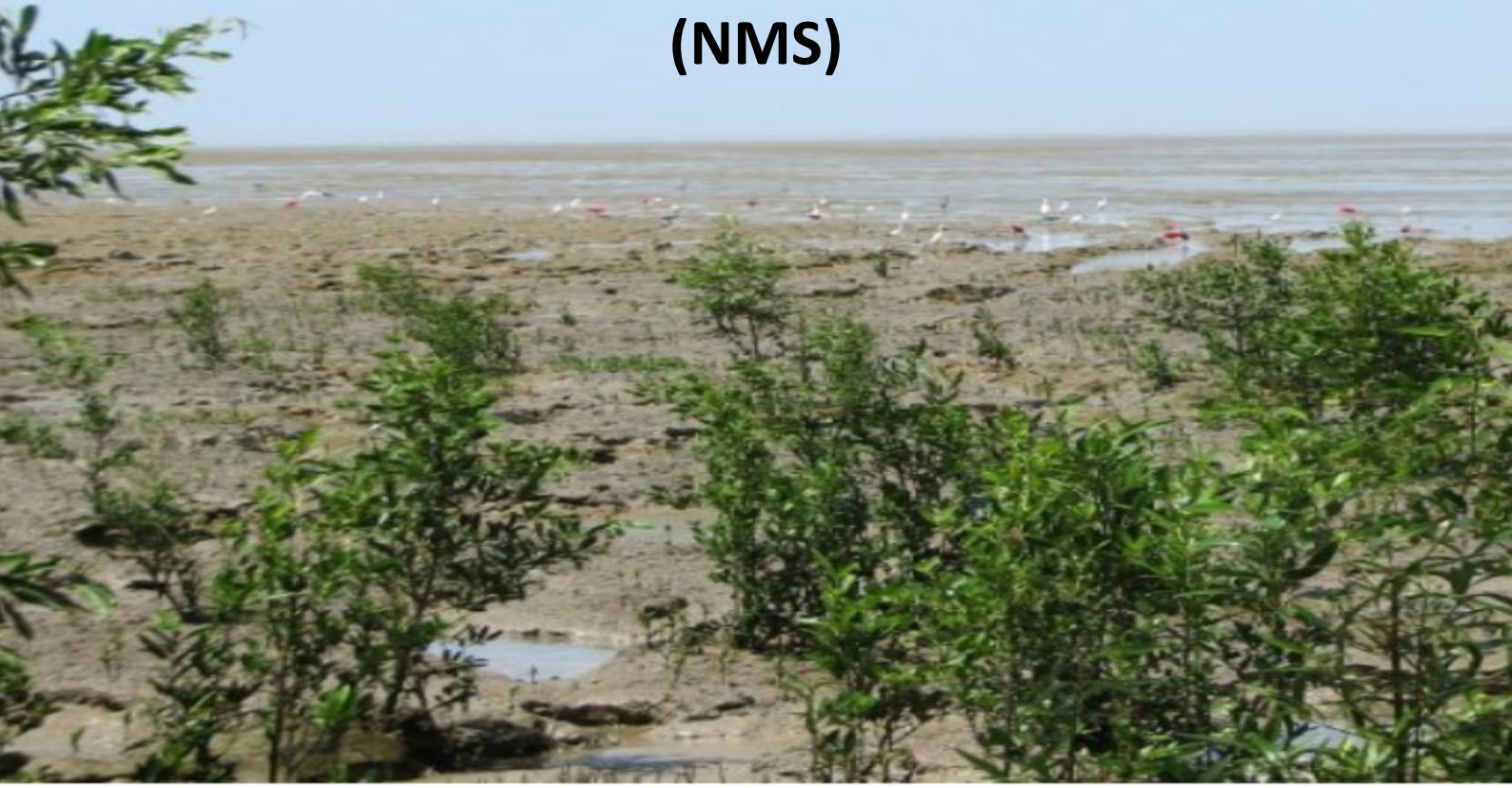
THE NATIONAL MANGROVE STRATEGY SURINAME (NMS)



Paramaribo, August 2019

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List of Abbreviations

ABS	General Bureau of Statistics
CDM	Clean Development Mechanism
GCF	Green Climate Fund
GEF	Global Environmental Facility
GCCA+	Global Climate Change Alliance+
GoS	Government of Suriname
ICZM	Integrated Coastal Zone Management
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
MAFOSUR	Mangrove Forum Suriname
MEA	Multilateral Environmental Agreement
MUMA	Multiple Use Management Area
NBSAP	National Biodiversity Strategy and Action Plan
NCCPSAP	National Climate Change Policy, Strategy and Action Plan
NGO	Non-governmental organization
NMS	National Mangrove Strategy
NR	Nature Reserves
OP	Policy Development Plan 2017-2021
REDD+	Reduced Emissions from Deforestation and Degradation
RGB	Ministry of Spatial Planning, Land and Forest Management
SCPAM	Suriname Coastal Protected Area Management
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wildlife Fund

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FOREWORD

Mangrove covers only a 0.5% of Suriname's land surface but plays an enormous role in the existence of the country's benefit. Amongst the number of goods and services the mangrove ecosystem provides, security is the most important value at present for the coastal communities and that of the country in general, through the generation of food, conservation of water resources and protection of goods and other economic values. Furthermore, it provides shelter for fish juveniles, birds and room for a wide variety of biodiversity. Mangrove are crucial for Suriname in respect to climate change mitigation and adaptation because they form a natural sea barrier in the low-lying coastline. Because of the fertile soils and abundance in natural resources, including hydrocarbons, these areas are attractive for agricultural production, establishment of new settlements, infrastructure and economic developments. The mangrove ecosystem sequesters much more carbon compared to other tropical forest types, whilst also demonstrating the ability to adapt current trends of sea-level rise. In this context, the mangrove ecosystem also offers good perspectives to the generations to come.

However, notwithstanding the various services and goods provided by mangrove ecosystem to the nation, the region and the world, it is under a tremendous pressure. In the absence of an up-to-date comprehensive coastal zone management strategy up to now, the government of Suriname has chosen to construct dams, dykes and sea walls against the risk of flooding and economic damage caused by persistent erosion and saltwater intrusion which can be exacerbated soon by the uncontrolled sea level rise. If this trend continues, which is likely, under the present rate of the sea level rise, construction of grey infrastructures, such as seawall, dams and dykes, will end up in loss and deterioration of mangrove ecosystem services, increasing thereby the vulnerability of the coastal communities and that of the people living and working in the low lying coastal area. Moreover, this approach will only fuel climate change impact further. Nevertheless, the government is intended to construct a new sea dyke projected in the north of the districts Wanica and Paramaribo in addition to the existing 22 km of seawall and dykes in the western districts Nickerie, and Coronie. In the first stage the new dyke may have a length of 8 km, but may extend up to 20 km.

As a low-lying coastal country, Suriname will be better off with actions that enhance the protection, conservation and expansion of the mangrove ecosystem. It should be noted that mangrove is one of the few ecosystems worldwide, which can adapt to the impacts of the increasing global temperature, if kept below the two degrees as indicated in the Paris Agreement.

Mangrove Forum Suriname (MAFOSUR) is a forum of people and organizations who are advocates for mangrove conservation in the country. MAFOSUR is of the opinion that loss of mangrove should be halted and where possible rehabilitated through the implementation of clean technologies and capacity building, among others. MAFOSUR is also in favor of sustainable use of the ecosystem goods and services. In this respect, the MAFOSUR is proud

to present this National Mangrove Strategy to the people of Suriname, which represents their intention to provide the government of Suriname with technical advice regarding conservation, expansion and management of healthy mangrove ecosystems, in order to secure the sustainable use of the services and goods it provides. MAFOSUR is supported by the GCCA+ Suriname adaptation project in drafting the mangrove strategy, for which the organization expresses its sincere gratitude. The platform expects that through the strategy the necessary actions will be generated to sustain the mangrove ecosystem goods and services for future generations.

On behalf of MAFOSUR
Prof. Dr. S. Naipal
(Chair of MAFOSUR)
Paramaribo, August 2019

1 INTRODUCTION

1.1 Background

Suriname is located at the north-eastern part of South America and is characterized with low lying coastal plains that are threatened by climate change-induced sea level rise and erosion[1]. It is expected that climate change will have significant impacts on the sustainability of the economic and social well-being of Suriname, especially along the low-lying coastal strip, with more than 90% of its population and much of its infrastructure and human activities.
The coast can be characterized by mud flats, sandy shell beaches and mangrove forest. Suriname's mangrove ecosystems are valuable both for their contributions to local livelihoods and for the globally important biodiversity that they contain. The mangroves also protect the marine ecosystem, defend the shoreline from erosion in the face of sea level rise and soil erosion, and can store significant amounts of carbon than most other tropical forests around the world (Kaufmann et al, 2018). But, according to Erftemeijer et al. (2009), this ecosystem is threatened by a range of unsustainable and uncontrolled activities, for example inadequate management, urbanization and over-harvesting. All these unsustainable activities combined with the impacts of climate change place enormous stress on the mangroves ecosystems.

1.2 Rationale of the National Mangrove Strategy

The Government of Suriname has been working towards promoting conservation of biodiversity in and reducing the impacts of climate change on coastal areas, through developing policy/legislation, conducting various studies and implementing projects in which mangroves are directly and indirectly discussed[2]. However, management of the country's mangrove ecosystems has not fully been addressed due to various existing barriers, for example, a lack of appropriate capacities in management skills and knowledge. Another barrier is the lack of enforcement and monitoring of existing policies, laws and regulations that further contribute to the destruction of these ecosystems. Thus a strategy is needed to remove the existing barriers in order to increase the coastal resilience through improved management and sustainable utilization of mangrove ecosystems.
The National Mangrove Strategy (NMS) promotes the strengthening of the legal framework (including enforcement) and introduces adaptation technologies to support the sustainable and effective management and monitoring of mangrove ecosystems. Emphasis is placed on building institutional capacities. The NMS will help the Government of Suriname (GoS) in their ambition regarding mangrove management, rehabilitation and expansion. In addition, the NMS will support the GoS in their strategic planning for integrated coastal management (ICM) with specific focus on mangrove ecosystems.

[1] World Bank, 2017, Suriname Coastal Resilience Assessment
[2] The various policies, studies and projects are mentioned in the Technology Transfer Assessment conducted by Caribbean Business and Development Consultancy Services, 2019.

2 CURRENT CONTEXT

2.1 Mangroves in Suriname

The 386 km of mainly muddy coastal zone of Suriname comprises a variety of productive coastal and marine ecosystems with extensive mangrove forests, salt marches, soft mudflats and fresh and salt water permanently interacting. Mangroves are sometimes called 'roots or rainforest of the sea[3].' or 'the pioneer plants along the coastline[4]', because they form a transitional zone between land and ocean that connects and supports both and are highly interconnected within the ecosystem itself.
The extensive mangrove forests covering about a total of 80,500 hectares (2017 data, SBB) occur along almost the entire length of the coastline as a fringe with an average width of approximately 3 km. Figure 1 shows a map of the mangrove forest and coastal swampland.

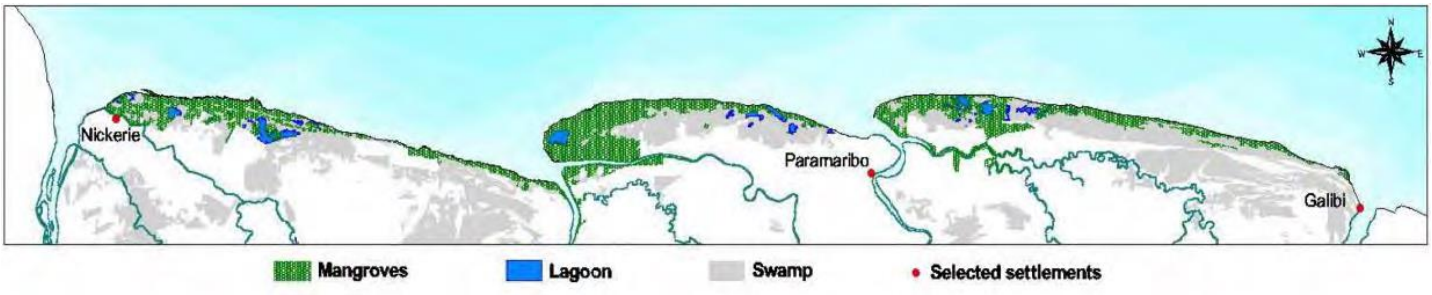

Figure 1: The Coastal zone of Suriname with mangrove forest and coastal swampland[5]

The coast consists of the following three types of mangroves (Erftemeijer et al, 2009):
1) *Avicennia germinans L*, black mangroves (Parwa),
2) *Laguncularia racemosa*, white mangroves (Akira) and
3) *Rhizophora mangle*, red mangroves (Mangro).

The mangrove forest offer sustainable ecosystem services and goods that include among other hydrological interactions, production of organic matter, food provision for the adjacent marine area, buffer capacity, shoreline protection and stabilization, habitat for migratory and other shorebirds, including birds of international importance.
More than two thirds of Suriname's mangroves are either located in nature reserves or in multiple-use management areas (MUMAs) which allow some level of development, but stress on careful management of mangroves and limited extraction[6]. Figure 2 shows the MUMAs, proposed Protected Areas and Nature Reserves.

[3] www.mangroveactionproject.org, retrieved July 5, 2019
[4] Prof. S. Naipal
[5] World Bank, 2017, Suriname Coastal Resilience Assessment
[6] Kaplan Planners, 2017, CCCD project- Component 1, Development of an Accessible Platform for Environmental Information and Knowledge and Improved Mechanisms to Support Decision-Making.

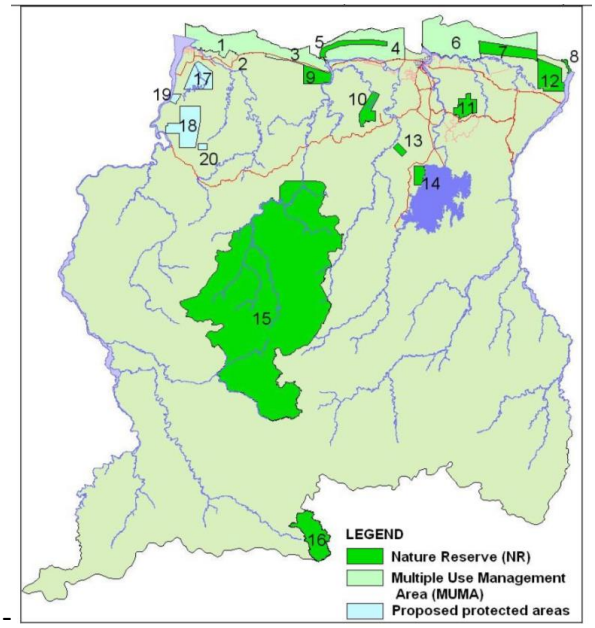

Figure 2: MUMAs, Nature Reserves and proposed Protected Areas in Suriname[7]

2.2 Mangrove Threats

Pressure on the coastal area occurs because of mangrove ecosystem degradation as well as the impact of climate change such as stronger waves and higher sea water levels. The environmental degradations are mainly caused by land degradation due to unwise human intervention such as urbanization and the overuse and overexploitation of natural resources (e.g. overfishing and poaching). Other threats are the pollution of water, air and soils from chemicals released from agricultural pursuits[8]. In addition, the growing interest of these ecosystems for nature-tourism purposes is resulting in an increased number of visitors entering these ecosystems. Since these ecosystems are poorly managed, the uncontrolled number of visitors may result in pollution and disturbance of the biodiversity within this valuable ecosystem. Lack of enforcement and lack of awareness and education among most of the main stakeholders combined with the ignorance of the rules and regulations regarding the conservation of mangroves jeopardize the existence of the mangrove ecosystems. Continued loss of mangrove forests will have serious ecological and socio-economic impacts. The impacts of loss are disproportionately felt by communities who are dependent on mangroves regarding their livelihood. Cutting down mangrove also means releasing large amounts of carbon into the atmosphere and increasing vulnerability to sea level rise and erosion[9].

[7] (Former) Ministry of Labour, Technological Development and Environment, 2013
[8] Deltares. Integrated Coastal Zone Management Suriname, 2010
[9] Beers, L., Crooks, S., May, C., and Mak, M. 2019. North Brazil Shelf Mangrove Project: Blue Carbon Feasibility Assessment. Report by Conservation International and Silvestrum Climate Associates.

2.3 Legal Framework for Mangroves

The greater part of the coastal zone, which has a special ecological value, has been designated as protected area. Four Multiple Use Management Areas (MUMAs) and four Nature Reserves, all situated in the estuarine area, were designated and made available to the Minister of RGB for management. The establishment of the MUMAs was urgent due to several increasing threats to these areas, including the disruption of the supply of freshwater to the brackish water and pollution as a result of the use of pesticides in the agriculture. These threats also have impact on the optimal functioning and survival of the mangrove forests. The MUMA Ministerial Orders clearly state the importance of the mangrove forest, serving as a breeding and feeding area for specified fish and migratory shorebirds and protecting the coast and river estuaries against erosion.

The first law in Suriname that provides rules for establishing protected areas, is the Nature Protection Law 1954 (Natuurbescherminsgwet). In line with this law eleven (11) Nature Reserves were established of which four are allocated near the coastal zone. The Nature Reserves have been established for various reasons, such as the protection of flora and fauna, in particular fauna (fish species, caymans, turtles and river otters) that is dependent on water areas. The Ministry of RGB, is responsible for the management of the protected areas.

Based on the legal analysis of the relevant legislation in Suriname (see Annex I: ´Legal Framework for the Protection of Mangroves in Suriname´) it can be concluded that the legislation is fragmented and sectoral oriented. The legislation overall focuses on regulating specific activities in different sectors (mining, forestry, fisheries, marine, and agriculture) which may have impact on mangroves, but rarely do they expressly require special consideration for the protection of these ecosystems.

In the last fifteen years several draft laws have been developed of relevance for mangroves among which the environmental law, the ICZM Law and the law for the protection of the coastal area. These draft laws do include provisions for the protection of mangroves, however are not approved yet.

The conservation and management of mangroves fall within the scope of several multilateral environmental agreements (MEAs). These international legally binding instruments create obligations that are relevant to mangrove conservation and their sustainable use. They also create and promote frameworks and tools such as lists of sites that can cover mangroves, mechanisms for investment and financing of mangrove conservation, and bilateral and multilateral governance structures that can include mangroves within their scope. In Annex I: Report ´Legal Framework for the Protection of Mangroves in Suriname´, a list is provided of relevant MEAs that Suriname has ratified.

2.4 Management of Mangroves

Within the MUMAs the emphasis is placed on their wise use which allows sustainable use and small-scale extraction of mangrove resources in these areas (Erftemeijer et al, 2009). According to the ICZM Plan (Erftemeijer et al, 2009), limited management capacities for the

protected areas exist. Main problems are illustrated by the following text derived from the ICZM Plan: ´… delays in decision-taking, limited institutional capacity especially with regard to local staff on the ground, lack of human & physical resources and financial constraints at the field level, all hamper effective implementation of mangrove conservation and management in Suriname today, especially in the area north of district Paramaribo and district Wanica´. The recent review[10] of the Management Plans of all four MUMAs points out the following problems that makes the enforcement and implementation of the management plans ineffective and inefficient:

- Lack of capacity and result-based implementation of management strategies
- Management approach applied is prone to micro-management of areas
- Insufficient stakeholder engagement and interdisciplinary cooperation in effective management of mangrove ecosystems (including development of the management actions)

Sustainable and effective management of mangrove ecosystems depend on crucial conditions, such as understanding ownership and use-rights, the right skills and capacities and a solid legislative infrastructure that supports and incorporates mangrove management strategies into a wider planning and policy framework[11]. But one of the most important condition is the involvement of stakeholders.

2.5 Stakeholder Engagement

Stakeholder engagement and stakeholder management are the most important ingredients for successful protected areas management (Dovers et al. 2015), because effective management requires a plan that is acknowledged by all the stakeholders involved.
During the development of the NMS, but also when implementing the NMS, the involvement and participation of all stakeholders are crucial in order to achieve sustainable and effective management of the mangrove ecosystem. Various stakeholders or groups of stakeholders, all with differing interests and roles that are affiliated with mangrove protection activities, have been identified during the development process of the NMS. These stakeholders[12] coming from the public sector, semi-governmental institutions, private sector, NGO's, civil society and the press will also be engaged in the implementation phase.

[10]Anex III, Report 'Coastal Protected Areas Management and Monitoring Plan using Indicators'
[11] UNU-INWEH (2012), Securing the Future of Mangroves
[12] Annex IV, Report ´NMS Stakeholders Engagement Plan´, 2019

3 BUILDING BLOCKS FOR THE NATIONAL MANGROVE STRATEGY

The NMS sets out a sound strategy for sustainable management of the mangrove ecosystems for the next ten years and will support the Government of Suriname to ultimately contribute to integrated coastal management.

3.1 Vision

Improving resilience and long term optimization of the natural productivity of the Surinamese mangrove ecosystem to safeguard ownership, biodiversity, healthy nature and equitable sharing of benefits.

3.2 Strategic Goal

Long term social, economic and environmental benefits to Suriname through primarily rehabilitation, conservation, expansion and sustainable use of mangrove ecosystems and their services.

The National Mangroves Strategy (NMS) comprises five Priorities that represent a specific area of need or concern on national level (see figure 3). These Priorities provide guidance in realizing the Vision and achieving the Strategic Goal.

3.3 Priorities

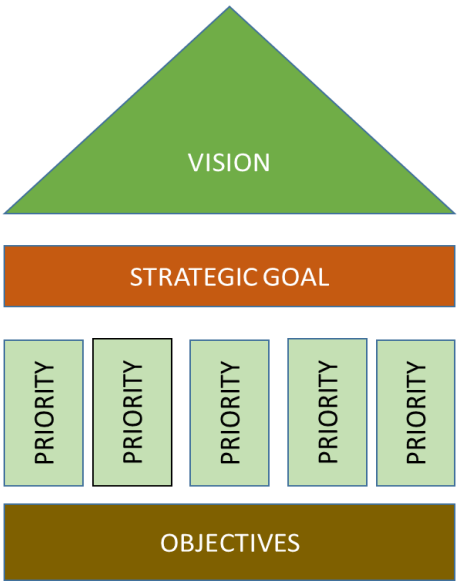

Figure 3: Building blocks for the NMS

- Strengthening the Legal Framework
- Sustainable Mangrove Management and Monitoring;
- Building Capacity
- Networking and Lobbying
- Adaptation Technology Transfer

The above mentioned Priorities can serve as a framework when developing the action plan in order to implement the NMS. Each of these Priorities can be addressed individually, but in order to achieve the Strategic Goal, it is necessary to follow an integrated path based on all five Priorities.

4 FIVE PRIORITIES REPRESENTING A SPECIFIC AREA OF NEED

As mentioned in previous chapter, the National Mangrove Strategy comprises five Priorities, each representing a specific area of need or concern on national level. Each Priority consists of one or more objectives with corresponding activities focusing on short, medium and long term. The five priorities are discussed further in this chapter.

4.1 Strengthening the Legal Framework

The NMS aims at strengthening the legal framework to protect, preserve and expand mangroves and their ecosystems in Suriname, for there is no legislation specifically designated to regulate the use, management and conservation of mangroves. The following objective is identified:

OBJECTIVE I

To enact enabling legislation for the protection, rehabilitation, expansion, use and management of Mangroves.

Suriname has legally protected parts of its coastline, by establishing Nature Reserves (NRs) and Multiple Use Management Areas (MUMAs) along the coast. A range of laws and subsidiary legislation regulate activities which may impact the health of mangroves. Most of these laws are outdated and do not require consideration for the environment generally and for mangroves in particular. However, some laws and regulations do provide for some legal tools which could be utilized towards the sustainable management of mangroves.

The legal options to enact enabling legislation include:

I. Prohibit or restrict the felling of mangroves (article 14 Forest Management law)
II. Designate mangroves as protected forest or special protected forest (article 5 Forest Management Law)
III. Approval of a framework law for ICZM

The first option is a short-term action and can be seen as a first step to protect mangroves. This can be achieved by amending the Ministerial Order S.B. 2000 no. 42 and include mangroves in Category C.

The second option is to designate mangrove forest as “protected forest” or “specially protected forest” under article 5 Forest Management Law 1992. These designated areas include areas which are or will be re-forested or where forest improvement measures will be taken. Further regulations may be prescribed under the State Order. To develop this State Order research, consultations and discussions among the responsible authorities and stakeholders is needed. It’s foreseen that the development and approval of the State Order could take some time and therefor a medium-term action.

The third option would be to develop an overarching law that provides for an integrated approach and management of the entire coastal zone. This law will cover the full cycle of information collection, planning (in its broadest sense), decision making, management and

monitoring with respect to the conservation and sustainable management of the coastal zone, including activities which may have impact on mangroves.
In 2009 a proposal for an ICZM Law for Suriname was developed and submitted to the Government but unfortunately not further discussed. In 2015 a draft law for the protection of the coastal area was prepared and submitted to the Parliament for their review. This draft law includes parts of the proposed ICZM law from 2009 and has been discussed in the Parliament, however not yet approved.
According to the draft law from 2015, the Minister of RGB may designate parts of the coastal area as "protected area" where specific measures are necessary for the protection of vulnerable ecosystems, habitats, animal and plant species, including mangrove ecosystems. It's advisable that the discussions in the Parliament and relevant stakeholders proceed and that the necessary provisions for *protection, rehabilitation, expansion, use and management of Mangroves,* are included in the law.

4.2 Sustainable Mangrove Management and Monitoring

The coastal protected areas have many of the same features and issues, making it justified to extrapolate relevant objectives identified in the latest management plans (2013-2014-2023-2024), to the NMS (Annex III, Report Mangrove Management and Monitoring). The following objectives are proposed for the sustainable mangrove management and monitoring:

OBJECTIVE I
To minimize the environmental impact of human activities in and around the mangrove ecosystems and to limit the impact of external changes to the natural equilibrium of the estuary.

With unregulated and unsustainable developments in activities such as agriculture, sand and shell mining, fishery, tourism and urbanization, mangrove deterioration is unavoidable. The issuance of land in these vulnerable areas might also result in deterioration of the mangrove habitat, and should therefore be considered carefully. To minimize negative impacts on the mangrove ecosystem, a monitoring system is required that will generate data on the trends in natural resource use and ecological dynamics of the mangroves. The data will determine the extent of these impacts and also the management procedures that are needed to minimize the impacts. Annex III proposes[13] a monitoring system using simple methodologies with indicators developed in the action plan.

OBJECTIVE II
To manage the mangrove ecosystem in a way that is sustainable to the estuarine environment and actively involves the local community, recreational users and commercial interests.

[13] Annex III, Report ´Coastal Protected Areas Management and Monitoring Plan using Indicators´

Participation of local communities is crucial in the development of management plans. They are dependent on these resources and therefore bring in the important attributes, functions and uses of the mangrove. Participation of stakeholders such as communities, recreational users and private persons with commercial interest helps to ensure sustainability, makes development activities more effective and builds local capacity. In fact, participation of local people also ensures benefits for the diverse interest groups within the community as well as effective stewardship (Borrini- Feyerabend, 1996; Dovers et al 2015). This is partly because communities often have better knowledge and expertise in the management of local resources than government agencies/ private industry.

OBJECTIVE III

To conserve and enhance native habitats and wildlife of the mangrove ecosystem for conservation or economic importance.

One of the benefits of mangrove ecosystem is that it acts as a breeding and nursing area for many species of fish, coastal birds and crustaceans (Erftemeijer et al, 2009). The occurring Scarlet Ibis and the jaguar are both at risk and have been recognized in the red data list (IUCN[14] Red List). Human activities carried out in the mangrove areas (e.g. overexploitation of fishing) or induced effects of anthropogenic actions (like sea turtle nesting beach erosion) cause habitat loss leading to a decline of mangrove forests. In addition, coastal erosion due to climate change is a real threat as well. Thus, conservation and protection of mangrove-dependent species requires effective management of the entire mangrove habitat (Macintosh et al, 2002).

OBJECTIVE IV

To promote sustainable, holistic mangrove and mud tourism -activities.

The coastal area consisting of the mangrove ecosystems is an attractive site for visitors. However, the impact of tourism on the fragile environmental resources must be taken seriously. Current uncontrolled tourism activities can enhance the pollution of the ecosystem and eventually disrupt the health of mangrove ecosystem.

[14] The International Union for Conservation of Nature's Red List of Threatened Species

4.3 Building Capacity

Mangroves are recognized as the source of a variety of renewable resources and a significant contributor in the local coastal economy and livelihood of communities. Mangroves also contribute in the national (economic) development and even in the global environment. Even though universally the ecological significance of mangroves for biodiversity and human welfare have been recognized, mangroves are still threatened due to natural factors, but moreover due to anthropological activities. The loss of the invaluable benefits of this mangrove ecosystem due to its continuous degradation needs to be halted to prevent a socioeconomic collapse for Suriname.

OBJECTIVE I

To enhance capacity of governmental and other relevant organizations in order to improve sustainable management of the mangrove ecosystem in close collaboration with various stakeholders.

To safeguard the benefits that are provided by the mangrove ecosystem services, the sustainable management of the mangrove ecosystem is essential. Therefore, governmental and other relevant organizations involved in the sustainable management of the mangroves, require sufficient capacity to succeed in achieving effective management of the mangrove ecosystem. Mangroves are complex coastal ecosystems and their health depends on the complex interrelationship with their environment. Therefore, mangrove management is part of coastal management. Taking into account the various key elements of mangrove management, the capacity of all governmental institutions that are responsible for the management, including of non-governmental partners, need to be strengthened to succeed in the sustainable management of the mangroves. Hence, each partner will need specific capacity based on its expertise in order to be able to fulfil its contribution. The capacity needs can be divided in: technical (staff with adequate knowledge, skills and experience), technology (technical infrastructure) and operational capacities (field equipment, measurement tools and devices, hardware, software, etc.). However, quite often the financial resources are not readily available which forms a barrier for capacity enhancement. Therefore, efforts to build capacity should result in stakeholders that are better equipped and more capable to create projects and implement activities in order to enhance effective mangrove management.

4.4 Lobbying and Networking

OBJECTIVE I

To influence decision-makers in order to advance and improve conditions for managing and monitoring mangrove ecosystems in a sustainable way.

Lobbying is a strategic, planned and informal way of influencing decision-makers. It is based on an open (two-way) communication and influencing by linking the interests of different stakeholders, creating win-win situations and investing in long-term relationships with decision-makers[15]. To implement the NMS successfully, policy-makers and political figures should be willing not only to gain knowledge of sustainable management and monitoring (SMME) of the mangrove ecosystem network, but also contribute to SMME. The Lobbying Strategy (Annex VI) advises to have a gender balance among the policy-makers and political figures participating. Furthermore, policy-makers and political figures should be willing to transfer knowledge of SMME to their colleagues.

OBJECTIVE II

To establish effective institutional arrangements for integrated management.

The Ministry of Spatial planning, Land and Forest management (RGB) is responsible for management of protected areas. Other key-government related stakeholders that are involved and have a role in the management of the Mangrove forests are listed in Annex II, Report ´Review Coastal Protected Areas Management Plans´.

Given the involvement of a number of government agencies and decision-making bodies within Government, there needs to be a coordinated approach in terms of better communication, better understanding the approval requirements and processes of the other government agencies, networking and information sharing amongst all stakeholders on mangrove use and management.

In august 2014, MAFOSUR was officially proclaimed as a platform of participants who strive to protect, preserve, rehabilitate and expand the mangrove ecosystem in Suriname, so that sustainable use can be made of the services and goods that this ecosystem provides in mainly the coastal region of Suriname. The Forum aims to be a medium to achieve integrated coastal zone management (ICZM) in Suriname. To achieve this, the legal status of the Forum must be determined. To ensure broad support and understanding for ICZM, all key stakeholders should be identified and involved in this process. It's proposed by the core group members from MAFOSUR to legally establish an association with the following objectives:

- Promote the protection, conservation, rehabilitation and extension of mangroves and the mangrove ecosystem;
- Support the sustainable use of the services and goods which this ecosystem delivers.

[15]Guidelines on lobby and advocacy, ICCO, 2010

- Teach/ educate how to make use of the services and goods in a sustainable way.

The main responsibilities will be to serve as a consultative body ("overlegorgaan") for all mangrove stakeholders and advocate and support the adoption and implementation of the National Mangrove Strategy.

The proposed timeframe is as following:

- Year 1 map all key stakeholders to actively engage in the process.
- Year 2-3 adopt the legal status of MAFOSUR.
- Within 5 years, MAFOSUR is able to monitor that the NMS is carried out successfully and the target (ICZM) is achieved.

4.5 Adaptation Technology Transfer

Climate Change Adaptation technologies for coastal conservation are defined as the broad set of processes covering the know-how, experience and equipment used by humans to reduce the adverse consequences of coastal change and exploit any benefits . Adaptation through coastal conservations technologies can be effective in order to conserve and rehabilitate mangrove ecosystems.

OBJECTIVE I

To introduce adaptation technologies as a means to support sustainable mangrove management and monitoring.

Within the NMS project a study was conducted on adaptation technologies in coastal conservation resulting in an array of technologies ranked under the strategies[16] 'Protect, Retreat and Accommodate' (see Table I). Most of these technologies have been recommended in various national reports and studies on coastal protection, but have not always been applied due to different barriers, including financial constraints and the limited attention given by government to coastal and mangrove management (UNDP 2016).

Protect	Retreat	Accommodate
Hard structures – Coastal embankment	Land use regulations (set-back zones)	Early warning and evacuation systems
Soft structures – Wetland/Mangrove rehabilitation		Integrated mapping
Controlled sedimentation in combination with permeable groins		Long term monitoring (observation of waves, tide levels, shore lines, etc.)
		ICZM

Table 1: Proposed adaptation technologies specifically for coastal and mangrove management

[16] IPCC, 1990

Knowledge sharing, creating awareness and capacity building are crucial for all selected technologies. If hard technology is to be used as a means of reducing vulnerability to climate change, it needs to be accompanied by soft technology and non-technical measures (e.g., early engagement, ESIAs, training and capacity building, institutional support) to ensure that the technology is accessible, effective and suitable to local conditions.

5 OVERVIEW NATIONAL MANGROVE STRATEGY

The following table 2 gives an overview of all the five priorities with corresponding outcomes and objectives for the short, medium and long term.

PRIORITIES	OUTCOMES	OBJECTIVES	SHORT TERM (1-3 YEARS)	MEDIUM TERM (3-5 YEARS)	LONG TERM (5-10 YEARS)
STRENGHTENING THE LEGAL FRAMEWORK	Improved legal framework for sustainable management of mangrove ecosystems.	I. To enact enabling legislation for sustainable use and monitoring of mangroves and the ecosystems.	- Prohibit or restrict the felling of mangroves (article 14 Forest Management law). - Discuss -and include feedback on- the proposed Ministerial Order (to include mangroves in the list of trees that are prohibited to cut) with Minister RGB in order to get their approval. - Implement Ministerial Order - No further occupation of the coastal lands.	- Designate mangroves as protected forest or special protected forest (article 5 Forest Management Law) - Draft (and submit for approval) the State Order involving all relevant stakeholders in the development process. - Enact and implement State Order.	- Develop a framework law for Integrated Coastal Zone Management (ICZM). - Discuss with all relevant stakeholders the Draft ICZM Law 2009 and Draft Law for the protection of the Coastal area 2015 - Propose a suitable (workable) ICZM Law for Suriname - Enact and implement the law.
SUSTAINABLE MANGROVE MANAGEMENT AND MONITORING	Anthropogenic activities are carried out in a manner that maintains or enhances the mangrove ecosystem equilibrium.	I. To minimize the environmental impact of human activities in and around the mangrove ecosystem (and their associated problems), and to limit the impact of external changes to the	- Establish a database with quantification of people and cargo. - Develop a waste management plan. - Execute existing management plans.	- Approve and enact the Environmental law, including the ESIA state Order. - Development of a disaster management plan.	- Execute disaster management plan.

		natural equilibrium of the estuary	- Update/develop management outdated management plans.	- Remote sensing and GIS monitoring of mangrove status.	
	A (financing) plan for sustainable use of mangrove ecosystems and ecosystem benefits, in service for national development and the well-being of coastal communities, is in place.	II. To manage the mangrove ecosystem in a way that is sustainable to the estuarine environment and actively involves the local community, recreational users and commercial interests.	- Develop a stakeholder database. - Formulate a financing plan for mangrove ecosystem management. - Implement an awareness plan focusing on effects of poaching, tourism, pollution and international importance.	- Establish regular coordinating meetings with (governmental) players in the mangroves. - Execute the financing plan.	- Execute the financing plan.
	Native mangrove habitats and wildlife of the mangroves are sustained and enhanced.	III. To conserve and enhance native habitats and wildlife of the mangrove ecosystem for conservation or economic importance.	- Implement monitoring programs for alien species and for fish, birds and specific for the scarlet Ibis and the jaguar. - Establish game yield database.	- Publish regular updates of monitoring observations. - Continue with monitoring and extend monitoring site locations.	- Rehabilitate damaged sites. - Designate RAMSAR sites. - Publish regular updates of observations. - Continue with monitoring and extent site locations.
	Sustainable mangrove and coastal eco-tourism is in place.	IV. To promote sustainable, holistic mangrove and mud tourism -activities.	- Establish a visitor's database and monitoring plan. - Develop mangrove tourism plans.	- Pilot project on beekeeping. - Establish regulations for boat trafficking.	- Establish building requirements for tourist camps and lodges.

BUILDING CAPACITY	Capacity of stakeholders is enhanced in order to achieve sustainable management of mangrove ecosystems.	I. To enhance capacity of governmental and other relevant organizations in order to improve sustainable management of the mangrove ecosystem in close collaboration between the various stakeholders.	- Conduct yearly training sessions, awareness campaigns, seminars and workshops regarding co-management and collective use of mangrove resources for all relevant stakeholders.	- Develop innovative financial plan to purchase equipment as part of the identified capacity - Refresher training or courses for staff and personnel from all relevant stakeholders - Public-private partnerships for mangrove management.	- Conduct yearly training sessions regarding technical and specific mangrove management for stakeholders related to technical activities concerning mangroves.
LOBBYING AND NETWORKING	Decision-makers acknowledge the importance of mangrove ecosystems and support the implementation of the NMS	I. To influence decision-makers in order to advance and improve conditions for managing and monitoring mangrove ecosystem in a sustainable way.	- Selection of lobbying firm. - Development of NMS lobbying plan. - Implementation of NMS lobby strategy. - Evaluation of NMS lobbying plan.	- Update-implementation of NMS lobby strategy. - Update-evaluation of NMS lobbying plan.	- Regional and international lobby for NMS.
	The Mangrove network MAFOSUR, a platform that brings mangrove scientists, managers and policy makers together, is legally established and supports the implementation of the NMS.	II. To establish effective institutional arrangements for effective management.	- All key stakeholders are identified and mapped. - The association MAFOSUR is established.	- MAFOSUR supports and monitors the implementation of the NMS. - In addition, MAFOSUR supports the implementation of the ICZM.	
ADAPTATION TECHNOLOGIES TRANSFER	Adaptation technologies for coastal conservation in order to improve adaptation and resilience to climate change, are implemented.	I. To introduce adaptation technologies as a means to support sustainable mangrove management and monitoring.	- Introduce integrated mapping, a simple technology based on participatory climate risk and assets mapping and analysis.	- Implement Long Term Monitoring, a tool that provides content for consideration of climate change impacts and countermeasures.	- Implement ICZM. - Enhance coastal embankment by constructing hard structures set back from the coastline combined

			- Establish a special ICZM-platform, a place for networking and exchange. The platform will act as a driver for implementing ICZM. - Establish set-back zones (minimum distance from designated zones).	- Establish Land-use regulation to ensure that private use of land resources are aligned with policy standards.	with mangrove fringe area for protection of the land.

Table 2: Overview of all the five priorities with corresponding outcomes and objectives for the short, medium and long term.

6 PROPOSED WAY FORWARD

With the proposed National Mangrove Strategy for Suriname, the following outcomes are expected to be achieved:

- ✓ Improved mangrove management and monitoring plans;
- ✓ Increased capacities of all stakeholders, especially government institutions;
- ✓ Increased ownership among all stakeholders;
- ✓ Increased resilience against the impacts of climate change on coastal area;
- ✓ Social and economic issues, especially of coastal communities, are addressed;
- ✓ Improved livelihood of coastal communities;
- ✓ Sustainable mangrove ecosystems that continue to provide extensive goods and services.

6.1 Implementation

In order to implement the NMS an action plan must be developed under a multi-level institutional framework. Therefore an appropriate structure needs to be created to coordinate the activities of all government agencies and other organizations that are active in the coastal area, including mangrove forests. Since the responsibility of coastal management is scattered over different ministries, this proposed coordinating structure may perform effectively and efficiently, because their main goal will be achieving a sound integrated coastal management.

6.2 Cross Cutting Issues

Economic Value of Mangrove Ecosystems

The mangrove ecosystem has important direct and indirect economic, ecological and social values to man. According to UNESCO, a growing number of economic valuations reveal the considerable benefits of intact mangroves, even towards single services such as fisheries. It is therefore recommended to calculate the economic value of the mangrove ecosystems in the coastal areas in Suriname.

Recent study within the North Brazil Shelf Mangrove Project[17] has shown significant potential of carbon projects through mangrove conservation, adding another reason in favor for the conservation of mangroves. The same study also stresses the fact that coastal freshwater swamps in Suriname has the potential to sequester soil carbon for a longer

[17] Beers et al., 2019

period than mangroves. The key role of mangroves as carbon stores and sinks needs to be highlighted in national strategies (e.g. National Communication, Nationally Determined Contribution) that address climate change. The income resulting from projects through carbon finance mechanisms such as REDD+ or CDM can therefore be an important way of improving the conservation and rehabilitation of the mangrove ecosystem.

Financing

Successful implementation of the Strategy depends on finance resources, allocation of human resources and political will for the conservation and rehabilitation of the mangrove forests in Suriname. Next to (possible) dedicated national budget for Mangrove protection, finance can also be achieved through donor programmes or development assistance from several international organizations such as CI, WWF, GEF, GCF, Adaptation Fund and UNDP. However, these financial resources can be limited and in that case, it is recommended to find innovative and sustainable funding mechanisms to ensure long term efforts for mangrove conservation, rehabilitation and management.

Increasing Knowledge Sharing and Awareness

As stated before, mangroves are the pioneers of plants along the coastal areas; they have numerous benefits not only for biodiversity but also for the livelihood of the population and play an important role in coastal protection and in reducing GHG emissions of Suriname. Thus, it is crucial that all stakeholders are aware of the benefits and importance of mangrove ecosystems. It is therefore strongly recommended to conduct a study on increasing the level of knowledge and awareness with regards to the benefits of mangrove ecosystems among all stakeholders.

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ANNEXES I - VI

Annex I: Report ´Legal Framework for the Protection of Mangroves in Suriname´

Annex II: Report ´Review Coastal Protected Areas Management Plans´

Annex III: Report ´Coastal Protected Areas Management and Monitoring Plan using Indicators´

Annex IV: Report ´National Mangrove Strategy on Developing Capacity´

Annex V: Report ´NMS Lobbying Strategy ´

Annex VI: Report ´Increase Capacity Building of and Technology Transfer between Stakeholders´