GCCA+

THE GLOBAL CLIMATE CHANGE ALLIANCE PLUS INITIATIVE

Funded by the European Union

Case Study Nr. 5 – Guyana

IMPACT AND SUSTAINABILITY STUDY

GUYANA

SUSTAINABLE COASTAL ZONE PROTECTION THROUGH MANGROVE MANAGEMENT

CRIS CODE: DCI-ENV/2009/021-549

MARCH 2021

www.gcca.eu

List of Acronyms

AF: Action Fiche
BSc: Bachelor of Science
CC: Climate Change
CCCCC: Caribbean Community Climate Change Centre
CDC: Civil Defense Commission
CI: Conservation International
CMMC: Coastal Marine Management Committee
CRSAP: Climate Resilience Strategy and Action Plan
DRR: Disaster Risk Reduction
EC: European Commission
EPA: Environmental Protection Agency
EU: European Union
FA: Financing Agreement
GCCA+: Global Climate Change Alliance Plus
GDF: Guyana Defense Force
GEF: Global Environment Facility
GFC: Guyana Forestry Commission
GIS: Geographical Information System
GLSC: Guyana Lands and Surveys Commission
GMIS: Guyana Mangrove Information System
GMRP: Guyana Mangrove Restoration Project
GoG: Government of Guyana
GPS: Global Positioning System
J-CCCP: Japan-Caribbean Climate Change Partnership
KAP: Knowledge, Attitudes and Practices
LCDS: Low-Carbon Development Strategy
MAC: Mangrove Action Committee
MARAD: Maritime Administration Department
MoA: Ministry of Agriculture
MoPI: Ministry of Public Infrastructure
MRPC: Mangrove Reserve Producers Co-op
MRP: Mangrove Reserve Producers
MRV: Measuring, Reporting and Verification
MS: Member State
M&E: Monitoring and Evaluation
NAO: National Authorising Officer
NAREI: National Agricultural Research and Extension Institute
NDIA: National Drainage and Irrigation Authority
NMMAP: National Mangrove Management Action Plan
NOAA: National Oceanic and Atmospheric Administration
OCC: Office of Climate Change
OO: Overall Objective
PAC: Protected Areas Commission
REDD+: Reducing Emissions from Deforestation and Forest Degradation Plus
ROM: Result Oriented Monitoring
SO: Specific Objective
SPSP: Sector Policy Support Programme
SRDD: Sea and River Defence Division

TA: Technical Assistance / Technical Assistant
TAPS: Technical and Administrative Provisions
UNFCCC: United Nations Framework Convention on Climate change
UoG: University of Guyana
VMAC: Village Mangrove Action Committees
WSG: Work Services Group

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I. Project Details and Outputs Delivered

PROJECT TITLE:

Sustainable Coastal Zone Protection through Mangrove Management (locally known as the "*Guyana Mangrove Restoration Project – GMRP*")

CRIS CODE: DCI-ENV/2009/021-549

AAP YEAR:	DURATION: 72 months[1] starting with the signature of the Financing Agreement (FA)[2]	DATE OF COMPLETION:
2009		08/2014[3]

TOTAL PROJECT COST: 4,165,000 EUR	GCCA ALLOCATION: 4,165,000 EUR (3,665,000 EUR sector budget support and 500,000 EUR project support with 420,000 EUR earmarked for TA, 60,000 EUR for evaluation and 20,000 EUR for visibility) *Actually disbursed: 3,346,828 EUR or 80% of initial allocation (2,965,000 EUR sector budget support and 381,828 EUR project support)*
AID MODALITY: Sector Policy Support Programme (SPSP), combined with project support (TA, evaluation, visibility)	MANAGEMENT ARRANGEMENTS: ▪ FA with the Republic of Guyana. ▪ Direct centralised management for the Non-targeted Sector Budget Support and the evaluation components; ▪ Direct decentralised management for the Technical Assistance component.

GEOGRAPHICAL COVERAGE:

The project operates across the entire coastline of Guyana, from Region 1 to Region 6.

MAIN STAKEHOLDERS AND BENEFICIARIES:

- The implementation is coordinated by the **National Agricultural Research and Extension Institute (NAREI)** of the Ministry of Agriculture. Role: identification of restoration sites, nursery production, propagation techniques, seedling planting, coastal infrastructure interventions, forest monitoring, public awareness and education, livelihood initiatives, research.
- The Guyana Forestry Commission (GFC). Role: enforcement of mangrove protection rules and MRV for REDD+
- The Work Services Group (WSG) of the Ministry of Public Infrastructure. The WSG absorbed the previous Sea and River Defence Division – SRDD. Role: identification of mangrove restoration sites, infrastructure aspects of mangrove restoration and protection.
- The Environmental Protection Agency (EPA)
- The University of Guyana/Faculty of Agriculture & Forestry. Role: research.
- Landell Mills as implementer of the TA contract (May 2012-July 2013) with Jamie Machin as team leader and mangrove specialist
- Direct beneficiaries: Coastal population of Guyana (protection of livelihoods against sea surges and flooding) and national agencies receiving institutional support.

[1] With an operational implementation phase of 48 months and a closure phase of 24 months
[2] The Financing Agreement was signed in September 2010
[3] As per GCCA+ Technical Fiche

GCCA PRIORITY AREA(S):

Adaptation, REDD, DRR

MAIN SECTOR(S):

Forests (mangrove protection and restoration); coastal zone management; resilience of coastal communities

OVERALL OBJECTIVE:

- To abate climate change (carbon sequestration through reforestation and forest preservation) and to mitigate its effects (sea defence, biodiversity). (According to the initial logframe attached to the Action Fiche (AF) and to the FA/Technical and Administrative Provisions (TAPS)
- To help arrest the process of mangrove forest degradation in Guyana and bring about sustainable mangrove management recognising the value of mangroves for sea defence, carbon sequestration and biodiversity. (According to the logframe attached to the TA's final report)

SPECIFIC OBJECTIVE(S):

To support Guyana's policies on sea defence, climate change and mangrove management.

EXPECTED RESULTS[4]:

1. Administrative capacity for the management of mangroves is established.
2. Sustainable management of mangrove forest is promoted (2.1 monitoring and 2.2 enforcement).
3. A legal framework for mangrove ecosystem management is developed and established and community-based mangrove management is encouraged.
4. Research and development of Guyana's mangrove forest is supported.
5. Improved and effective protection and rehabilitation of mangrove ecosystems is instituted.
6. Public awareness and knowledge on the benefits of mangrove forests has increased.

OUTPUTS DELIVERED[5]:

COMPONENT 1 (ADMINISTRATIVE CAPACITY):

- The Mangrove Action Committee (MAC) established as an advisory body with representation of 12 government agencies, research organisations and the private sector[6]
- MAC Secretariat (MS) established as an operational entity (staffed and supplied with two vehicles, computer equipment, monitoring equipment and furniture) within NAREI HQ
- MS staff (2) and mangrove rangers trained in field monitoring, incl use of GPS (on the job)
- MS staff (2) trained in project management
- An updated National Mangrove Management Action Plan (approved by Cabinet, May 2010)

COMPONENT 2 (SUSTAINABLE MANGROVE MANAGEMENT):

- Guidelines for mangrove monitoring: Mangrove Monitoring Protocols for Guyana and Mangrove Restoration Monitoring Plan (2 publications)
- Mapping and Inventory of coastal zone forests in Guyana (publication by Persaud[7])
- A mangrove GIS database system, and a Guyana Mangrove Information System (GMIS) established.

[4] Based on the logframe in the TA's final report (Landell Mills) and on the project components which fully coincide with the components of the National Mangrove Management Action Plan (NMMAP)
[5] Based on the TA's final report
[6] Ministry of Agriculture, Ministry of Public Works - Sea and River Defence Division, Ministry of Education, Ministry of Local Government and Regional Development, Fisheries Department, National Drainage and Irrigation Authority, Ministry of Finance, University of Guyana, Environmental Protection Agency, Hydromet, National Agricultural Research & Extension Institute, and the Guyana Forestry Commission.
[7] Several quality issues according to the TA final report

- A GIS database system user manual
- A GMIS application manual
- A Guyana Mangrove Monitoring Plan, linked to the GIS database and the GMIS
- 16 staff members (professionals and rangers) trained in GPS and GIS (3 sessions)
- 1 monitoring/GIS officer trained in GIS (1-month advanced GIS training)
- Biodiversity surveys in 3 locations (Golden Grove / Belfield Mangrove Reserve (5 villages within the proposed reserve), and Wellington Park)
- An operational and equipped mangrove ranger network comprising of 8 rangers to monitor and protect the mangroves along a coastline of 36.5km
- Code of Practice for mangrove harvesting
- Guyana's first proposed Mangrove Reserve and related mangrove eco-tourism product which won in 2011 the Environmental Award of the Guyana Tourism Hospitality Association.
- Draft Management plan for the Golden Grove / Belfield Mangrove Reserve (based on previous studies, including social assessments and biodiversity assessments)

COMPONENT 3 (LEGAL FRAMEWORK AND COMMUNITY-BASED MANGROVE MANAGEMENT):

- Amended Forest Act (including the requirement of an official permit to fell mangrove trees)
- Study on impacts of infrastructure and land development on mangroves initiated (Rory Fraser)
- Assessment study on current institutional arrangements related to mangrove management
- 5 Village Mangrove Action Committees (VMAC) established and trained in mangrove monitoring data collection, mangrove ecology and public awareness strategies
- Community Development Manual (for use by VMACs)
- 5 Community infrastructure projects completed[8]
- Mangrove Reserve Producers (MRP), with representation of 8 communities (cooperative societies), to promote alternative livelihoods in communities along the coast established, trained and supported (TA, business plans)

COMPONENT 4 (RESEARCH):

- 6 completed and 11 initiated research projects with final year students (University of Guyana - UoG)
- Mangrove Forum conducted in collaboration with UoG, over 100 attendees from 10 countries
- Methodology for setting up a mangrove research database (with UoG) containing relevant research projects, academic papers and project reports
- Publication "Review of mangrove research in Guyana: research, gaps and strategies" (May, 2013)

COMPONENT 5 (PROTECTION AND REHABILITATION OF MANGROVE FOREST):

- Mangrove Nursery Manual
- 30 Community groups trained in the propagation of black mangrove seedlings
- 421,600 mangrove seedlings produced in community nurseries, distributed and planted at selected sites in order to restore 35 ha along 5.59 km coastline (survival rates varying from 0 to 100%)
- 37 people trained in ecological mangrove restoration techniques (3 day workshop)
- Project plans and designs for supporting coastal engineering works to protect mangroves
- 3 coastal engineering projects completed (rubble mound groynes, geotextile tube breakwater and brushwood dam)
- Mud bank study report

COMPONENT 6 (PUBLIC AWARENESS AND EDUCATION):

- Public awareness campaign developed and carried out (website, billboards, signs, house to house talks, jingle, documentary, infomercials on national television, boosting press coverage, exhibitions, school presentations, brochures and posters, tours)
- Tour Guide Training manual
- Mangrove Resource Manual for secondary school teachers which has been endorsed by the Ministry of Education and is now part of the secondary school curriculum

[8] Playground at Mon Repos; Benab at Victoria; Mangrove Awareness centre at Village #7; Bleacher at Buxton.

- 120 secondary school teachers trained in using the Resource Manual
- 30 secondary school teachers trained for the mangrove outreach programme
- A Mangrove Visitor Centre at the Guyana Women's leadership Institute as part of the Golden Grove / Belfield Mangrove Reserve established and equipped
- Field guides for rangers and community members

II. Analysis of impact

2.1. Impact expected as per logframe objectives and their indicators:

The Overall Objective (OO), as formulated in the logframes attached to the programming documents (*Action Fiche and TAPS/FA*), is: To abate climate change (carbon sequestration through reforestation and forest preservation) and to mitigate its effects (sea defence, biodiversity)".
The two corresponding indicators are:

- Indicator OO.1: Temperature rise in Guyana
- Indicator OO.2: Sea level rise in Guyana

The indicators are to be verified in resp. UNFCCC reports and NOAA[9] / CCCCC[10] reports. Baselines and targets are lacking.

The Overall Objective (OO), as *reformulated* in the logframe of the *TA Final Report*, is: To help arrest the process of mangrove forest degradation in Guyana and bring about sustainable mangrove management recognising the value of mangroves for sea defence, carbon sequestration and biodiversity.
The two corresponding indicators are:

- Indicator OO.1: The length of shoreline protected by mangrove
- Indicator OO.2: Total area of mangrove in each Region (1-6) of Guyana in 2013 compared to these in 2011.

Baselines: Rate of decline of Guyana's mangroves is estimated at 58,368 ha or 4,864 ha per year (80,000ha – 22,000ha) from 2000 – 2012, or X* km of shoreline protected per year. This loss in area and protected length represents a loss in ecosystem services for Guyana of X** USD for fisheries production, X** USD for carbon sequestration, X** for shoreline protection and X** for direct community benefits.
Targets: The length of shoreline protected by mangrove and total area of mangrove in Guyana increases from X km (X ha) to X km (X ha) by 2013. Individual targets for each region are as follows: *not further specified in the document.*

*: Data will be derived from the inventory study using recent satellite imagery purchased in 2013.
**: Values will be estimated from an economic study being conducted on the value of mangroves in Guyana.
***: Targets for each region will be derived based on an inventory study and on the results of a study on mud banks that will be conducted in March 2013.

As the reformulated OO, developed by the project implementing team and presented in the TA final report, is much more relevant and the corresponding indicators much better specified, impact assessment will be conducted against the latter.

The Specific Objective (SO), as formulated in the several logframe versions, is: To support Guyana's policies on sea defence, climate change and mangrove management.
The two corresponding indicators[11] are:

- Indicator SO.1: Sustainability of mangrove forests

[9] US National Oceanic and Atmospheric Administration
[10] Caribbean Community Climate Change Centre
[11] It concerns the indicators presented in the logframes attached to the AF and to the TAPS/FA. The logframe presented in the TA final report does not include indicators at SO level.

- Indicator SO.2: Implementation by Guyana of its Low-Carbon Development Strategy[12].

Baselines and targets are lacking in the programming documents. Sources of verification are specified and include: EPA, GFC, WSG and MAC reports; CC Committee reports; and the national REDD MRV system.

The narrative section explaining the intervention logic in the TAPS/FA, indicates that the project is designed to support the implementation of significant parts of the Guyana National Mangrove Management Action Plan (NMMAP), rather than the Low-Carbon Development Strategy. Also the final TA report consistently refers to NMMAP implementation. The LCDS includes mitigation through forestry but covers more components that fall outside the scope of the GCCA support project. *For further analysis and discussion on generated impact, we will therefore use the:*

- *Adjusted indicator SO.2: Implementation by Guyana of its NMMAP.*

2.2. Direct and indirect impact as reported in the available documents (desk phase):

RELATED TO THE ACHIEVEMENT OF INDICATOR OO.1 (ADJUSTED VERSION): THE LENGTH OF SHORELINE PROTECTED BY MANGROVE FOREST

Comment on the adequacy of the indicator: No clear baselines nor targets set. Rather a performance indicator than an impact indicator.
On generated impact: Through mangrove planting, combined with engineering works, an additional 5.59 km of coastline became protected by the end of the project (2013). It concerns the coastline along East Coast Demerara, West Coast Berbice and Corentyne Coast.
On drivers for success and failure:

- The project has rightly given due attention to community involvement and to the development of a network of community-based mangrove rangers. This has contributed to the conservation of existing mangrove stands, amongst others through timely identification and reporting of threats, and ultimately to natural regeneration of mangroves in extensive areas.
- The survival – and hence success - of planted mangrove trees depends significantly on natural coastal processes (hydrology and mud bank movements). The correct selection of suitable sites for planting – based on sound knowledge of the mentioned natural processes - are crucial for seedling survival / success.

RELATED TO THE ACHIEVEMENT OF INDICATOR OO.2 (ADJUSTED VERSION): TOTAL AREA OF MANGROVE

Comment on the adequacy of the indicator: A baseline is given, though figures do not make sense (see 3.1). No clear targets set. Rather a performance indicator than an impact indicator.
On generated impact: Through mangrove planting, combined with engineering works, an additional area of 35 ha of mangroves along the East Coast Demerara, West Coast Berbice and Corentyne Coast were rehabilitated by the end of the project (2013).
On drivers for success and failure: idem as above (indicator OO.1)

RELATED TO THE ACHIEVEMENT OF INDICATOR SO.1: SUSTAINABILITY OF MANGROVE FORESTS

Comment on the adequacy of the indicator: No baselines nor targets set. Unclear on how the indicator should be measured/assessed.

[12] The Low-Carbon Development Strategy is implemented under the Office of Climate Change, Ministry of the Presidency, Shiv Chanderpaul Drive, Georgetown. Tel: +592 223 0975. E-mail: info@lcds.gov.gy. The LCDS (original version as well as the update version of 2013) hardly refers to mangrove conservation. REDD+ is prominent but not directly related to mangrove forests. The two broad goals of the Strategy, as detailed in the LCDS Update (2013), are: (1) Transforming the economy to deliver greater economic and social development by following a low carbon development path; and (2)Providing a model for the world of how climate change can be addressed through low carbon development in developing countries, if the international community takes the necessary collective actions, especially relating to Reducing Emissions from Deforestation and Forest Degradation Plus (REDD+).

On generated impact: No reporting done.
On drivers for success and failure: idem as above (indicator OO.1)

RELATED TO THE ACHIEVEMENT OF INDICATOR SO.2: IMPLEMENTATION BY GUYANA OF ITS NMMAP

Comment on the adequacy of the indicator: No baselines nor targets set. In the context of the project, it is a performance indicator rather than an impact indicator.
On generated impact:

- As a result of the project, mangrove components are now part of the BSc Curriculum for Forestry at the University of Guyana.
- MAC obtained membership of the Curriculum Committee at the Ministry of Education (hence MAC will be in a position to advocate for the continued/enhanced integration of the topics "mangrove ecosystems" and "climate change" in the school curricula).

On drivers for success and failure:

- The final TA report highlighted the persistent lack of clarity regarding the role of MAC: limited to providing strategic direction and oversight to the project (GMRP) or – in addition - a national mandate for mangrove management and for addressing issues that are affecting mangroves (e.g. illegal cutting, illegal coastal development). Further to this, the final report emphasized the need for broader institutional coordination in mangrove management.

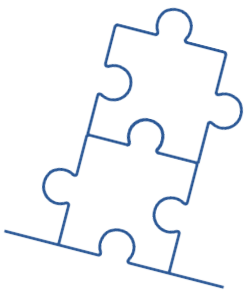
OTHERS (INDIRECT IMPACT):

On generated impact:
The placement of signs at Cove and John resulted in a 75% reduction in garbage dumping around that site
On drivers for success and failure: No reporting done.

2.3. Findings from the desk phase and specific issues to be further explored during the field phase:

The indicators at OO and SO levels are not providing the required basis for measuring and assessing impact. They are generally deficient in terms of relevance and measurability. Baselines and targets are not well-specified.

None of the available reports has a dedicated section on impact; generation of impact is hardly addressed in the progress and M&E reports. Only one external evaluation has been carried out; the study focused on the project's compliance with the performance indicators and criteria for disbursements, specific to the budget support modality.



To be further explored: The Action Fiche – under its section "Lessons Learned" – highlighted the low impact that had been achieved with previous EC funded projects for coastal management in Guyana. The reasons for this low impact were mainly institutional and were explained as: poor capacity and high staff turnover at the Sea and River Defence Division (SRDD), that acted as the main implementing partner; difficult coordination across the sea defence sector (sea defences, drainage, mangroves etc); overlapping responsibilities of various agencies within the sea defence sector. The AF therefore called upon the present project's implementation team to ensure good coordination and close monitoring. To what extent has this been taken into account and with what effect?

2.4. Achievement of the logframe indicators at overall and specific objectives levels (direct impact)

INDICATOR	LEVEL OF ACHIEVEMENT	EXPLANATORY NOTES
OO.1: Increased length of shoreline protected by mangrove stands (width of >50m) *Baseline:* 0 km *Target:* At least 11 km	51% (2013)[13] 153% (2018)[14]	During the implementation period of the project (2010-2013), a total distance of 5.59 km of shoreline (51% of the target) along the Regions East Coast Demerara, West Coast Berbice and Corentyne was replanted with mangrove. According to NAREI's Annual Report of 2018, replanting had continued after the project's closure and in 2018 a distance of 16.8 km of coastline (153% of the target) was replanted in the targeted sites.
OO.2: Increased area of mangrove in each of the coastal Regions of Guyana (2013) as compared to 2011 *Baseline:* Between 2000 and 2012, the mangrove area declined at an estimated rate of 4,864 ha per year[15] *Target:* Not specified in the project documents, but assuming 2 planting seasons during the project life and with the estimated annual rate of decline of 4,864 ha, the area to be replanted/rehabilitated by the project should at least be 9,728 ha.	0.4% (2013)[16] 5.4% (2018)[17] 110% (2018)	In 2013, the area of mangrove in the sites targeted for restoration had increased by 35 ha (0,4% of the target of 9,728 ha). By 2018, the mangrove cover in the targeted sites had increased with 526 ha (5.4% of the target of 9,728 ha). The increase had been achieved by combining replanting with assisted natural regeneration (installation of geotextile tube groynes, brushwood dams and planting of Spartina grass) *Remarks*: 1. The levels of achievement, as mentioned above, only refer to the project intervention sites 2. Data on increased areas of mangrove per region are not available 3. The planned (as was indicated in the logframe) economic study on mangrove ecosystem services (fishery production, carbon sequestration, shoreline protection, direct community benefits) was not conducted. However, comparison of data on mangrove coverage for the entire coastline of Guyana (430 km long) shows an increase of 10,729 ha between 2011 (22,632 ha)[18] and 2018 (33,361 ha)[19]. In other words, the target of 9,728 ha was achieved.
SO.1: Sustainability of mangrove forests *No baseline, no target*	50%	It is unclear on how this indicator should be measured. The sustainability of mangrove ecosystems in Guyana mainly depends on their capacity to naturally regenerate. This capacity is to a large extent determined by hydrological processes (interaction of salt and fresh water, sea currents, floodings) and soil stability (cyclic movement of mudbanks from east to west, sediments) [20]. Detailed long-term monitoring data on these important factors for mangrove ecosystems to sustain themselves do not exist. Besides, also human factors are negatively affecting processes of natural mangrove regeneration, such as:

		▪ Construction of sea walls, resulting in an increase in wave energy and therefore in reduced sedimentation. ▪ Mangrove cutting/clearance to get free access to the open sea (tourism, fishery). ▪ Draining of swamp forests. ▪ Pollution (e.g. influx of sawdust from sawmills up the Corentyne River contributed to the loss of the entire mangrove forest at Wellington Park). ▪ Keeping animals in mangrove forests for grazing. Under the GCCA project, NAREI has been experimenting with methods to facilitate natural mangrove regeneration. Screened techniques included: ▪ Planting of coastal grasses (Spartina) to enhance stabilisation of sediments in areas subject to heavier wave strength. ▪ The entrapment and use of mangrove propagules for planting, which was amongst the most successful methods used by the project for mangrove restoration. ▪ Establishment of coastal engineering structures (geotextile breakwaters and low-cost brushwood dams) to reduce wave energy and facilitate accretion of sediments. ▪ Fencing restoration sites to protect the natural regeneration from grazing animals. So, the project has contributed to the sustainability of mangrove forests by developing and providing the country with methods to facilitate natural mangrove regeneration or restoration.
SO.2: Implementation by Guyana of its NMMAP *No baseline, No target*	47.5% (on average)	This indicator is a performance indicator rather than an impact indicator. The GCCA project was programming and reporting according to the six specific objectives of the NMMAP 2010-2012[21]. The impact of the project with regard to these

[13] Source: page 47 of the Final TA Report (Landell Mills)
[14] Source: page 11 of the Annual Report 2018 of the Mangrove Department, NAREI
[15] As per Logframe in the TA Final Report (Oct 2013)
[16] Source: page 47 of the Final TA Report (Landell Mills)
[17] Source: page 11 of the Annual Report 2018 of the Mangrove Department, NAREI
[18] Study conducted during the GCCA project
[19] Study conducted under Conservation International (CI), financed by GEF funds
[20] *Guyana"s intertidal zone is made up of long, sloping, ever-moving mud banks that originate at the mouth of the Amazon River. Huge deposits of fine silts and clays from the Amazon are carried northwest along the coast in slow moving „slings". As these mud banks, which extend out from the shore as far as three miles, progress along the coast, a pattern develops, where mud builds in one region as the crest of the bank passes, followed by a period of depletion as a corresponding trough follows. The high banks provide ideal conditions for mangrove forest growth, whereas the troughs appear to lead to erosion and depletion. Local experience is that a severe erosion period lasts for about three years at any one place* (Source: Page 14 of the NMMAP 2010-2012).

[21] Specific objectives of the NMMAP:
1. To establish the administrative capacity for the management of mangroves in Guyana
2. To promote sustainable management of mangrove forest.

		six components can be commented and assessed as follows: COMPONENT 1 (ADMINISTRATIVE CAPACITY) – 30% ACHIEVEMENT: ▪ After the project, NAREI assumed the responsibility to give continuity to mangrove restoration activities. NAREI therefore created a dedicated "Mangrove Restoration and Management Department", staffed with 6 persons (4 technical experts[22] and 2 administrative persons). ▪ However, during the field visit, it became clear that NAREI's expertise in GIS is inadequate for assuming its role (monitoring data are not introduced in GIS databases nor analysed). Apart from more advanced expertise in GIS, also better equipment is needed. ▪ The Mangrove Action Committee, the inter-institutional advisory body that was established to provide strategic guidance to the implementation of the project, has not significantly contributed to the creation of an administrative structure for mangrove management. Participation of the members in the MAC meetings was minimal and instead of providing strategic guidance, the MAC only discussed operational issues. [23]. The MAC was dissolved soon after the closure of the GCCA project. ▪ Since the end of the GCCA project, the NMMAP has never been updated again. COMPONENT 2 (SUSTAINABLE MANGROVE MANAGEMENT; WITH FOCUS ON MONITORING AND ENFORCEMENT) – 50% ACHIEVEMENT: ▪ A monitoring system was established as an important factor for sustainable mangrove management. However, the capacity of the team to analyse and interpret the collected data is deficient. As a consequence, a strategic approach is missing, e.g. in respect to the selection of priority sites for mangrove restoration. ▪ Through the 8 mangrove rangers (now paid by NAREI) enforcement in the different regions is guaranteed. In addition, they play an important role with regard to awareness raising (at community level as well as at local schools) and to the monitoring activities in the mangrove restoration sites.

3. To establish and complete a legal framework for mangrove ecosystem management which encourages community-based participation.
4. To support research and development of Guyana"s mangrove forest
5. To develop effective protection and/or rehabilitation of mangrove ecosystems
6. To increase public awareness and education on the benefits of the mangrove forests

[22] Monitoring Officer, Assistant Monitoring Officer, GIS expert and Civil Engineer.
[23] Source: page 10 of the TA Final Report.

		COMPONENT 3 (LEGAL FRAMEWORK AND COMMUNITY-BASED MANGROVE MANAGEMENT) – 25% ACHIEVEMENT: ▪ Inspite of studies conducted and the Forest Act amended, the institutional and legal frameworks for mangrove management remain very unclear in Guyana, with very poor coordination amongst the concerned institutions (unclear mandates, duplications). ▪ In the places (5) where the project established and trained VMACs, communities are actively involved in mangrove management and are aware of the benefits of mangrove conservation. COMPONENT 4 (RESEARCH) – 50% ACHIEVEMENT: ▪ The research activities have resulted in a better insight in the complexity of the mangrove ecosystems, in particular regarding the conditions for successful restoration. Still, more research on the coastal dynamics[24] is needed. ▪ There is no easy access to existing research reports and publications. Altough the project developed a methodology for the creation of a mangrove research database, such a database is still lacking. COMPONENT 5 (PROTECTION AND REHABILITATION OF MANGROVE ECOSYSTEMS) – 50% ACHIEVEMENT: ▪ The results of the rehabilitation efforts under the project varied significantly across the different planting sites, with survival rates ranging from 0-100%. ▪ However, rehabilitation activities currently continue with gradually increasing success rates. COMPONENT 6 (PUBLIC AWARENESS AND EDUCATION) – 80% ACHIEVEMENT: ▪ It is reported that the effects of the project's public awareness raising activities have been remarkable, especially under the younger generations. Nevertheless, this has never been measured, for example through regular KAP studies. ▪ The Mangrove Visitor Centre at the Golden Grove / Belfield Mangrove Reserve receives many visitors, often in the context of school trips. ▪ Mangrove components are now integrated in the BSc Curriculum for Forestry at the University of Guyana, as well as in the secondary school curriculum.

[24] *"Monitoring of coastal mangroves carried out by the Department during 2017, reinforced the dynamic nature of Guyana"s coastline and the need for research to inform understanding about the coastal dynamics, mud shoal movements and its impact of mangrove regeneration. While there are a number of sites along the Essequibo Coast showing evidence of natural regeneration of mangroves as a result of previous restoration interventions (seedling planting, coastal structures) and accreting sediments, the opposite has been recorded along West Coast Demerara and selected sites on the East Coast of Demerara where erosion has resulted in significant loss of natural and restored forest*" (source: Annual Report 2017 of NAREI)

2.5. Achievement of the overall and specific objectives (direct impact, exceeding the scope of the indicators)

OVERALL OBJECTIVE (OO): To help arrest the process of mangrove forest degradation in Guyana *and bring about sustainable mangrove management* recognising the values of mangroves for sea defence, carbon sequestration and biodiversity
Achievement: "2" (between 50% and 75%)

EXPLANATORY NOTE

- **INSTITUTIONALISATION OF MANGROVE MANAGEMENT** (see also Indicator SO.2 in box 2.4):

Before the project, several ministries were in one way or another involved with mangroves, but at that time mangroves did not receive the attention and importance that they deserve and need. So, the fact that NAREI established ranger units in the regions and created in 2014 a dedicated department for Mangrove Restoration and Management, demonstrating and formalising its commitment to continued mangrove management is a significant effect of the project. Besides, the entire staff of the Mangrove Restoration and Management Department (7 persons) as well as the rangers (8) are paid by NAREI.

- **LEVEL OF AWARENESS** (see also Indicator SO.2 in box 2.4):

A second important effect of the project consists in the increased level of awareness achieved through the active (and continued) involvement of local communities in mangrove planting ("the planters", being paid by the project and afterwards by NAREI), the integration of local community members in the ranger units and the establishment of VMACs (volunteers) who organised and undertook awareness raising activities in their respective communities and schools. During the field visit it was observed that many members of the communities now recognise the importance of mangroves for coastal defence, tourism, fish breeding grounds, biodiversity, etc. In particular the younger generations gave evidence of a good level of awareness.

- **MANGROVE RESTORATION** (see also Indicator OO.2 in box 2.4):

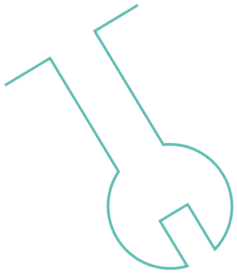
Over a period of 7 years (2011-2018), mangrove coverage increased with 10,729 ha. Though this increase cannot be entirely attributed to the project, the project has been instrumental in the development of appropriate techniques for mangrove restoration, including the understanding of enabling conditions for succesfull natural regeneration. Yet, as mentioned before, continued research is needed to gain further understanding on the particularities of Guyana´s coastal dynamics.

- **INTER-INSTITUTIONAL COORDINATION**:

Inter-institutional coordination and collaboration remains a major weakness in arresting mangrove forest degradation in Guyana. The lack of a strategic and integrated approach hampers effective mangrove management and conservation. These institutional deficiencies are amongst others related to unclear and overlapping mandates of the concerned agancies and poor exchange of data and information.
It should also be mentioned that during the field visit some of the interviewees observed that the Office of Climate Change (OCC; established in 2009) is not very visible inspite of its high number of staff members (15) all paid by national funds. *Their mandate is huge, but they are lacking technical expertise*[25].

SPECIFIC OBJECTIVE (SO): To support Guyana´s policies on sea defence, climate change and mangrove management.
Achievement: "1" (> 75%)

EXPLANATORY NOTE



The main goal of the GCCA project was to support the implementation of the **National Mangrove Management Action Plan** 2010-2012 (NMMAP), whose overall objective was "*to respond to climate change and to mitigate its effects through the protection, rehabilitation and wise use of Guyana´s mangrove ecosystems through processes that maintain their protective function, values and biodiversity while meeting the socio-economic development and environmental protection needs in estuarine and coastal areas".* To date, the NMMAP, which has never been reviewed since the end of the project (2013), is still guiding the operations of NAREI´s Mangrove Restoration and Management Department. The NMMAP needs urgently to be updated.

Guyana's **Sea and River Defence Policy** (updated in 2015) and **Sea and River Defence Sector Strategy** 2016-2020 clearly call for alternative solutions to the traditional sea defence infrastructures and include the re-establishment of mangroves for flood protection and safeguarding environmental resources, thereby fully recognising the value of mangroves. In this sense, one can say that the project significantly contributed to the implementation of Guyana's sea defence policy and strategy.

Also Guyana's **Climate Resilience Strategy and Action Plan** (CRSAP) [26] (Nov 2015) calls for "*Sea Defence Enhancement and Maintenance, through coordinated and complementary actions for mangrove development and restoration and for rebuilding the most critical sea and river defences in low-lying coastal areas",* hence recognising that mangroves function as important natural breakwaters along the coast and represent one of the most important natural sea defences available for Guyana. In that regard, the GCCA project also supported Guyana's climate change policy.

2.6. Signs of indirect impact

- **INCOME GENERATION**: The mangrove forest in the East Coast Region (Victoria) became a key tourist destination, being an important area for biodiversity and providing the habitat for amongst others the iconic scarlet ibis (*Eudocimus ruber*). Through the mangrove heritage trail tours[27] and the wildlife spotting and birdwatching activities organised by Mahaica River Adventures[28], the community tour guides have been earning an important income[29]. Besides, additional incomes have been generated through the promotion of other livelihood activities by the project, such as honey production. These income-generating initiatives were not included in the original project design.

- **EMPOWERMENT OF WOMEN**[30]: Women made up more that 80% of the community members that participated in project activities and they were trained to be leaders in their communities and to disseminate information on the importance of mangroves and the need to protect and restore them. Over 50 women were trained in the production of mangrove seedlings in community nurseries, which

[25] Linda Bhola and Owen Bovell, University of Guyana
[26] Draft for consultation
[27] https://www.facebook.com/pages/category/Travel-Company/Mangrove-heritage-trail-tour-536009856557740/
[28] https://www.mahaicatours.net/
[29] Source: ROM 2012
[30] https://panorama.solutions/sites/default/files/gmrp_empowering_women_to_take_action_2_0.pdf

were sold and generated earnings of a total of USD 115,000. Following project-provided training in beekeeping and tourism, the women formed the Mangrove Reserve Producers Cooperative Society[31].

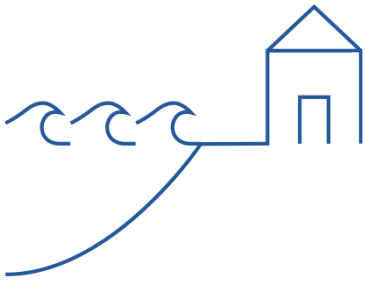
- **REDUCED GOVERNMENT EXPENDITURE:** Mangrove restoration has in some areas reduced the need for establishing hard structures, and hence the cost for the Government to ensure protection of the shore zone[32].

- **REDUCED LITTERING:** The placement of signs at Cove and John resulted in a 75% reduction in garbage dumping at this site[33].

2.7. Conclusions on direct and indirect impact generated by the project and discussion on factors for success and failure

CONCLUSIONS ON GENERATED IMPACT:

The coastal zone of Guyana, where approx. 90% of the nation´s population is living, lies between 0.5 to 1.0 m below high spring tide level of the Atlantic Ocean, making it particularly vulnerable to flooding and erosion. Increases in sea level and wave energy, has made it for Guyana important to place significant emphasis on shoreline protection, which includes traditional hard structures but also the re-establishment of mangroves for effective flood defence and to protect environmental resources ("Green-grey infrastructure" or "Building with nature" for sea and coastal defence).



The main impact of the GCCA project is that it has put mangrove literally and figuratively "on the map". This conclusion is based on the following observations:

- Before GCCA, mangrove was considered to be an issue of the Guyana Forestry Commission only, without receiving much attention since it covered only a very small area in comparison with the rest of the country´s forests. To date, mangrove is rather seen as a "cross-cutting" issue involving a variety of related ministries and agencies, leaded by NAREI.
- The creation and institutionalisation within NAREI of a dedicated department (Mangrove Restoration and Management Department), with the objective *to respond to climate change and mitigate its effects through the protection, restoration, conservation and management of Guyana's coastal mangrove ecosystem,* reflecting the high commitment of NAREI to give follow-up to the NMMAP.
- The increased awareness achieved at local community level about the importance of mangrove as protector of Guyana´s coastline in the first place and for improved biodiversity and income generation activities (tourist attraction, honey production, fisheries) in the second place.

With regard to the increase of the mangrove forest area along the coastline, as has been observed during the period between 2011 and 2018, it should be admitted that this increase is mainly due to natural regeneration processes influenced by the particular dynamics at Guyana´s coast (mud bank movements) and cannot be attributed to the project. However, the project supported research leading to a better understanding of these dynamics and developed technologies that facilitate this natural regeneration.

In order to achieve in the future a greater impact in relation to arresting mangrove forest degradation (OO: *to help to arrest the process of mangrove forest degradation in Guyana and bring about sustainable mangrove management recognising the values of mangroves for sea defence, carbon sequestration and biodiversity*), priority should be given to the following:

- A longer-term strategy for mangrove conservation should guide action and measures taken. Concretely, the NMMAP (2010-2012) should be updated and include a National Integrated Mangrove Strategy. The strategy

[31] NAREI Annual Report 2017
[32] Source: ROM 2012
[33] Observation noted by ranger and tour guide

development should be led by NAREI in close coordination with other related ministries/agencies. The strategy should clearly indicate the responsibilities of each of the related government agencies. In addition, a "Mangrove Board" should be established with a clear mandate and responsibilities.
- More research and long-term data collection on the mud bank movements, in order to obtain a better understanding of the coastal dynamics and to be able to select the most appropriate sites for mangrove restoration interventions. Technical knowledge and proper site selection are crucial for success.
- Improvement of accessibility to information/studies/documents related to mangrove.
- Improvement of capacities within NAREI to analyse and interpret the monitoring data and information that are collected in the field.
- Continuation of mangrove monitoring and local awareness activities.

FACTORS FOR SUCCESSFUL ACHIEVEMENT:

- Active involvement of the local community (local mangrove nurseries, planting of seedlings, local ranger network, VMACs) has been essential for increased awareness about the importance of mangroves.
- High level of commitment of NAREI.

FACTORS FOR FAILURE OF ACHIEVEMENT:

- Lack of clarity regarding the role of MAC and lack of interinstitutional coordination.
- Coastal zone management is complicated by outdated, and at times overlapping, legislation.
- Lack of financial resources of the GoG.
- Loss of staff and difficulty to retain the built capacity.

III. Analysis of sustainability levels

3.1. List of services, systems and products that were established/delivered under the project and that should have been maintained (based on the outputs delivered):

COMPONENT 1:

- Mangrove Action Committee and MAC Secretariat (or alternative structure) within NAREI operational and dedicated to mangrove protection and rehabilitation.
- National Mangrove Management Action Plan (NMMAP) updated and under implementation.

COMPONENT 2:

- Continued mangrove monitoring, including data registration and reporting
- Mangrove ranger networkt for monitoring and protecting coastal mangroves still operational
- Management plan for the Golden Grove / Belfield Mangrove Reserve (based on previous studies such as social asessments and biodiversity assessments) under implementation

COMPONENT 3:

- Follow-up on recommendations of assessment study on institutional arrangements related to mangrove management
- 5 Village Mangrove Action Committees still existing and operational; maybe number of VMAC increased
- Infrastructure built with project support still in good state and in use
- One Mangrove Reserve Producer group (MRP) with representation from 8 communities still existing; with improved livelihoods; maybe the number of active MRP groups has increased

COMPONENT 4:

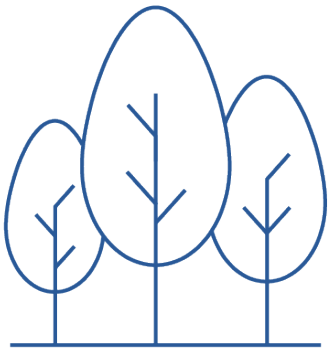
- The UoG, Faculty of Agriculture and Forestry is still active in the area of mangrove research and maintains the mangrove research database
- Findings of the assessments and studies[34] undertaken under the project disseminated and incorporated in mangrove management plans/actions

COMPONENT 5:

- Mangrove restoration activities (tree planting and supporting coastal engineering works) are continued; improved rates of survival / success
- Coastal communities still active in mangrove seedling production and tree planting

COMPONENT 6:

- Mangrove ecology is still part of the secondary school curriculum
- Educational tours to mangroves continue to be organised
- The Mangrove Visitor Centre at the Golden Grove / Belfield Mangrove Reserve still open and in good condition; upward or downward trend in the number of visitors
- Mangrove information website still existing and updated (http://www.mangrovesgy.org/home/)



3.2. Information and comments on sustainability aspects from the available reports (desk phase):

FROM THE TA FINAL REPORT (OCTOBER, 2013):

> The short duration of the TA contract didn't allow for the testing of the mangrove monitoring system put in place nor for producing the first monitoring products that would have formed the basis for mangrove management and action; the TA expressed his doubts about the skills of local staff to ensure continuation of the mangrove monitoring and planning activities.

[34] Amongst other:
- The Guyana Mangrove Restoration Project: A situational Analysis of Coastal Mangrove Sites in Guyana (Owen Bovell, May 2010)
- Report on the mapping and inventory of coastal zone forests in Guyana (Persaud, 2011).
- Golden Grove – Belfield Mangrove Forest Biodiversity Assessment (Indranee Roopsind, 2012)
- Golden Grove – Belfield Mangrove Reserve: Five Year Management Plan 2013 – 2018
- Controls on coastal mangrove regeneration in Guyana (Edward J. Anthony & Antoine Gardel, March 2013)
- Research projects (16) of students of the University of Guyana
- A review of Mangrove Research in Guyana: Gaps and Strategies (Owen Bovell, May 2013)
- Papers presented during the First National Mangrove Forum (2013)

FROM NAREI'S WEBSITE:

> One can understand that - upon completion of the GMRP - a Mangrove Restoration and Management Department has been established as a new department within NAREI. The Department focuses on mangrove restoration (planting, monitoring and installation of physical structures); on community-based mangrove management; on public awareness and education; on the Geographical Information System (GIS) database; and on the use of mangroves for alternative livelihoods. The Department offers the following services: monitoring of mangrove forests; education on the importance of mangroves; and the facilitation of mangrove heritage trail tours.

FROM THE TECHNICAL GCCA FICHE:

> The choice of Sector Budget Support as aid modality has facilitated the establishment of a new institutional arrangement and a new national budget line, allowing continuity to this part (mangrove protection and rehabilitation) of the national response to CC.

3.3. Summary findings from the desk phase and specific issues to be further explored during the field phase:

The available reports have no dedicated sections on sustainability.

From the TA final report: for each project component, the report includes an analysis of issues encountered during implementation and corresponding recommendations for next steps. A good number of these recommendations are made to enhance sustainability levels (and also impact). The report should in that sense be used to guide data collection and analysis during the field visit.

3.4. Results of the sustainability analysis (as per table in Annex)

17 items were checked for their sustainability. Information could be collected for 16 of these.

The scores of these 16 items are as follows:

- 8 items (50%) scored 2, meaning that they were fully sustained in a "status quo" situation
- 6 items (38%) scored 3, meaning that they still exist but with quality and/or coverage issues
- 2 items (12%) scored 4, meaning that they disappeared or lost their functionality

Evidence was found through direct observation for 4 item (25%); through reporting by reliable sources for 11 items (69%); and through information gained from uncertain sources for 1 item (6%).

3.5. Conclusions on the sustainability aspects and discussion on factors for success and failure

CONCLUSIONS ON SUSTAINABILITY:

Sustainability is valued as "good". More than five years after completion of the GCCA project, 14 (87%) of the 16 systems/services, of which information could be obtained, are still existing. The exceptions relate to (1) the management plan for the Golden Grove / Belfield Mangrove Reserve that has never been put into implementation; and (2) the recommendations of the institutional assessment study that were never given the required follow-up.

It should be noted that none of the sustained systems/services scored "1" (improved) and only 50% of the assessed systems/services were fully maintained; the others had lost coverage, functionality or quality. Under the latter category are found:

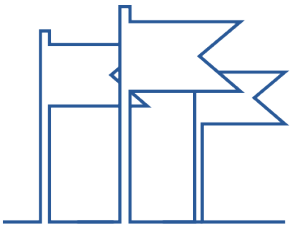
- The Mangrove Action Committee (MAC) that was dissolved and not replaced yet by an equivalent alternative
- The NMMAP (2010-2012) that was never updated
- Reduction in number and size of the VMACs
- The UoG who never made use of the methodology for setting up a mangrove research database that was developed with project support; the UoG is still without such a database
- Insufficient dissemination of research documents and incorporation of research findings in management plans / strategies / policies
- The mangrove information website that does not exist anymore and was replaced by a less informative facebook page.

FACTORS THAT ENHANCED SUSTAINABILITY:

- Interest and commitment of NAREI to give follow-up and to sustain mangrove restoration activities
- Active involvement of stakeholders, e.g. of (1) local communities (local nurseries, seedling planting, VMAC, rangers), creating ownership and awareness and (2) academici, actively supporting continued research and education related to mangroves
- The financial viability of the promoted livelihood projects - that are generating stable and considerable incomes - and the continued support and follow up by NAREI. Specifically, for the eco-tourism projects, their suitable location relatively close to Georgetown and hence easy to visit for (international) tourists, proved to be an important driver for success.
- Well-conducted and successful awareness raising campaigns, motivating people/students to undertake action and to sustain project activities

FACTORS THAT UNDERMINED SUSTAINABILITY:

- Lack of solid and sound institutional structures and arrangements
- Lack of technical skills and capacities (data analysis, knowledge management)
- Lack of political will or initiative (in this case to adopt an integrated approach to mangrove conservation, embedded in a broader coastal zone management strategy)
- Lack of funds
- Reluctance to share data/information



IV. Additional elements

4.1. M&E Practice

M&E ACTIVITIES THAT HAVE TAKEN PLACE (INTERNAL AND EXTERNAL):

- **Internal[35]:**

  Mainly through reporting: annual project reports during the GCCA, annual reports by NAREI since the closure of the GCCA project, final TA report by Landell Mills (2013)

- **External:**
  - 2 ROM missions (2011 and 2012)
  - An external assessment of the 2nd year achievements to support the decision on the release of the variable tranches (budget support procedure); the assessment was done by COWI (E. Topper), 2012

% OF BUDGET ALLOCATED TO M&E THAT HAS BEEN USED:

- Budget for evaluation: 60,000 EUR
- No information could be obtained on what % of this budget was actually spent for M&E.

ADDITIONAL M&E REPORTS THAT HAVE BEEN COLLECTED:

- 2 ROM mission reports (2011 and 2012)
- NAREI Annual Reports (2013, 2014, 2015, 2016, 2017 and 2018)

4.2. Contributions to GCCA+ knowledge management and communication

PROJECT-SUPPORTED RESEARCH AND RESEARCH FINDINGS:

- 1st Guyana Mangrove Forum. Restoring and Managing Mangrove Ecosystems in a Changing World: Book of Abstracts (April 2013) (http://www.mangroverestoration.com/pdfs/AbstractBookletFinal_Withcover.pdf)
- Mangrove Management in Guyana: A Case of Climate Compatible Development? Dissertation submitted in partial fulfilment of the requirements for a Master of Science Degree in Climate Change and Development from the University of Sussex (Mahendra Saywak, 2013) (https://www.ccrif.org/sites/default/files/publications/Mahendra_Saywack_Dissertation_Mangrove_Management_in_Guyana.pdf)

COMMUNICATION MATERIALS:

- **Quotes, testimonies**
  - *"Through the GCCA project mangrove became a programme and from then it became ours"* (Kene Moseley, NAREI)
  - *"We had not a full understanding of the dynamics of Guyana´s coastline. It is key to have the community people involved who have been living there their whole live. Sometimes these guys are sharper than I am"* (Owen Bovell, Lecturer of the University of Guyana)

[35] Page 18 of the Final Report and Exit Strategy (October 2010 - December 2013), prepared by the PMU.

- *"Mangrove should be considered as a kind of cross-cutting issue in Guyana, it has to do with environmental, social as well as economic aspects"* (Ria Bisnauth, Guyana Forestry Commission)

- **Videos**
  - https://www.youtube.com/watch?v=fFJXTYckZEg
  - https://www.youtube.com/watch?v=-W_zKo6HmB0
  - https://www.youtube.com/watch?v=wLy4t1cRwW0
  - https://www.youtube.com/watch?v=m0nTr994t5k
  - https://www.youtube.com/watch?v=wWxrJVAYnrI

4.3. Opportunities for scaling up (future GCCA support activity)

- Application of lessons learned and best practices developed in relation to mangrove restoration. (site selection, techniques to assist natural regeneration)
- Replication of the successful mangrove-based livelihood enhancing projects (beekeeping, eco-tourism).

4.4. Climate Finance – evidence of funding mobilised from public and/or private local sources

MOBILISATION OF PUBLIC RESOURCES:

- Operational costs, including staff (6 persons), of NAREI's Mangrove Restoration and Management Department
- Salaries for rangers (8 persons) and community planters of mangrove seedlings by NAREI

V. Sources of Information

DOCUMENTS COLLECTED AND CONSULTED FOR THE DESK PHASE ANALYSIS:

- **Programming documents**
  - Action Fiche, with annexes including the logframe, 2009
  - Financing Agreement, with annexes including TAPS and logframe, 2010
  - EC Closure note and related communications, 2014

- **Progress reports**
  - GMRP progress report, feb-aug 2010, NAREI, 2010
  - GMRP progress report on Performance Criterion 1, sept 2010 – aug 2011, NAREI, 2011
  - GRMP annual progress report for 2011, NAREI, 2012
  - GMRP progress report on Performance Criteria 1 and 2, sept 2011 – aug 2012, NAREI, 2012
  - Final TA report, Landell Mills, October 2013

- **Monitoring and Evaluation reports**
  - Conclusions and recommendations for payment of first fixed tranche, EUD, 2010
  - Progress made on NMMAP implementation, NAO, 2012
  - Progress made on Guyana's Sea and River Defence Sector Policy, 2011-2012, NAO, 2012
  - External assessment of 2nd year achievements, COWI (E. Topper), 2012

- Conclusions and recommendations for release of 1st variable tranche 2011, EUD, 2012.
- Conclusions and recommendations for release of 2nd variable tranche 2012, EUD, 2013.
- Review of EU experience, best practices and lessons learned in the field of environment and climate change through the aid modality of budget support, chapter Guyana, Neil Bird and Fabrice Ferrandes, November 2014

- **Technical documents**
  - Dissertation on mangrove management in Guyana by Mahendra Saywack, Master programme on CC and Development, University of Sussex, UK, 2013

- **Country policies**
  - The Low Carbon Development Strategy, 2010 (+ update from 2013)
  - The National Mangrove Management Action Plan (2010-2012), + annexes and budget

ADDITIONAL DOCUMENTS COLLECTED AND CONSULTED DURING THE FIELD PHASE:

- **Progress/Evaluation reports**
  - ROM Reports 2011 and 2012
  - NAREI Annual Reports (2009, 2013, 2014, 2015, 2016, 2017, 2018) (https://narei.org.gy/document-centre/)

- **Policy and legislative documents/Management plans**
  - Climate Resilience Strategy and Action Plan for Guyana: draft for consultation, Ministry of the Presidency (November 2015) (https://www.lcds.gov.gy/index.php/documents/reports/national/self-assessment-and-action-plan/262-climate-resilience-strategy-and-action-plan-for-guyana/file)
  - Sea Defence Act (1992) (http://parliament.gov.gy/documents/acts/5915-30_of_1992_sea_defence_laws_(amendment)_act_1992.pdf
  - Sea and Defence Policy (Dec 2015)
  - Terms of Reference Coastal Marine Management Committee (CMMC), EPA

- **Technical documents**
  - Mangrove monitoring protocols for Guyana (P. Da Silva and M. Kalamdeen, March 2011)
  - Guyana Mangrove Information System: Application Manual
  - Guyana mangrove nursery manual (Owen Bovell, March 2011) (http://www.gcca.eu/sites/default/files/catherine.paul/guyana_mangrove_nursery_manual_2011.pdf)
  - The Code of Practice for Mangrove Harvesting (Owen Bovell, March 2011) http://www.gcca.eu/sites/default/files/catherine.paul/code_of_practice_for_mangrove_harvesting_2011.pdf
  - Controls on coastal mangrove regeneration in Guyana (Edward J. Anthony & Antoine Gardel, March 2013)
  - 1st Guyana Mangrove Forum. Restoring and Managing Mangrove Ecosystems in a Changing World: Book of Abstracts (April 2013) (http://www.mangroverestoration.com/pdfs/AbstractBookletFinal_Withcover.pdf)
  - North Brazil Shelf Mangrove Project: Regional biophysical review (draft) (Conservation International, 2019) (https://nbslmegef.files.wordpress.com/2019/11/nbs_regional-biophysical-review.pdf)

- **Others**
  - EU Action Fiche for Integrated Coastal Zone Management (2016)
  - National Adaptation Plan Guyana Japan-Caribbean Climate Change Partnership (J-CCCP), Inception Report

- **Videos**
  - https://www.youtube.com/watch?v=fFJXTYckZEg

- https://www.youtube.com/watch?v=-W_zKo6HmB0
- https://www.youtube.com/watch?v=wLy4t1cRwW0
- https://www.youtube.com/watch?v=m0nTr994t5k
- https://www.youtube.com/watch?v=wWxrJVAYnrI

RELEVANT WEBSITES:

- http://www.lcds.gov.gy/
- http://www.mangrovesgy.org/home/
- http://narei.org.gy/departments/mangroves/
- http://www.gcca.eu/programmes/sustainable-coastal-zone-protection-through-mangrove-management-guyana
- https://www.facebook.com/Guyana-Mangrove-Restoration-Project-251163728610/
- https://climatechange.gov.gy/
- https://mopi.gov.gy/posts/sea-and-river-defence-board-2018-2020
- https://panorama.solutions/sites/default/files/gmrp_empowering_women_to_take_action_2_0.pdf

CONTACTS OF STAKEHOLDERS COLLECTED DURING THE DESK PHASE:

- **EUD:**
  - Susana Fernández: focal point CC, closed the GMRP project (currently in Jerusalem)
  - Albert Losseau: took over from Susana Fernandez (currently in Gabon)
  - Layla El Khadraoui (layla.el-khadraoui@eeas.europa.eu) and Rajesh Majeed (rajesh.majeed@eeas.europa.eu): indicated as present contacts
  - Federico Suárez (federico.suarez@eeas.europa.eu), responsible for environmental projects since the end of 2018

- **Implementing partners and institutional beneficiaries:**
  - NAREI, Agriculture Road, Mon Repos, East Coast Demerara, Guyana. info@narei.org.gy; tel: +592 220 2843
  - Dr. Oudho Homenauth (oudhohomenauth@gmail.com), Chief Executive Officer of NAREI.
  - Mangrove Action Committee (MAC): Annette Arjoon-Martins (Chair), Annette.Arjoon@aslgy.com
  - Kene Moseley, coordinator of the GMRP and government official focal person, macsecretariat@gmail.com, kmoseley@narei.gov.gy
  - Other members of the GMPR team[36]: Renata Robertson (Engineer); Kimberly Craig (Monitoring Officer) and Tana Yussuf (Community Development Officer). All the same e-mail address: macsecretariat@gmail.com
  - Guyana Forestry Commission (GFC): Pradeepa Bholonath (project.coordinator@forestry.gov.gy), Head of Division for Planning and Development
  - University of Guyana (UG): Owen Bovell, Dean of Facility of Agriculture & Forestry
  - Works Services Group (WSG) of the Ministry of Public Infrastructure: Geoffrey Vaughn (jam22no@yahoo.com), Coordinator of the WSG

PERSONS CONTACTED DURING THE FIELD PHASE:

- Federico Suarez, Programme Manager Cooperation, EUD, Federico.SUAREZ@eeas.europa.eu
- Anna Corrreia de Sa, Programme Officer Cooperation, EUD, Anna.singh-correia-dias-de-sa@eeas.europa.eu
- Layla El Khadraoui, Programme Officer, EUD, layla.el-khadraoui@eeas.europa.eu

[36] 2020: the team does not exist anymore. The positions are now under NAREI's Mangrove Department.

- Dr. Oudho Homenauth, Chief Executive Officer, NAREI, info@narei.org.gy, tel. 220 5581
- Kene Moseley, coordinator of the GMRP and government official focal person, macsecretariat@gmail.com, kmoseley@narei.gov.gy
- Luandra Jack, Engineer, NAREI, luandra0958@gmail.com
- Zola Marine, GIS Officer, NAREI, zdanaraine@yahoo.com
- Rudolph Adams, Monitoring Officer, NAREI, addiie_mocha@yahoo.com
- Luan Gooding, Assistant Monitoring Officer, NAREI, akeemrodrigues347@gmail.com
- Jermaine Braithwaite, Senior Engineer, Project Manager, Ministry of Public Infrastructure, jbraithwaite@mopi.gov.gy
- Annette Arjoon-Martins, President of the Guyana Marine Conservation Society, Former Chair of MAC, Annette.arjoon@asigy.com
- Gavin Agard, Commissioner of Forests, GFC, gagard@forestry.gov.gy
- Ewart Moore, Assistant Commissioner of Forest – Forest Inventory Unit, GFC, ewartsgmoore@gmail.com
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Annex to the report: Sustainability Analysis

NR	DESCRIPTION OF SYSTEMS/SERVICES/PRODUCTS TO BE SUSTAINED	SCORE	EVIDENCE	EXPLANATORY NOTES
COMPONENT 1. ADMINISTRATIVE CAPACITY FOR THE MANAGEMENT OF MANGROVES IS ESTABLISHED				
1	Mangrove Action Committee (MAC) and MAC Secretariat[37] (or alternative structure) within NAREI operational and dedicated to mangrove protection and rehabilitation	3	R	The MAC, established through the GCCA project as an inter-institutional advisory body to provide strategic guidance to the implementation of the project was dissolved soon after closure of the project. However, it should be mentioned that EPA recently launched Terms of Reference for an **Integrated Coastal Marine Management Committee (CMMC)**[38] with NAREI's Mangrove Restoration and Management Department represented in this Committee as Core Member. The CMMC's strategic objective is "*to enhance technical and analytical capacity for the conservation and protection of Guyana's ecological, coastal and marine systems by 2022*". To a certain extent, this Committee – when operational - will take over the role of the former MAC but with a much broader scope. The MAC Secretariat got institutionalised after the end of the project as a full-fledged department – the **Mangrove Restoration and Management Department**[39] - within NAREI, Ministry of Agriculture. The Department has a total staff of 6 persons (4 technical experts[40] and 2 persons in charge of the administration). Oversight is provided by the NAREI Board. A major issue remains by the fact that NAREI – as an agricultural research and education insitute – does not have the capacity nor institutional authority to put in place and guarantee an integrated approach to mangrove conservation, embedded in an overall coastal zone management strategy that will be required for an adequate coastal defence.

[37] The MAC Secretariat was established in 2010 within NAREI and equipped with IT equipment, monitoring equipment, furniture and two vehicles. As of May 2013, the MAC Secretariat had a staff of seven people including a Project coordinator, Administration and finance officer, Administrative assistant, two Monitoring officers, a Community development officer, Coastal engineer and a Driver.

[38] With 9 Core Committee members: EPA (Environmental Protection Agency), CDC (Civil Defense Commission), Ministry of Presidency - Department of Environment, MoA (Ministry of Agriculture), NAREI, NDIA (National Drainage and Irrigation Authority), Fisheries Department, MoPI (Ministry of Public Infrastructure), MARAD (Maritime Administration Department), GDF (Guyana Defense Force), OCC (Office of Climate Change), PAC (Protected Areas Commission), and GLSC (Guyana Lands and Surveys Commission)

[39] The overall objective of the Mangrove Restoration and Management Department is to respond to climate change and mitigate its effects through the protection, restoration, conservation and management of Guyana's coastal mangrove ecosystem. This will be accomplished through the implementation of strategies that maintain their protective function, values and biodiversity while meeting the socio-economic development and environmental protection needs of coastal areas.

[40] Monitoring Officer, Assistant Monitoring Officer, GIS expert and Civil Engineer.

NR	DESCRIPTION OF SYSTEMS/SERVICES/PRODUCTS TO BE SUSTAINED	SCORE	EVIDENCE	EXPLANATORY NOTES
				Reasons for success: ▪ High level of commitment of NAREI Reasons for failure: ▪ Lack of inter-institutional coordination and collaboration ▪ Lack of clarity regarding institutional mandates and overlapping roles related to mangrove conservation ▪ Deficient data analysis and information exchange ▪ Lack of an integrated approach (mangrove conservation should be embedded in an overall coastal management strategy) – lack of political will or initiative to ensure such an integrated, holistic approach.
2	National Mangrove Management Action Plan (NMMAP) updated and under implementation	3	R	The NMMAP (2010-2012) is currently being updated (final document expected to be completed in 2020) with new data on mangrove coverage and the findings of an ongoing valuation study of mangrove ecosystem services[41]. Planning and reporting by the Mangrove Restoration and Management Department of NAREI is done according to the six specific objectives of the NMMAP 2010-2012. Reasons for failure: Main reasons for the long delay in updating the NMMAP are: ▪ Lack of expertise at GoG level and need for additional technical assistance ▪ Lack of funds

[41] Kene Moseley, NAREI

Nr	Description of Systems/Services/Products to be sustained	Score	Evidence	Explanatory notes
Component 2. Sustainable management of mangrove forest is promoted				
3	Continued mangrove monitoring, including data registration and reporting	2	D	NAREI's Mangrove Restoration and Management Department has a Monitoring Officer, who is in charge of data collection and monitoring of the mangrove planting sites, supported at local level by the 8 rangers in their respective regions. The data collection methodology is based on the *Guyana Mangrove Monitoring Protocols and Plan*[42] that was developed under the GCCA project. Reporting is done through the NAREI Annual Reports (NB: the most recent report is from 2018). However, it should be mentioned that the database system (Excel sheets) is not linked to the GIS platform of the Department and analysis of the collected data is hardly undertaken. (major weakness in the Department's performance). Further, the GIS licence that was procured by the project is expired and, although still in use, updating is no longer possible. The GIS services are not accessible online, and are not linked to Guyana's REDD+ MRV[43] system which is developed and updated by the Guyana Forest Commission or the GIS of the Work Service Group of the Ministry of Public Infrastructure. Additional technical training of the Department´s GIS expert and better equipment are urgently needed. Reasons for success: Commitment and interest of NAREI to give continuity and follow-up to data collection and monitoring activities.
4	Mangrove ranger network for monitoring and protecting coastal mangroves still operational	2	R	The mangrove ranger network was established with the project and is still active (payment of rangers assumed by NAREI).
5	Management plan for the Golden Grove / Belfield Mangrove Reserve (based on previous studies such as social assessments and biodiversity assessment) under implementation	4	R	The management plan for the Golden Grove / Belfield Mangrove Reserve, developed under the project, has never been used and implemented.

[42] https://es.slideshare.net/IanKissoon1/mangrove-restoration-monitoring-plan-final
[43] MRV = Measuring, Reporting and Verification

NR	DESCRIPTION OF SYSTEMS/SERVICES/PRODUCTS TO BE SUSTAINED	SCORE	EVIDENCE	EXPLANATORY NOTES
COMPONENT 3. A LEGAL FRAMEWORK FOR MANGROVE ECOSYSTEM MANAGEMENT IS DEVELOPED AND ESTABLISHED AND COMMUNITY-BASED MANGROVE MANAGEMENT IS ENCOURAGED				
6	Follow-up on recommendations of the assessment study on institutional arrangements related to mangrove management	4	R	No concrete action has been taken and the observation made in the Final TA Report[44] is still in force: "*There is a lack of clarity and division of responsibilities between agencies of the Government of Guyana involved in mangrove management*".
7	5 Village Mangrove Action Committees (VMAC) still existing and operational	3	D (2 VMAC) R (1 VMAC)	Out of the five VMACs established at the end of the GCCA project, to date only three still exist and are active. The VMACs that are still active are the ones from resp. Region 3, Region 4 and Region 6. Yet, even for these three remaining VMACs the number of active members decreased over time. The rangers, being villagers from the same region, form part of the VMACs with the difference that they are paid by NAREI for their services related to regular data collection / mangrove monitoring, while the rest are volunteers.
8	Infrastructure built with project support still in good state and in use	5		No information could be collected on all infrastructure works, which include community infrastructure (the Mangrove Awareness Centre at Village #7, a community playground, a bleacher, a bus shelter).
9	One Mangrove Reserve Producer group (MRP) with representation from 8 communities still existing; with improved livelihoods	2	D	The Mangrove Reserve Producers Co-op (MRPC)[45] is still active and has 19 members, who also belong to the VMAC of Region No.4 (East Coast Demarara), which is the biggest of the three remaining VMACs. The MRPC is taking successfully advantage of the livelihood projects that have been promoted by the GCCA project (beekeeping, ecotourism, educational tours[46]) through which additional income is being generated. Reason for success: ▪ The projects are generating a stable and considerable income ▪ Suitable location at a relative short distance from Georgetown which makes it easy for (international) tourists to visit the area ▪ Continuous support from NAREI

[44] Landell Mills, 2013
[45] https://www.kaieteurnewsonline.com/2013/05/01/mangrove-co-op-society-completes-essential-project/
[46] https://www.facebook.com/pages/category/Travel-Company/Mangrove-heritage-trail-tour-536009856557740/ https://www.mahaicatours.net/

NR	DESCRIPTION OF SYSTEMS/SERVICES/PRODUCTS TO BE SUSTAINED	SCORE	EVIDENCE	EXPLANATORY NOTES
COMPONENT 4. RESEARCH AND DEVELOPMENT OF GUYANA'S MANGROVE FOREST IS SUPPORTED				
10	The UoG, Faculty of Agriculture and Forestry is still active in the area of mangrove research and maintains the mangrove research database	3	R	The Faculty of Agriculture and Forestry is still encouraging students to do research on mangrove. However, a well-developed and accessible research database is lacking. Reasons for success: ▪ Active engagement in the GCCA project of the (former) Dean of the Faculty (currently being lecturer at the UoG) and of the Head of the Department of Geography, Faculty of Earth and Environmental Sciences. ▪ Students got more interested in and aware about the importance of mangrove forests (awareness raising). Reasons for failure: ▪ General weakness of the universities and agencies to upload research documents on their respective websites
11	Findings of the assessments and studies[47] undertaken under the project, disseminated and incorporated in mangrove management plans/actions	3	R	Findings are incorporated to some extent in day-to-day mangrove management actions lead by NAREI. However, till now such findings have not been incorporated in the National Mangrove Management Action Plan (2010-2012), a key guiding document in practical mangrove management. Reasons for failure: ▪ Low capacity of analysis and interpretation of data and research results ▪ People and government agencies are not very willing to share their information/data[48]

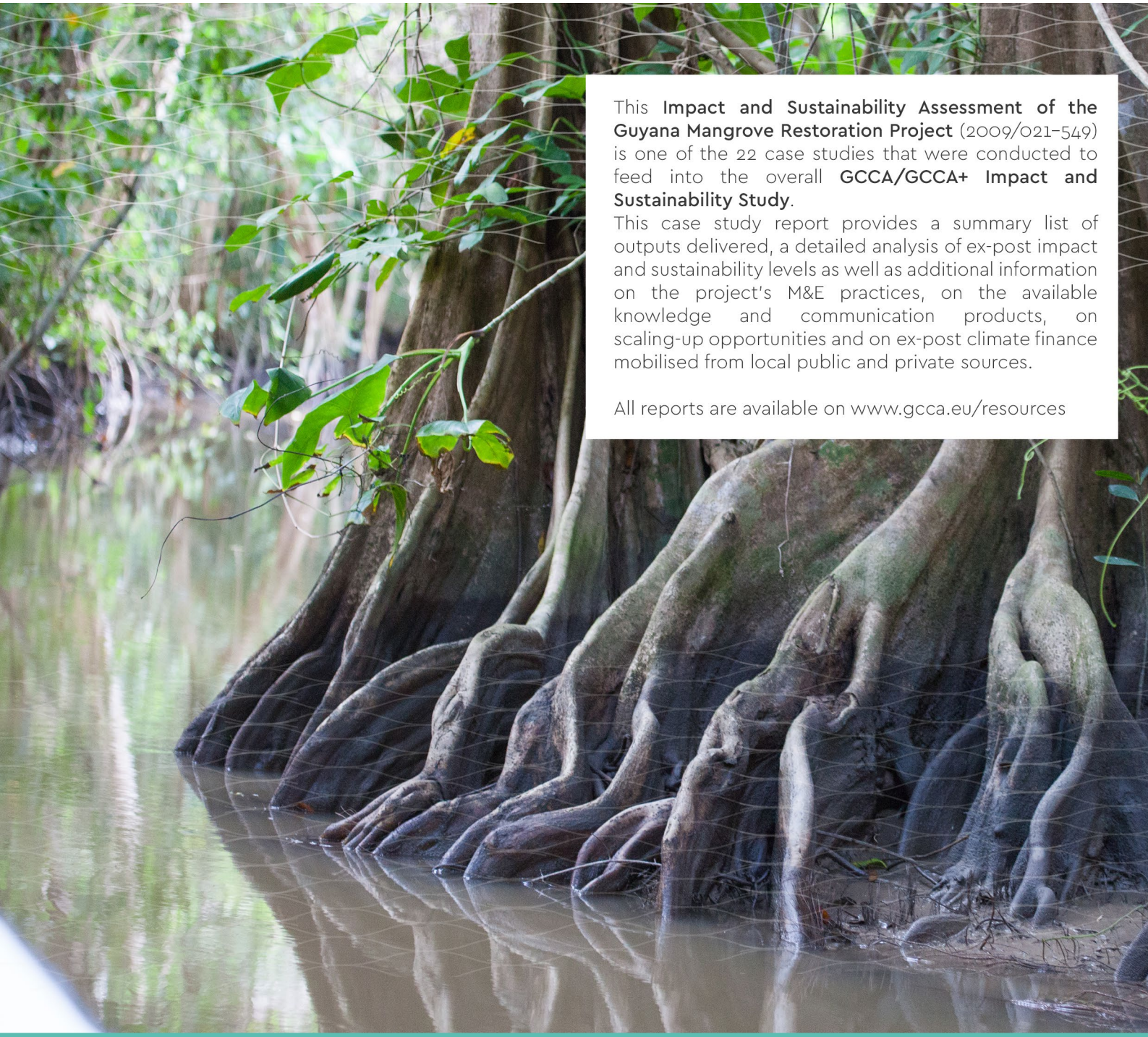
[47] Amongst other:
- The Guyana Mangrove Restoration Project: A situational Analysis of Coastal Mangrove Sites in Guyana (Owen Bovell, May 2010)
- Report on the mapping and inventory of coastal zone forests in Guyana (Persaud, 2011).
- Golden Grove – Belfield Mangrove Forest Biodiversity Assessment (Indranee Roopsind, 2012)
- Golden Grove – Belfield Mangrove Reserve: Five Year Management Plan 2013 – 2018
- Controls on coastal mangrove regeneration in Guyana (Edward J. Anthony & Antoine Gardel, March 2013)
- Research projects (16) of students of the University of Guyana
- A review of Mangrove Research in Guyana: Gaps and Strategies (Owen Bovell, May 2013)
- Papers presented during the First National Mangrove Forum (2013)

[48] *"Just to get information out of all these agencies it was like to pull their teeth"* (Annette Arjoon, Former Chair of the MAC)

Nr	Description of Systems/Services/Products to be sustained	Score	Evidence	Explanatory notes
Component 5. Improved and effective protection and rehabilitation of mangrove ecosystems is instituted				
12	Mangrove restoration activities (tree planting and supporting coastal engineering works) are continued; improved rates of survival / success	2	R	Mangrove restoration activities are still undertaken, promoted and coordinated by the Mangrove Restoration and Management Department of NAREI. The restoration programme is using the best practices and mainly focused on assisting natural regeneration through: (1) Spartina grass planting, (2) seed dispersal trails, and (3) coastal infrastructure (brushwood dams and geotextile tube groynes). The results are mixed but on average promising; they are presented in NAREI's Annual Reports.
13	Coastal communities still active in mangrove seedling production and tree planting	2	R	In the selected planting sites, community members are still active in seedling production and planting, being paid by NAREI.
Component 6. Public awareness and knowledge on the benefits of mangrove forests is increased				
14	Mangrove ecology is still part of the secondary school curriculum	2	U	The Manuals "Mangroves" and "Planting Mangrove Seeds" are still used at the schools.
15	Educational tours to mangroves continue to be organised	2	R	The remaining three VMACs are still very active in visiting the primary and secondary schools in their respective communities and in organising summer camps and educational tours to the mangrove sites. The Mangrove Heritage Trail Tour, targeting Guyanese and foreign tourists, still exists and forms part of public awareness campaigns.
16	The Mangrove Visitor Centre at the Golden Grove / Belfield Mangrove Reserve still open and in good condition; upward or downward trend in the number of visitors	2	D	The Mangrove Visitor Centre at the Guyana Women´s Leadership Institute is open and in good conditions. The ground floor is used by the VMAC as a meeting place and as starting point for the Mangrove Heritage Trail Tour. Numbers of visitors are still registered. They strongly vary from year to year: over 700 visitors inclusive students and tourists in 2014; over 1,000 visitors in 2015; 449 visitors in 2016; 845 visitors in 2017; and 538 visitors in 2018.[49]

[49] Source: NAREI Annual Reports

NR	DESCRIPTION OF SYSTEMS/SERVICES/PRODUCTS TO BE SUSTAINED	SCORE	EVIDENCE	EXPLANATORY NOTES
17	Mangrove information website still existing and updated (http://www.mangrovesgy.org/home/)	3	R	The mangrove website does not exist anymore; the site has been replaced by a Facebook page (https://www.facebook.com/Guyana-Mangrove-Restoration-Project-251163728610/) which is still existing and regularly updated.



This **Impact and Sustainability Assessment of the Guyana Mangrove Restoration Project** (2009/021-549) is one of the 22 case studies that were conducted to feed into the overall **GCCA/GCCA+ Impact and Sustainability Study**.

This case study report provides a summary list of outputs delivered, a detailed analysis of ex-post impact and sustainability levels as well as additional information on the project's M&E practices, on the available knowledge and communication products, on scaling-up opportunities and on ex-post climate finance mobilised from local public and private sources.

All reports are available on www.gcca.eu/resources

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