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Report No: ICR00004386

IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF 99869

ON A

GRANT FROM THE GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US$4.1 MILLION

TO THE

DEMOCRATIC REPUBLIC OF SÃO TOMÉ AND PRÍNCIPE

FOR THE

SAO TOME - ADAPTATION TO CLIMATE CHANGE (P111669)

June 29, 2018

Environment and Natural Resources Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2017)

Currency Unit =	Dobras (STN)
STN 20,491 =	US$1
1 US$ =	STN 20,491

FISCAL YEAR
July 1–June 30

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
B/C Ratio	Benefit-Cost Ratio
CGRE	*Comités (comunitários) de Gestão de Riscos e Emergências* (Committee for Management of Risk and Emergencies)
CONPREC	*Conselho Nacional de preparação e Resposta as Catastrofes* (National Council for the Preparation and Response to Disasters)
CPS	Country Partnership Strategy
ESMF	Environmental and Social Management Framework
EWS	Early Warning System
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environmental Facility
GRM	Grievance Redress Mechanism
GPS	Global Positioning System
ICR	Implementation Completion and Results Report
IMF	International Monetary Fund
INM	*Instituto Nacional de Meteorologia* (National Institute of Meteorology)
IRR	Internal Rate of Return
ISR	Implementation Status and Results Report
LDCF	Least Developed Countries Fund
M&E	Monitoring and Evaluation
NAPA	National Adaptation Programme of Action
NGO	Nongovernmental Organization
NPV	Net Present Value
PAMCZC	*Projeto de Adaptação as Mudanças Climaticas das Zonas Costeiras* (Coastal Zone Adaptation Project on Climate Change)
PDO	Project Development Objective
PIU	Project Implementation Unit

PMU	Project Management Unit
PRIASA	Projet de Rehabilitation des Infrastructures d'Appui à la Sécurité Alimentaire
RPF	Resettlement Policy Framework
SIDS	Small Island Developing States
SMS	Short Message Service
STP	São Tomé and Príncipe
TTL	Task Team Leader
UNDP	United Nations Development Programme
WACA	West Africa Coastal Areas

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P111669	Sao Tome - Adaptation to Climate Change
Country	**Financing Instrument**
Sao Tome and Principe	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Ministry of Public Works, NR, and Environment	MARAPA, Directorate Geral do Ambiente, CONPREC, Institute Nacional da meteorologia, Directorate das Pesca

Project Development Objective (PDO)

Original PDO

Project Development Objective is to increase the adaptive capacity of vulnerable coastal communities in São Tomé and Príncipe to the adverse impacts of climate variability and change.

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-96127	282,500	269,128	269,128
TF-99869	4,100,000	4,053,815	4,053,815
Total	**4,382,500**	**4,322,943**	**4,322,943**
Non-World Bank Financing			
Borrower	0	0	0
Total	**0**	**0**	**0**
Total Project Cost	**4,382,500**	**4,322,943**	**4,322,943**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
31-May-2011	01-Dec-2009	13-Mar-2014	31-Dec-2016	31-Dec-2017

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
15-Dec-2011	.58	Reallocation between Disbursement Categories Change in Disbursements Arrangements
11-Mar-2015	3.12	Change in Results Framework
31-Jul-2015	3.37	Change in Disbursements Arrangements
03-Nov-2016	4.27	Change in Loan Closing Date(s) Reallocation between Disbursement Categories

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	22-Sep-2011	Satisfactory	Satisfactory	.19
02	28-May-2012	Satisfactory	Moderately Satisfactory	.38
03	25-Jan-2013	Satisfactory	Satisfactory	.50
04	07-Aug-2013	Satisfactory	Moderately Satisfactory	1.19
05	24-May-2014	Satisfactory	Satisfactory	1.77
06	09-Dec-2014	Satisfactory	Moderately Satisfactory	2.59
07	19-Jun-2015	Satisfactory	Satisfactory	3.12
08	11-Dec-2015	Satisfactory	Satisfactory	3.94
09	17-Jun-2016	Moderately Satisfactory	Satisfactory	3.94
10	14-Jun-2017	Satisfactory	Moderately Satisfactory	4.27

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Agriculture, Fishing and Forestry	**20**
Other Agriculture, Fishing and Forestry	20
Public Administration	**12**
Other Public Administration	12
Transportation	**12**
Other Transportation	12

Water, Sanitation and Waste Management	**56**
Other Water Supply, Sanitation and Waste Management	56

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Environment and Natural Resource Management	**0**
Climate change	100
Mitigation	100

ADM STAFF

Role	At Approval	At ICR
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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. The Democratic Republic of São Tome and Príncipe (STP) is an isolated Small Island Developing States (SIDS) located in the Gulf of Guinea, 350 km off the west coast of Africa. Its surface is approximately 1,001 sq. km. In 2010, its population was estimated at 163,000 people and a gross national income per capita of US$1,170. At the time of appraisal, in 2011, the STP economy was still very fragile.

2. The Government had consolidated macroeconomic stability and begun achieving steady progress on governance. Despite this progress, the national economy remained highly dependent on marine and coastal resources, with 20 percent of the nation's workforce—among the poorest and most exposed workers—employed in artisanal fisheries and nearly 70 percent of the population living in coastal zones. The country was experiencing an average of 4.8 fishers lost at sea per year since 2006—equivalent to 240 per 100,000 or three times the average reported by the International Labour Organization for fishing as an occupation. The country lacked a reliable early warning system (EWS) and adequate capacity for search and rescue operations. Moreover, over two-thirds of the fishing fleet consisted of fragile small dugout canoes, relying mainly on visual contact with land or by clouds to navigate. Over the years, the number of fishermen has been increasing,[1] while fishing resources near the coast grew scarcer and fishermen were forced to travel further away to catch fish, leading to increased risk of loss of life and incidents, with no adequate action taken to address the issue.

3. The country had experienced extreme floods in 2008–2010 and changes in weather patterns. Since the 1960s, the country faced longer dry seasons, increased flooding events, and intensified fog seasons (*mini Gravana*, during December to February)—the time of the year when the highest levels of mortality for fishermen at sea are recorded. Moreover, analyses[2] showed that the country would be facing severe weather events in the next decades, exacerbated by climate change. While further data were needed and later acquired to more precisely characterize the evolution of climate patterns, results at appraisal stage indicated that STP would experience increased coastal erosion, decrease in average precipitation, and increased intense flooding events and an intensified fog season.

4. The Government of São Tomé and Príncipe was aware of the risks and consequences of climate change toward long-term growth of its economy and sustained poverty reduction. STP had published its National Adaptation Programme of Action (NAPA) in 2006 to identify how to respond to the country's adaptation needs, particularly in the most vulnerable zones of the country. The plan identified 22 urgent and immediate climate change adaptation priorities, including promoting adaptation in the fisheries sector and a series of structural and soft adaptation measures for coastal areas. The Government had also established in 2011 a new National Council for the Preparation and Response to Disasters (*Conselho Nacional de preparação e Resposta as Catastrofes*, CONPREC), by the legal decree n^0 17/11, and allocated

[1] *Relatório de Principais Resultados do Censo Geral da Frota de Pesca Artesanal/Semi-Industrial/ Empresas e Serviços Ligados a Pesca 2014, Direcção das pescas*.
[2] STP's First National Communication to the United Nations Framework Convention on Climate Change.

US$1.3 million in budgetary resources for disaster contingency funds and another US$1.4 million for emergency coastal erosion works.

5. Additionally, several projects supported by international organizations were being implemented to strengthen the country's hydro-meteorological and warning capacities (a Japan Africa Adaptation Program was supporting equipment acquisition and institutional capacity building; the European Development Fund was supporting technical assistance and project management, such as some coastal protection interventions for the national road 1;[3] and the International Development Association for the Central African Backbone Project - APL 2 (P117652) was supporting technical assistance for the information and communication technology sector-enabling activities and project management).

World Bank Strategy and Response

6. Reinforcing adaptive capacity in STP had been identified as a key priority for the World Bank Group's intervention in STP. Both the Government's Poverty Reduction Support Program (2011–2015) and the Interim Strategy Note (FY2011–2012) extending the 2006–09 Country Assistance Strategy identified the reinforcement of human development as priority, particularly by strengthening environmental conservation and resilience to climate change to benefit the poorest populations such as artisanal fishers and coastal communities. At the time of appraisal, the World Bank was already actively engaged with STP on climate activities and had a good understanding of the country's challenges. It had supported the preparation of the NAPA, which led to the development of this project in response to some of the key priorities identified in the NAPA. Moreover, in preparation of this project, the World Bank conducted specific studies on the impact of climate change on fog patterns, to inform the safety at sea system to be developed as a part of this project. The World Bank team had also accumulated experience of past and ongoing operations on similar coastal climate change adaptation projects in other islands of the SIDS.

7. Financed through a US$4.1 million grant from the Least Developed Countries Fund (LDCF, a global fund for adaptation) from the Global Environmental Facility (GEF), the project's activities aimed at filling critical gaps in vulnerable coastal communities' capacity to adapt to the impacts of climate variability and change. The project focused on four communities (Malanza, Santa Catarina, Ribeira Afonso and Praia Burra – which replaced Praia Sundy). As shown in the map presented in annex 9, the first three communities are located in the main island of Sao Tome, while Praia Burra is located on the island of Principe. Through its activities, the project protected these communities' lives, livelihood, and property, which had been severely affected in the past years due to extreme weather events. It financed the development of a functional weather and climate monitoring capacity to ensure reliable and timely weather information to fishermen and coastal communities. It also introduced behavior changes through the adoption of safety at sea practices and equipment for fishermen. These activities were directly aligned with the NAPA priorities 1 [training and equipment of artisanal fishermen], 2 [establishing a system of climate alert], and 15 [reinforcement of human technical capacity of national civil protection and fire brigade]. In four highly vulnerable communities, the project piloted an innovative participatory approach to identify the risks and vulnerability of the communities and developed coastal adaptation measures. The communities had been identified by the NAPA, and these activities were directly aligned with its

[3] Because of budget limitations, not all of the coastline was protected and a new project for support to road sector, including coastal protections, is under preparation: Sao Tome é Principe Transport Sector Development and Coastal Protection Project (P161842).

priorities 3 [communication action for behavior change], 9 [relocation of local communities (Malanza, Santa Catarina and Sundy) at risk of floods and landfalls, and 10 [construction of shelters and parks for artisanal fishing].

8. This project is part of a larger, multidonor program that aims to increase the adaptive capacity of STP's population to the effects of climate change and climate variability. In particular, the United Nations Development Programme (UNDP) financed meteorological and hydrometric stations and supported the CONPREC as part of its EWS program. It also replicated the project's approach and created Emergency Risk Management Committees in 16 additional communities (while the project itself only directly financed 14 Committees).

9. During the project, adaptive capacity has been considered as the ability of people, assets, and systems to adjust, modify or change characteristics and actions to moderate potential future impacts from hazards so as to continue to function without major qualitative changes, for example through diversity, redundancy, integration, connectedness, and/or flexibility.

Theory of Change (Results Chain)

10. At the time of project appraisal, coastal communities and fishermen were experiencing high human losses at sea and property damage due to changing climate patterns and increased climate variability. This project, as stated in its Project Development Objective (PDO), aimed "to increase the adaptive capacity of vulnerable coastal communities in the Recipient's territory to the adverse impacts of climate variability and change". Increasing their adaptive capacity implied intervening to strengthen the fishermen and coastal communities' ability to identify risks to reduce their exposure and proactively take actions and change behavior to face the evolutions in their environment.

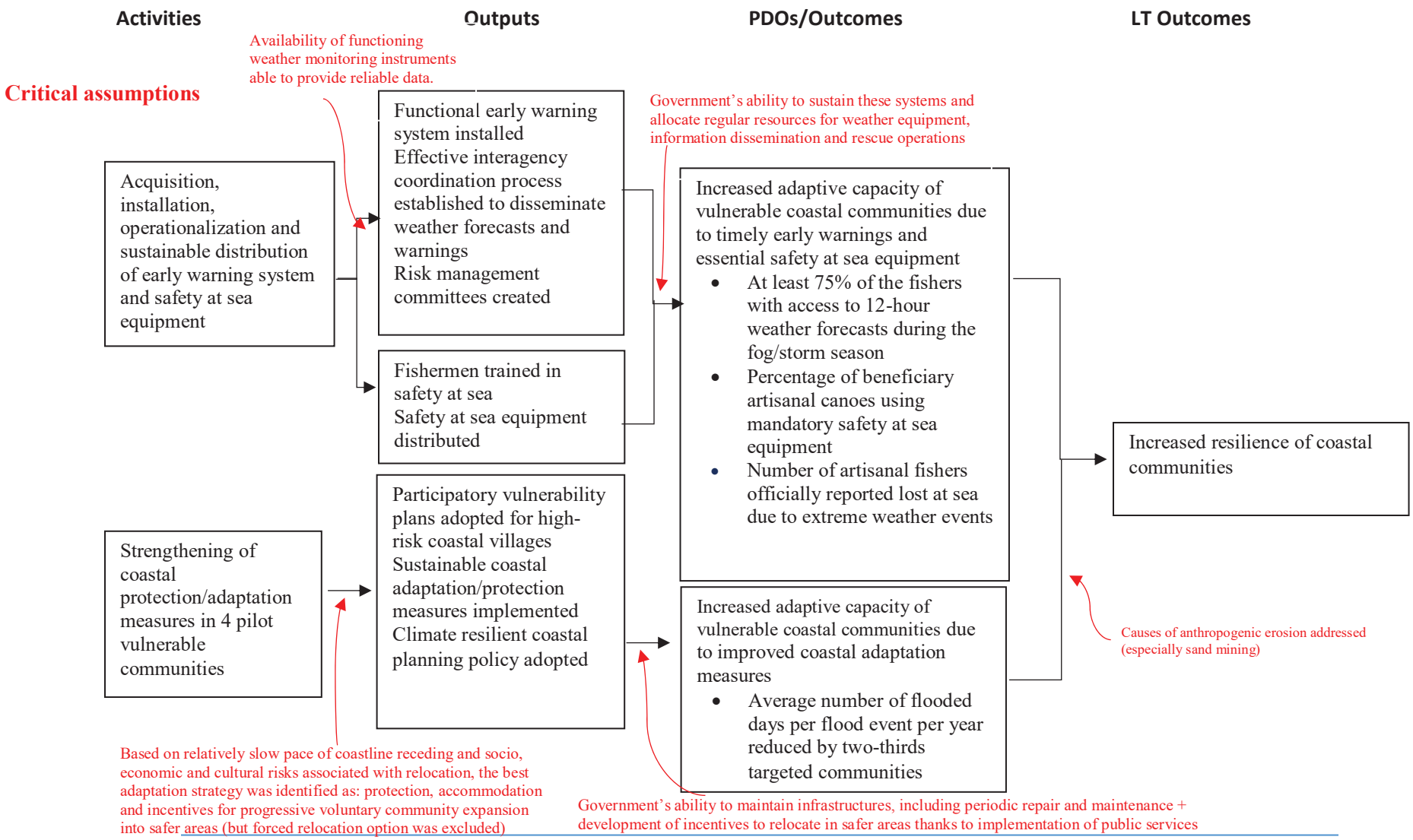
11. To achieve its PDO, the project had two main areas of focus: stemming the loss of life and equipment due to extreme weather events and shifting climate impact patterns and reducing climate risk for targeted communities through coastal adaptation measures. In its first component, the project would create a national capacity to produce, issue, and disseminate 12-hour coastal weather forecasts for fishermen. In addition, safety at sea practices and equipment would be disseminated to fishermen, who previously primarily depended on their traditional knowledge and navigation practices. These activities would be critical to allow fishermen to take risk-informed decision whether to go to sea and therefore reduce their risk of being lost and dead. However, this outcome would depend on the availability and maintenance of functioning and reliable weather instruments and communication systems to disseminate alerts, as well as the availability of functional rescue vessels (mainly dependent on secured government resources allocated for this).

12. In its second component, the project would pilot developing participatory climate-resilient development plans at community level so that communities themselves identify the risks to which they are exposed, identify those who are most at risk/vulnerable and then identify adaptation solutions. Adaptation strategies are usually categorized in three categories (protection, accommodation, or population retreat). The project would also help communities own this information by developing tailored risk maps (based on historical maps and climate change projections) and identifying adjacent 'safe expansion zones' where new public facilities would eventually create an incentive for communities to expand or voluntarily relocate in these areas. For these activities as well, the sustainability of the outcome

would depend on government and communities' ability to maintain infrastructure, including periodic repair and maintenance. It would also depend on its action to effectively prevent sand mining, which has been a major cause of the past observed coastal erosion.

13. Overall, both of these activities would also contribute to increase the communities' ability to adapt to changing risks over time. The training provided and the participatory approach followed would establish a solid foundation in the communities to monitor, assess, and respond to risks through adaptation measures.

Figure 1. Graphical Presentation of the Theory of Change



Project Development Objectives (PDOs)

14. The PDO was to increase the adaptive capacity of vulnerable coastal communities in the Recipient's territory to the adverse impacts of climate variability and change.

15. The project aimed to do so by increasing the capacity of fishermen to adjust their fishing practice based on weather-information and increased preparedness. With improved-access to information, they would be able to decide when and whether to go at sea and whether to secure their boats more inland to protect them from upcoming storms. And, training and distribution on safety-at-sea equipment would help them to be prepared to react would foggy and stormy situations occur while they are at sea.

16. The project also aimed to protect coastal communities, by encouraging them to develop and expand in areas less exposed to current and potential future impacts from hazards and by supporting them to build protection works, in order to preserve their assets and livelihoods.

Key Expected Outcomes and Outcome Indicators

17. The project outcome indicators were monitored during the project and following the closing date of the project (December 2017) during the Implementation Completion and Results Report (ICR) mission in January 2018. They reflect different dimensions of adaptive capacity, including the ability of people and systems to adjust, modify or change to mitigate adverse impacts from climate change and vulnerability.

18. The PDO/Global Environmental Objectives Indicators are the following:

- At least 75% of the fishers have access to 12-hour weather forecasts during the fog/storm season
- Percentage of beneficiary artisanal canoes using mandatory safety at sea equipment
- Number of artisanal fishers officially reported lost at sea due to extreme weather events (annual average)
- Average number of flooded days per flood event per year reduced by two-thirds

Components

19. The project had two main investment components and one project management component:

Component 1. Coastal Early Warning System and Safety at Sea (Estimated costs: US$1.9 million/actual costs: US$1.658 million; ratio: 87 percent):

Subcomponent 1.1. Establishment of an early warning system for coastal communities and near-shore fisheries to timely inform artisanal fishers prior to fog/storm events *(Estimated costs: US$1.4 million/actual costs: US$1.004 million; ratio: 72 percent):*

20. This subcomponent included (a) acquisition and installation of EWS equipment and (b) strengthening interagency coordination and capacity for producing, issuing, and disseminating 12-hour coastal weather forecasts and for providing early warning. The cost for this subcomponent was lower than

anticipated due to the decision to not acquire a Doppler radar and instead to buy a marine weather station (see section I.B).

Subcomponent 1.2. Improvement of safety at sea for artisanal fishers *(Estimated costs: US$0.5 million/actual costs: US$0.654 million; ratio: 131 percent):*

21. This subcomponent included (a) acquiring and installing safety, search and rescue, and communications equipment; (b) providing safety at sea training; (c) improving the availability and utilization of safety at sea equipment, including distribution of essential equipment to trained fishers; (d) providing community outreach and disaster preparedness and response training for highly vulnerable coastal fishing communities; and (e) providing technical assistance. The cost for this subcomponent was higher than anticipated due to the increased number of artisanal fishermen covered by the project. However, a reallocation from Subcomponent 1.1 made it possible to cover this cost and the expansion of the safety at sea program.

Component 2. Coastal Protection for Vulnerable Communities (Estimated costs: US$1.8 million/actual costs: US$1.748 million; ratio: 99 percent):

Subcomponent 2.1. Community Preparedness (Estimated costs: US$0.4 million/actual costs: US$0.268 million; ratio 67 percent):

22. This subcomponent included (a) specialized technical assistance to the pilot communities in developing participatory climate-resilient development plans (to encourage community growth to lower-risk areas) and (b) geomorphological analysis of the main risks in the communities and identification of detailed engineering designs of possible flood-reduction measures in four pilot communities. The cost for this subcomponent was lower than anticipated because works in Praia Burra were smaller than in the other communities and therefore required less technical studies, compared with the ones done for Ribeira Afonso and Santa Catarina financed under the Project Preparation Grant.

Subcomponent 2.2. Coastal Protection for Vulnerable Communities (Estimated costs: US$1.3 million/actual costs: US$1.441 million; ratio: 111 percent):

23. This subcomponent was to (a) finance the implementation of urgent medium-scale coastal adaptation activities and (b) build commitment and awareness toward climate resilience through the promotion of small-scale, community-based adaptation activities in the four pilot communities. The cost for this subcomponent was slightly higher than expected due to the reallocation of budget from the Doppler radar, which was no longer required, for additional interventions (such as the protection wall of the school in Io Grande and the extension of the drainage system in Santa Catarina, compared to the initial plans).

Subcomponent 2.3. Promotion of Coastal Resilience (Estimated costs: US$0.1 million/actual costs: US$0.076 million; ratio: 76 percent):

24. This subcomponent was to finance (a) cross-community and island-wide exchange and dissemination of lessons learned through study tours and workshops and (b) technical assistance and workshops for a climate-resilient coastal spatial planning and resource management policy. The costs for

this subcomponent were slightly lower than expected because the support to the preparation of policies has been reduced, as the enabling factors appear to be lacking to ensure a proper implementation of any new regulation. Indeed, as not all artisanal fishermen received the safety at sea equipment (component 1.1), the legislation on mandatory safety equipment for fishing boats could not be passed without creating unfair treatment for the remaining fishermen. The same applied to the adoption of the new legislation on aggregates, as without proven alternatives to sand from the beach for construction, legislation could not be enforced.

Component 3. Project Management (Estimated costs: US$0.4 million/actual costs: US$0.611 million; ratio: 153 percent):

25. This component included support for project implementation, communication, reporting, monitoring, and evaluation, as well as incremental operating costs. The cost for this component was significantly higher than initially estimated due to the one-year extension of the project, the increased need for support for interagency collaboration, and some preparation activities for the second phase (to be done under West Africa Coastal Areas [WACA] Resilience Investment Project", P162337).

26. The detailed estimated and actual total project costs by component and sources of funds are presented in annex 3.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

Revised PDOs and Outcome Targets

27. The PDO was not revised.

Revised PDO Indicators

28. The project was restructured (Level 2) in March 2015[4] to make minor changes to the project indicators to ensure consistency and clarity, as described in table 1:

[4] The restructurings, approved by the Country Director in January 2012 and March 2015, do not appear in the restructuring table of this document owing to a system error at the time of preparation.

Table 1. Revised Indicators

Type of Indicator	Original Indicator	Revised Indicator	Date of Revision	Reason for Change
Long-Term Programmatic Indicator	# of Artisanal fishers officially reported lost at sea due to extreme weather events (annual)	# of Artisanal fishers officially reported **as disappeared** at sea due to extreme weather events (annual)	March 2015	*Better definition* Reflecting the new official definition of 'disappeared at sea', that is, when it is considered that the fishermen will no longer return, after a year of being lost at sea. 'Lost at sea' could mean a temporary disappearance of 48 hours, after which the fishermen can still be found alive, ensuring specific and accurate indicator.
Indicator Two	% of artisanal canoes using mandatory safety at sea equipment (70% by end of project)	% of **beneficiary** artisanal **fishermen** using mandatory safety at sea equipment (70% by end of the project)	March 2015	*Improved indicator* Compliance can only be expected from fishermen who have benefited from distribution of minimum safety at sea equipment, as this equipment is not widely available in São Tomé and Príncipe. In addition, monitoring centers on individual fishermen rather than canoes.
Indicator Three	Average # of flooded days per flood event per year reduced by two-thirds: **1. Ribeira Afonso (from 5.5 to 1.8)** **2. Malanza (from 3.5 to 1.2)** **3. Sta Catarina (from 1.5 to 0.5)** **4. Sundy (from 3.0 to 1.0)**	Average # of flooded days per flood event per year reduced by two-thirds: 1. No change 2. No change 3. No change **4. Praia Burra (from 3.0 to 1.0)**	March 2015	*Change of location* All locations remained the same, except Praia Sundy that was replaced by Praia Burra (see details in the following paragraphs on this change).

Type of Indicator	Original Indicator	Revised Indicator	Date of Revision	Reason for Change
Intermediate Result Indicator Two	Training in safety at sea and basic equipment provided to 25% of the fleet: # of fishers trained: **485** # of safety at sea sets distributed: **485**	Training in safety at sea and basic equipment provided **to 70% of the artisanal fishers:** # of fishers trained: **1,650** # of safety at sea sets distributed: **1,750**	March 2015	*Alignment of indicators* Adjustment to make this indicator consistent with Indicator 2. If only 25% of the fleet were trained or provided with safety equipment, it would not be possible to expect 70% of the canoes or fishermen to be compliant with the minimum required equipment. The project targets were therefore increased to cover about 70% of the artisanal fishers. Additionally, the number of fishermen was initially underestimated and grew during the project time from about 2,000 to about 3,000. The target was therefore expanded and the targets were revised to provide training to 1,650 fishermen and distribute 1,750 safety at sea sets.

Revised Components

29. The components were not revised, but important changes were made to some activities:

- One of the four pilot communities was changed in May 2013, at the Government's request. Praia Sundy was replaced by a nearby, denser, and more vulnerable coastal community: Praia Burra. This request was based on a reassessment of the vulnerability of Praia Sundy but also in light of the clarification of the scope of the tourism resort investment, for which a concession was signed in 2011—which included socioeconomic development—making it somewhat irrelevant to the project's activities. An amendment to the Grant Agreement was not needed as the Grant Agreement did not mention the choice of pilot villages, but the indicator was revised (as shown in table 1) and additional consultations were conducted in both communities in 2013.

- A decision was made in 2013 to not purchase a Doppler radar (initially part of the activities in Subcomponent 1.1, establishment of an EWS) following the assessment of a radar expert. The implied recurrent expenditures required for the radar's maintenance raised concerns over the sustainability of this option, and it was decided that these costs would be most efficiently used for the purchase of a marine station and additional community protection works. No restructuring was needed as the project description did not specify the type of equipment that would be acquired for the EWS, but the Procurement Plans and the Expected Disbursement Plan were revised to reflect the changes.

- Relocation, even voluntary, had initially been excluded from the preferred adaptation options (as protection and accommodation measures were deemed more adequate) following the participatory risk identification process in the communities done for project preparation.

However, given the higher level of risks identified,[5] unusually severe storms in 2014–2015, and the widespread desire to maintain the ability to grow communities locally, it was decided in 2015 not only to develop land-use planning, as initially envisaged, but also to undertake the civil works to open adjacent 'safe expansion zones' where people could voluntarily relocate, with a priority given to the most vulnerable households,[6] which were also the most exposed to climate effects.

Other Changes

30. Through Level 2 restructurings, three amendments to the Grant Agreement and extension of the closing date were made to the project:

- **A change in Disbursements Arrangements (December 2011).** The Government requested support for incremental salaries (US$180,000) for the Project Coordinator to meet a shortfall in salaries within the Ministry of Public Works and Natural Resources. The World Bank accepted this amendment based on STP special characteristics, particularly its difficulties with retaining qualified experts within the Government. During implementation, it was decided that the Project Implementation Unit (PIU) should not be staffed with highly paid external consultants, as from experience with other development partners, they did not have the required leverage to coordinate implementation throughout government agencies. It was therefore agreed that experienced staff of the Directorate General of Environment in the Ministry of Public Works and Natural Resources would be best positioned to serve as Project Director and Project Coordinator. This would ensure effective coordination with all other agencies and the quality of safeguards oversight. It would also build long-term capacity of the Government in project management and fiduciary and safeguards oversight, as these staff members would be reassigned to their positions after the project. A payment of US$180,000 (the initial amount estimated to hire an external consultant) was transferred to Category (2) 'Operating Costs and Training' of Schedule 2, Section IV.A.2 from Category (1) 'Goods, Works, and Consultants' Services' of the Grant Agreement. This was consistent with OP/BP 6.00 'Bank Financing' (paragraph 2.b on recurrent cost financing) and with the Country Financing Parameters (which specified no limits for recurrent cost financing).

- **Eligibility of cash compensation for affected persons (July 2015).** The Government requested that the project provide cash compensation to a number of affected persons in the project's pilot communities for loss of assets and loss of production of crops and fruit trees. The

[5] Maps showing the coastlines and the community expansion in 1956, 1990, 2003, and 2010/11 produced by GeoVille and the European Spatial Agency revealed rates of coastline loss approaching 0.3–2 m per year and expected to accelerate with climate change.

[6] The project team's Sociologist led the process of identifying the most vulnerable households. A report summarizing this process and its conclusions was prepared by the Sociologist and is available (*Relatório de atualização das casas nas zonas de risco nas comunidades da primeira fase do Projeto* in Portuguese). The methodology consisted of identifying which households were the most at risk and the least able to manage the risk. The sociologist first conducted a household survey in all four communities to find out the socioeconomic situation of households and identify the most vulnerable people. The criteria to identify the 'most vulnerable of the vulnerable' included the capacities (ages, illness, and disabilities) and resources (both economic and social) to cope with a disaster and relocate on their own. These results were then discussed at the community level, with representatives from the National Social Program, the local authorities, and the local risk committees, to identify which of these vulnerable households were most at risk and should be prioritized for relocation support.

proposed compensation was to be paid to affected persons who were making part of their agricultural concessions land available for settlement by households (from the same village) threatened by coastal storms and flooding, as well as for protection works benefiting the larger community against these recurrent disasters. The estimated cost of cash compensation to affected people was equivalent to, on average, US$1,250 (four persons have been compensated, two in Santa Catarina and two in Malanza). This compensation was viewed by the Government as an intrinsic part of the adaptation investments funded by the GEF/LDCF and therefore asked for this exception. This restructuring created a new disbursement category in the Grant Agreement (3) Cash Compensation under Part B.2 (c) and the revision of the Project's Resettlement Policy Framework (RPF) to incorporate a new category of land ownership (agriculture concessions in the private domain of the state), allowing for cash compensation for standing crops and assistance in reestablishing livelihoods to concession holders.

- **A change in loan closing date and a reallocation between disbursement categories (November 3, 2016)**

  - The closing date of the project was extended from December 31, 2016, to December 31, 2017, to minimize the gap between this project and the WACA project (approved April 2018), assist with the preparation of the second phase, and complete community activities (such as reinforcement of the training and use of safety at sea equipment for fishermen and reinforced monitoring, exchanges between coastal communities on their experience in adaptation solutions, maintenance of coastal protection works and reinforcement using vegetative approaches, conclusion of the opening and allotment of the expansion areas in Praia Burra and Malanza, strengthening of social and environmental oversight of these activities, and continuation of project management and audit).

  - A reallocation of grant proceeds was also made at the same time to cover the increase in the operating costs associated with the project extension (transfer of US$55,000 to Category (2) 'Operating Costs and Training' of Schedule 2, Section IV.A.2 to the Grant Agreement from Category (1) 'Goods, Works, and Consultants' Services').

Rationale for Changes and Their Implication on the Original Theory of Change

31. The changes in the indicators as well as the formal restructurings did not affect the theory of change of the project and were made to contribute to the same expected project outcomes. The two restructurings allowed for needed revisions in budget allocations to conduct project activities and to deliver the desired outcomes most effectively. Changes in indicators contributed to improving the accuracy and relevance of monitoring aimed at achieving the initial objectives. Changes in the activities ensured that funds and activities were optimally focused on the most critical needs, in light of the assessment of local capacity, changes in local development projects, or risk assessments. These changes, however, highlight the importance of building in flexibility into adaptation project design to deliver high-impact and lasting results (as further discussed in section V. 'Lessons Learned and Recommendations').

32. Given the nature of indicator changes and the fact that neither the PDO statement nor the scope of the project was changed, a split rating was not applied in this ICR.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

33. The project is highly relevant to the current World Bank Country Partnership Strategy (CPS) (2014–2018).[7] The objectives of the project directly support the two themes of the CPS (1: supporting macroeconomic stability and national competitiveness and 2: reducing vulnerability and strengthening human capacity[8]). More specifically, in the latter, the CPS aims to "increase adaptive capacity of coastal communities and reduce potential loss of assets and lives" (Outcome 8), which is directly aligned with the project's PDO. The CPS monitors this support in its results frameworks through the project indicator: "Proportion of fishing population benefitting from early warning system and safety at sea (indicator 8.1).

34. The project is closely aligned with STP's NAPA priorities (as described in paragraph 7) and their objectives to improve the "life of the most vulnerable populations of the country, endowing the capacity to minimize the disastrous effects of climate change and poverty reduction."[9] Moreover, the climate stresses and weather impacts to the coastal communities in STP have only become worst since the Legal Agreement was signed. If anything, climate change impacts have been identified even more accurately owing to the studies conducted by this project,[10] and the need to address impacts for vulnerable communities is more pressing than ever. For example, satellite imagery precisely documented coastline recession in the past decades, at a faster rate than initially envisioned.[11]

35. The project also fits into the regional strategy of the World Bank for Africa announced in the Africa Climate Business Plan (2016), aiming at strengthening the resilience of the physical assets, with a specific focus (Chapter 6) on the resilience of the coastal areas of Western Africa.

36. Finally, the relevance of the PDO has been confirmed by the decision[12] to continue the work of this project in a second phase—as part of the WACA regional investment project (P162337)—to scale up its activities and consolidate the behavioral changes needed to ensure long-term impacts of fishermen

[7] Report No. 83144-ST.
Source: http://documents.worldbank.org/curated/en/851211468105842423/pdf/831440CAS0REVI0C0disclosed070100140.pdf.
[8] Outcome 1 'Strengthened public financial and natural resource management' and Outcome 8 'Increased adaptive capacity of coastal communities and reduced potential loss of assets and lives'.
[9] São Tomé and Príncipe National Adaptation Programmes of Action on Climate Change, December 2006, https://unfccc.int/resource/docs/napa/stp01.pdf.
[10] UNESCO-IHE and Deltares, Coastal Geomorphology and Adaptation options study: São Tomé and Príncipe Phases I and II, produced in March 2011 and December 2012; Tadross and Thomson, 2011, Historical decadal changes in regional climate and aerosols; Tadross 2011, Projected and observed changes in climate from historical data and General Circulation Models.
[11] Maps showing the coastlines and the community expansion in 1956, 1990, 2003, and 2010/11 produced by GeoVille and the European Spatial Agency.
[12] Project Adopted by the Board of the World Bank on April 9, 2018.

communities and community adaptation process, with a PDO fully aligned with the one of the project first phase "increasing adaptive capacity of coastal communities and reduced potential loss of assets and lives."

37. The PDO relevance is therefore rated **High**.

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

38. This project aimed to increase the adaptive capacity of vulnerable coastal communities in STP to the adverse impacts of climate variability and change. To do so, the project built capacity in communities and in STP's administration to establish a functioning warning system to disseminate timely warnings to artisanal fishers before fog or storm events and to come up with proactive adaptation measures to reduce flooding exposure of target communities.

39. The Results Framework is presented in annex 1, and despite initial limited data and capacity on the ground and the intrinsic difficulties to define and measure success for adaptation projects, the project managed to achieve concrete and quantifiable results.

40. The project increased STP's ability to monitor weather and disseminate timely warnings to artisanal fishers, which directly contributes to protect fishermen lives and goods. As a result of the overall national adaptation program, the country now counts a set of 12 new meteorological stations and 12 hydrometric stations (installed by a UNDP-implemented GEF project) as well as one new marine station (installed by the adaptation to climate change project), compared to only an existing meteorological station [13] at appraisal. The project also funded a maritime meteorological station and provided training to the National Institute of Meteorology (*Instituto Nacional de Meteorologia*, INM) staff, on analysis of weather data and production of meteorological bulletin. While no reliable weather forecast was available when the project started, daily weather forecasts are now being produced by the INM, and this is done twice a day during the fog/storm season. Specific alerts are also being issued in case of specific events. Owing to the strengthened coordination between agencies and to the support provided to the CONPREC, these daily reports are sent by radio to the communities (local risk committees and beach supervisors have been equipped with radios).

41. In addition, a system of short message service (SMS) (FrontlineSMS) has also been established by the CONPREC in which 1,478 fishermen's phone numbers are registered (representing around 50 percent of the fishermen). However, as not all fishermen have a cell phone and as they tend to change numbers very often (due to the non-replenishment of their phone credit once it expires), this was not considered to be the best proxy to measure fishermen's access to information. However, the system has proved to be useful to send targeted messages to different categories of end users, such as risk committees members called for interventions at the same time. A behavior change was also noted as fishermen have increasingly proactively reached out for the information before going to sea. A good indication of this is the increased frequency of the calls received by the newly established weather service calling-free number (average of five calls a day). Site visits and interviews conducted during the ICR mission confirmed that an estimated 85 percent of fishermen now have access to 12-hour weather forecasts during the fog/storm season,

[13] Installed at the international airport.

although mainly through word of mouth (from their local beach supervisor, coastguard, or fishermen association members). Before the project, they did not have access to these reliable forecasts. During project implementation, this indicator was obtained by fishermen communities interviews.

42. Overall, STP's ability to monitor weather and disseminate timely warnings greatly improved, even if a few shortcomings were noted with some equipment experiencing some malfunctioning (such as the captors of the maritime meteorological station) or non-functioning (such as the studio to register TV weather forecasts). This lowers the ability to produce accurate marine forecasting (particularly for information related to waves, currents, and storms) and to disseminate the information more broadly. During the second phase, carried out by the WACA project, the malfunctioning equipment will be repaired, but also, and more importantly, emphasis will be placed on training on operation and maintenance for technical staff. It will also be a requirement for contracts to contain longer warranty and formations for recipient institutions, so that providers would be involved over the longer term.

43. The project strengthened fishermen's safety at sea, and essential equipment are now regularly used by fishermen. In the years preceding the project, STP was losing an average of 4.8 fishers per year[14] at sea (equivalent to three times the average reported by the International Labour Organization for fishing as an occupation). Since 2013 (and since the introduction of the safety at sea program), there have not been any reported weather-related disappearances (except for two deaths reported in 2015, but after investigations,[15] they proved to not necessarily be related to weather events but rather to health issues). Based on the identification work done by the specialized nongovernmental organization (NGO) MARAPA with local fishermen organization and communities, 2,064 safety kits were distributed to fishermen, along with additional equipment adapted to their needs (for example, global positioning system [GPS] devices for those going offshore) and trainings on safety at sea practices. The distribution and training covered 23 coastal communities (17 in São Tomé and 6 in Príncipe). This was verified during the ICR mission and is documented by the project team inventory and receipts from each intervention and distribution signed by fishermen. The number of fishermen increased during the project time (from about 2,000 to over 3,000[16]), and the final ratio of fishermen who received training in safety at sea and basic equipment[17] was estimated at 66 percent. It should however be noted that the use of the various component of the equipment varies and also depends on fishing practices (such as distance from the coast). Some equipment is used (and asked for) more than others such as raincoats and first aid kits as well as GPS, while waterproof seal cases for phones, for example, are less needed, partly because not all fishermen bring a cell phone to sea.

44. The effectiveness of this equipment to contribute to saving fishermen has been clearly demonstrated. According to surveys undertaken by the project team on the causes of accidents at sea and direct interviews with rescued fishermen, the use of GPS allowed them to safely get back to the coasts while visibility was extremely reduced. The initially envisaged compass proved to not be efficient for the island situation. Indeed, as both islands are relatively small, (only 35 km long for São Tomé), lost fishermen

[14] Source: Port authorities.
[15] PIU Report: *Relatório dos pescadores desaparecidos no alto mar*, August 2016, author Olivio Diogo.
[16] *Relatório de Principais Resultados do Censo Geral da Frota de Pesca Artesanal/Semi-Industrial/ Empresas e Serviços Ligados a Pesca , Direção das pescas*
[17] Efforts have been made to better define what 'basic safety equipment' should include and what each fisherman should mandatorily go to sea with. A strategy for safety at sea was prepared owing to the projects' funding, and a draft regulation was prepared for safety at sea but not yet adopted. 'Basic equipment' is considered to be at least radar reflector, raincoat, first aid kit, and life jacket.

do not know which direction to follow and are likely to miss the land mass during foggy periods if their location is unknown. In addition, records show that in 2015, all but one of the fishermen involved in the 22 incidents recorded by the Port Authority had not been given training and safety at sea equipment. This validates the efficiency of these measures and the need to further expand training and equipment distribution to more fishermen. Other successful elements include exchange of experiences and good practices (such as taking drinking water and establishing a clear decision-making process in case of incident and risk of sinking).

45. Finally, it is noteworthy that in some sense, the theory of change was 'so successful' that there seemed to be emerging trends, especially among young fishermen, who now feel more secure and tend to venture further away to access more fish. However, given the fragility of their boat, this puts them at significant risk. Focused outreach to mitigate these new risks will be needed in the second phase of the project.

46. The project started an adaptive process, actively engaging communities, from the start to formulate solutions to the risks they faced and collectively select their adaptation options, which successfully reduced flooding exposure. The preparation of risk maps in all four pilot communities (and which was even started for Praia Sundy before the decision was made to change the location) helped communities to better understand the risks they were (or would be) facing. It informed the development of participatory climate-resilient development plans, which were completed in all communities. A good indication of the success of this process is the fact that communities came up with adaptation solutions that had not been initially selected by the project team (such as asking to be relocated to safer areas). In addition, local Emergency Risk Management Committees were established in 30 communities and have been very active by engaging the population to discuss adaptation options and, in some communities, to organize community activities such as cleaning of infrastructures and monitoring of weather events.

47. A wide range of adaptation options (protection, accommodation, and relocation) were implemented to reduce flooding exposure. To mitigate the impacts on households, protective works (dams, drainage, and wave breakers) were completed in the four pilot communities. Table 2 summarizes the works completed. Numbers indicated are based on measurements conducted independently by the Environmental Observatory and the office of cadaster[18] and confirmed by drone's observations, as well as direct observation from the team and during the ICR mission. Since the completion of construction works, households that used to be affected by floods during heavy rains or storms report that their house and properties (e.g. animals, canoes, wood) are now protected. It should be noted that the vegetative solution, intended to complement this protection scheme, has been relatively unsuccessful: while palm trees and creeping plants survived, attempts to plant mangroves have failed due to a combination of lack of maintenance and fragility of the plants. The lessons from those failures have led to attempts to use 'payment for result' approaches,[19] which have shown promising results. Further efforts to address this issue include the selection of more resistant species and better trainings and incentives for the local population to grow these plants under the second phase of the project.

[18] Government of São Tomé and Príncipe, *Relatório de medição das obras de engenharias e/ou adaptação implementadas no quadro do projecto pamczc,* October 2017.
[19] Some community members received small financial incentives for the number of trees surviving at the end of each month.

48. Finally, a change in behavior for construction and temporary protection is clearly notable (for example, households now more systematically move assets to safer locations). While some houses continue to be built in at-risk areas (especially in areas where construction works have lowered the risks), they are being built using designs that take the risks into account (for example, in higher elevation zones, using higher piles to elevate the floors) which demonstrates the positive impact of the project in risk awareness. Although there is a lack of a systematic process to report flood damages,[20] these various lines of evidence confirm an overall decrease of the number of flooded days and affected houses per flood event per year in Malanza and Ribeira Afonso (where protection works have been conducted).

49. However, in Santa Catarina, for example, the impacts for households located on the beach remained high in case of storms and sea surges as no protective works could be provided given the length and exposure of the beach. Results will be seen only once these households relocate to the safety zone (which will only be possible in Phase 2, under the WACA project). Phase 1 delivered key progress to enable relocation by identifying and cleaning these zones in Malanza, Santa Catarina, and Praia Burra[21]). Another positive impact of the project is the provision of titles to the people who would relocate to safer areas; they did not previously hold title to the land they were occupying.

50. A comprehensive coastal planning policy would also be needed to ensure sustained protection and development of the coasts. Supporting the development of a draft climate-resilient coastal planning policy was an initial objective of the project, but based on an assessment of the local institutional context, the team considered that instead of drafting a new law that would just add to a malfunctioning policy environment, it would be more efficient to first assess the gaps in existing legislation and eventually put these different pieces together to inform a broader legislation. It therefore funded risk analysis and participatory workshops but was not able to move forward toward a full legislation due to a lack of coordination and enforcement.

51. This project benefited from the contributions of other programs aiming to increase the adaptive capacity of STP and from a successful coordination with these programs. In particular, UNDP financed meteorological and hydrometric stations and supported the CONPREC as part of its EWS program, which contributed to the improvement of the preparation and dissemination of timely warnings. UNDP also replicated the project's approach and created Emergency Risk Management Committees in 16 additional communities (while the project itself only directly financed 14 committees). The close collaboration with partners enabled to improve, scale up, and amplify the impacts of this project, but its outcomes could not have been met without the activities carried out specifically by this project.

Table 2. Construction Works Completed by the End of the Project

	Type of Construction Works	Size (in m)
Malanza	Gabions	127

[20] As further explained in annex 1, it should be noted that the indicators reported can be slightly misleading. In some instances, they show an increasing trend of the number of flooding days, but this is actually mostly due to an increase in attention to the phenomena. Increased awareness and the creation of the local committees have led to more people reporting the damages they experienced. It is also important to note that the baselines had been underestimated due to the absence of capacity before the start of the project to consistently and efficiently record impacts of floods.

[21] In Ribeira Afonso, it wasn't possible to find a suitable and available land during the time of the project, only private lands could have been candidates

	Type of Construction Works	Size (in m)
	Dike	278
	Drainage canal	878
	Natural protection for the coast	225
	Natural protection for the dike	250
Ribeira Afonso	Drainage canal	525
	Dike	350
	Natural protection for the coast	136
	Parking for canoes	130
	Break water	559
	Natural protection for the dike	525
Santa Catarina	Dike	253
	Gabions	150
	Drainage canal	1,122
	Natural protection for the dike	350
Praia Burra	Drainage canal	250
	Natural protection for the coast	250

Source: Government of São Tomé and Príncipe, *Relatório de medição das obras de engenharias e/ou adaptação implementadas no quadro do projecto pamczc*, October 2017, Report on measurement of engineering and adaptation works implemented under the Adaptation to Climate Change Project, October 2017.

Justification of Overall Efficacy Rating

52. The project's effectiveness has been rated **Substantial** as its activities led to strengthening the adaptive capacity of vulnerable coastal communities in STP and the protection of their livelihood, housing, and lives. Besides some shortcomings, this project met its objectives. Importantly, the project engaged communities and agencies in an adaptive process that delivered results in the short term and will enable them to continue to proactively take adaptation measures in the long term. This successful approach has been identified as a model for SIDS and coastal projects and could be replicated in future projects, with the sharing of experience in the design of the regional WACA project (P162337).

C. EFFICIENCY

Assessment of Efficiency and Rating

53. Efficiency is rated **Substantial**. An economic analysis was carried out for this ICR for Components 1 and 2. Conservative estimates were used for the benefit streams. Multicriteria analyses were carried out based on avoided losses related to the project action. The full analysis, including assumptions, is presented in annex 4. At appraisal, an economic analysis had been carried out for Component 2 only, due to the difficulties in estimating the value of human lives related to Component 1. However, since then, a methodology was developed for the second phase of the project and it has been used to analyze the benefits of Component 1. It should however be noted that while results are robust to adverse changes in the key parameters, relevant data are scarce and not easily available in STP. The economic analysis, and its results, should therefore be interpreted with this in mind.

54. The analysis concludes that the safety at sea and early warning equipment (Component 1) have an estimated economic internal rate of return (IRR) of 25 percent. No ex ante analysis was made for this component, but, when compared to other similar projects, this rate can be considered as positive. For Component 2, the ex post analysis estimated that the adaptation investments, when aggregated across the four pilot communities, had an IRR of 10 percent. The ex-ante economic analysis for this component estimated an economic IRR of 15 percent. It is important to note that one of the pilot communities was changed during the project, but it still makes sense to compare both numbers as both the costs of the planned constructions and the level of damages experienced are quite similar in both communities. Overall, the economic analysis concluded that project-supported investments have brought significant economic benefits to the beneficiaries.

55. The difference between estimated and actual component costs is presented in annex 4 and has briefly been discussed in section I. It shows that the project efficiently reallocated resources to the activities that would deliver the most impacts, such as the decision to not fund the installation of a Doppler radar due to recurring costs and maintenance concerns and instead allocate more funds to adaptation measures, the decision to expand the safety at sea program, and preparation of the second phase.

56. Regarding construction works, which represent over a quarter of the costs, the difference between estimated and actual costs overrun was US$221,213 (see annex 4.). Overall construction works did not suffer from unreasonable delays. The difference in costs and delays can be explained by several factors, which did not hamper the efficiency of the overall project, including the reallocation of funds following the decision to not buy a Doppler radar (see section I.B). STP is a singular, small market (particularly in Príncipe, the smallest of the two main islands), and it can be hard to find a lot of companies bidding for the calls for proposal. In Praia Burra, construction works have been delayed due to initial low bidder response and the works had to be rebid. As detailed in Table 4.3 (annex 4), most of the delays are due to weather events or to the fact that STP had never done such construction works and had to learn by doing. It is also worth considering the constraints to the engineering design due to the lack of systematic rainfall and river flow data. Finally, delays in Santa Catarina and Ribeira Afonso have been proactively addressed by the Government, which replaced works supervisors, to maintain costs.

57. Overall, the design of the project and its implementation contributed to efficiency. Following best practices learned from other SIDS and community coastal management projects, the project activities had been designed in a flexible way, ensuring that activities chosen, based on communities' consultation and technical studies, would maximize results. The team of the PIU stayed fully staffed throughout the project, with smooth transition between staff when needed, both on the implementing entity's and on the World Bank's side.

58. Even if additional financing was requested for the first time in 2015, it was decided to start a full new project for the second phase (as previously mentioned) whose objective is closely aligned with this project, to leverage more financing and knowledge. This has led to the extension of the closing date by a year to ensure continuity in the project activities between phases and in this sense contributed to the efficiency of the project outcomes in the long term.

59. ***Alternative analysis.*** Without the project, the country would have implemented adaptation activities, but without a change in paradigm. Weather and hydraulic conditions would have been monitored through the acquisition of the automatic stations, but without the diffusion of this information

to the end-users, the information would not have been fully exploited to save lives. Also, the fishermen would have not been trained to use the potential information to adapt their fishing practice and would have still be threatened by unpredictable events, without safety materials to save their lives. Regarding the coastal communities, the government would have financed some interventions to deal with urgent needs, the localized relief efforts, but without the systematic analysis of the situation of the coastal communities, which would have been locked in some at-risk situations, with some local developments, such as electrification, or construction of social infrastructures which would have pulled people to locate themselves in exposed areas, increasing future risks. The project changed the approach, by providing both protection and vision for future developments.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

60. The overall outcome is rated **Satisfactory** based on the joint evaluation of high relevance, substantial efficacy, and substantial efficiency. The objectives and implementation of this operation have usefully piloted community outreach strategy. The project activities have already inspired other donors who replicated the approach (for example, *Projet de rehabilitation des infrastructures d'appui à la sécurité Alimentaire* - PRIASA II) and expanded it and will be used in its second phase and in the WACA regional program. The few shortcomings observed in some of the outcome indicators are not considered to have a major effect on the overall outcome.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

61. The project did not include specific targets or activities relating to gender. However, its outcomes have benefited women directly, and it is also possible to make some general qualitative statements and quantitative estimates about the project's impact on gender. A specific effort was made to ensure gender balance in the Emergency Risk Management Committees. It was difficult to reach parity due to cultural barriers, but the number of women has been constantly growing and they now represent, on average, a third of the committee members, as documented in the composition of the committee. The project also had a positive socioeconomic impact for dependents of fishermen (discussed in further details in annex 4). Most of the women in coastal areas depend on selling fish caught by designed fishermen for their livelihood and therefore benefited from the project's activities to protect their fish suppliers' gear and life. Adaptation works, particularly in Santa Catarina and Malanza, also improved access to water, and in those villages, 1,351 women can now use nearby canals for their daily chores, reducing the time dedicated to cleaning by around 1 hour every day on average.

Institutional Strengthening

62. The project contributed to several activities that will strengthen institutional capacity in STP. For example, it supported the Director of Fisheries and the Harbor's authorities to register canoes, which is part of a much-needed and important step toward the creation of complete national registries and enhanced statistical system (as also identified in Outcome 1 of the CPS Interim Note). It also organized the sharing of experiences from the Comoros to help the Government consolidate its incident enquiry report system. Overall, the project financed several trainings to strengthen institutional capacities (such as

international trainings for the employees of the INM). It also made efforts to retain and maintain local capacity in the long term in the government agencies (see section I.B 'Significant Changes during Implementation").

Mobilizing Private Sector Financing

63. Not applicable.

Poverty Reduction and Shared Prosperity

64. By targeting the poorest part of the STP population (isolated coastal communities and fishermen) as beneficiaries, the project has been directly contributing to poverty reduction, through improved and more secure livelihood activities (reduced time to walk to school or to sources of water, for example) and through possibility for fishermen to access more resources in a secure way.

Sustainability

65. **The project developed sustainable systems,** with creation of the committees of risk, reinforcement of the CONPREC, and its capacitation, development of safety-at-sea mentality between fishermen, but also the structuration of a core group of institutions working on the adaptation of the coastal areas. All these elements have been institutionalized and therefore will continue to provide the enabling environment for sustained momentum, which will allow the efficient integration of future supports, such as the WACA project, which will put the pilots of this project at the scale required to build the resilience of the coastal areas of STP and its population.

Other Unintended Outcomes and Impacts

66. The project leveraged other basic development outcomes (such as electricity and education) in the safety expansion zones it created, particularly in Malanza and Praia Burra. More specifically, in Praia Burra, the preparation of the expansion zone enabled the construction of a school (financed by the United States Agency for International Development), which could not have been built otherwise and will benefit children who were either not going to school or walking over 5 km every day to get to school. The regional government will also install electricity in this area by 2018/2019. The project also conducted additional protective construction works for a school located on a beach within an adjacent community (Io Grande—which was not part of the pilot communities) whose wall had been destroyed due to extreme climate events and sea surges and would have had to remain closed otherwise. This response further aligned the project with the CPS objective of strengthening human capacity (education).

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

67. **Soundness of the background analysis.** The project was well prepared. Its PDO and design were clear and its activities were straightforward. It was technically simple, adapted to the limited technical capacity and absence of basic weather data and coastal maps of STP. The choice of the beneficiaries and

pilot communities directly supported the country's adaptation plan priorities. International experts, financed by the Project Preparation Grant, conducted analyses of climate change impacts (both historical and forecasted) to inform the community participatory engagement and the design of interventions in the pilot communities, as well as the identification of possible adaptation options in two of these communities.[22]

68. **Identification of institutional risks.** Overall, risks and mitigation measures were well identified. In particular, limited institutional capacity was a strong concern, and efforts were made to mitigate these by hiring staff to the Minister of Public Works and Natural Resources (see section B 'Significant Changes during Implementation'). Institutional responsibilities had been clearly outlined, and each activity was under the sole responsibility of an agency. To mitigate the risk of lower capacity in the fishery sector at the time of appraisal, an NGO experienced in coastal and safety at sea issues (MARAPA) was used to assist with the training and distribution of equipment.

69. **Simple design and built-in flexibility to fully integrate beneficiaries' views.** The project's design was simple, with clear objectives and straightforward sequencing of tasks. It did not predetermine all the activities during preparation but rather allowed for flexibility to adapt to the needs of the local communities, the assessment of capacities, and the findings of technical studies. The planning of activities by stages allowed for this flexibility and for ongoing adjustments. This was particularly useful in Component 1: for example, changes were made to the type and quality of equipment ordered depending on what would function best and be most useful for local fishermen—notably decisions to order a higher quality of raincoats as the lower-quality ones were easily torn or to replace compasses with GPS units. It was also essential for Component 2 as the ability of local communities to self-determine their adaptation options based on vulnerability assessment maps was intrinsic to the project strategy. Through an appropriate selection of beneficiary groups to engage, and dedicated means for community outreach, the project was able to build capacity at the local level, engage with the local communities and collect their views on the best adaptation options.

70. **At the time of approval, the framework of interventions was clear and well understood by the different partners, and therefore, the project was ready to be implemented**. By design, the project kept some flexibility for further development, but the key partners, identified during technical studies carried out for project preparation, were fully on board.

B. KEY FACTORS DURING IMPLEMENTATION

Factors Subject to Government and/or Implementing Entities Control

71. **Effective coordination within agencies.** The PIU effectively coordinated with all the stakeholders and agencies involved in this project. This was particularly important given the numerous stakeholders involved (INM, CONPREC, Coast Guard, Port Authority, Directorate of Fishery, MARAPA, and communities). It organized regular meetings with all stakeholders and a note on roles and responsibilities of each agency, as described in the Operation Manual. Given the multi-sectoral aspect of its activities, it was very important to ensure a smooth coordination with the Directorate of Fisheries, Coast Guard, and CONPREC, as well as

[22] UNESCO-IHE and Deltares. March 2011. "Coastal geomorphology and adaptation options study: São Tomé and Príncipe (Santa Catarina and Ribeira Afonso)."

maintain a close link with local communities. The composition of the team allowed for this outreach as it included both the Director General of Environment, who could easily reach out to his counterpart in other governmental agencies on the one hand, and some staff who could easily connect with the beneficiaries, owing in part to their ability to speak the local language and knowledge of these communities. While coordination could be further strengthened, including through enforcing a better and more coordinated M&E system, these activities were conducted in a very inclusive and collaborative way overall.

72. **Fiduciary.** As further described in section IV. B, despite limited capacity initially, the implementing agency progressively built capacity and trained staff to deliver adequate procurement, financing, budgeting, and financial management.

73. **Counterpart financing.** While the STP Government fulfilled its commitment toward the PIU (and provided a good office location and environment as well as vehicle, for example), recurrent issues emerged related to the concerns of the lack of provision for the contingency fund. The contingency fund was supposed to help maintain search and rescue operations and to finance CONPREC daily operations (as discussed in section II). The availability of funding for rescue operations represented a crucial part to ensure safety at sea (for example, in 2011, this fund directly contributed to saving at least 10 lives). As discussed with the Government ahead of the project and included in the Legal Agreement, the Government committed to maintain its annual budget at around US$90,000, budget identified as necessary to conduct search and rescue operations. It was initially established in 2011 and seeded with contributions from Taiwan, China and Equatorial Guinea, but it was already almost depleted when the project started. Ad hoc budget allocations and special funds allocated by the President of STP partially funded these operations, but it resulted in delays when timing was vital for this type of activity. Recurrent concerns were shared with the Government about the lack of continuous, long-term, and secured provisioning of this fund, and it led in several instances to the downgrading of the implementation progress rating.

74. **Legislation and regulations.** Further action from the Government to advance key policies topics would have been needed to maximize the impact of the project. Man-made causes of costal erosion need to be addressed through better coastal management planning and a phase-out of sand mining. The project supported preliminary technical studies (for example, to explore the feasibility of offshore sand dredging[23]), and the Government showed interest (including at the Ministers' level) to address sand-mining issues. A revision of the law on aggregate was initiated, and sand-mining is now authorized only in one beach in the island of Príncipe, while deep-sea dredging will continue in authorized zones (so far only in one site offshore close to Malanza), and alternatives (such as crushed basalt) are increasingly used, but enforcement is still lacking. Further, a strategy was prepared for safety at sea (*Estratégia Nacional no domínio de Aviso Prévio Costeiro e Segurança Marítima*), along with a draft legislation—clarifying the requirement for equipment by fishermen—but the Government has not passed it yet. The delay is because the legislation could not be enforced without all fishermen being equipped. This would have been useful to maximize the impact of this project.

[23] Alessio Giardino. February 2014. Preliminary Study for the Construction of Two Beach Nourishments (Case study: Malanza and Praia Burra). Deltares.

Factors Subject to World Bank Control

75. **Alignment with partners' activities.** The World Bank's team ensured continuous and effective coordination with partners and other donors, which enabled a good maximization of resources (see section II.B 'Achievement of PDOs'). Notable achievements include the acquisition of meteorological equipment and doubling of the number of Local Risk Committees through UNDP funding. The NGO MARAPA also benefited from the African Development Bank (AfDB) funding to strengthen safety at sea and the fishery sector, which helped them to deliver better results for this project as well. Another example is a training in geospatial data interpretation funded through a grant from the Trust Fund for Environmentally and Socially Sustainable Development. This was a great contribution to the process of participatory risk mapping, as participants could access data on historical coastline and settlement changes from the 1950s to the present, as well as future climate change projections.

76. **Adequacy of reporting and supervision.** As further described in section IV.C, the World Bank provided a high-quality supervision, tailored to the specific needs of this complex project, in a difficult environment. It closely supported the PIU in the implementation of the project, in overcoming difficulties, and in increasing flexibility and adaptation capability. The team supporting the project was adequately staffed and included a Procurement Specialist and a Financial Management Specialist (both based in Angola); an Environmental Specialist and a Social Development Specialist joined the team as the community engagement work increased. A Coastal Area Planning Specialist, a Coastal Protection Engineer, an EWS Expert, and a Fishery Expert joined the different supervision missions when the respective topics were important and provided supports from Washington, DC, as required. The World Bank team made specific efforts to strengthen the M&E framework and ensure regular and timely data collection. It was able to regularly report on progress and challenges, in a very candid manner (as shown in the ISRs). The quality of this reporting allowed for the development of efficient and strategic action plans to address implementation issues and define priority actions.

77. **Diligent application of the Environmental and Social safeguards**. Overall, the project brought significant positive environmental and social impacts and the World Bank team was very careful and diligent in ensuring that environmental and social safeguards would be fully respected. It hired the required specialists and reinforced capacity on social issues as soon as relocation was identified as an option by local communities. The attention that the team put on the implementation of the safeguards and on community consultations were key factors in avoiding any conflicts or concerns, while dealing with complex activities such as planning for relocation. The team also addressed early on some issues that might have arisen later on, such as the question of property title, which will be important in the second phase of the project, when people will relocate to new locations. It set up a clear process with local authorities to avoid any problems when facing the issue of land tenure, which is particularly sensitive in STP. The World Bank team also innovated and explored new approaches, which will be particularly useful for future adaptation projects (such as WACA). These include the recognition that compensatory measures for people giving up their land to serve as safety zone for relocation could be considered as an intrinsic part of adaptation investments (and therefore covered by the project) and that voluntary relocation is a possible adaptation solution for households faced with climate change impacts.

78. **South-South experiences.** The project benefited from lessons learned in other SIDS projects in its preparation phase and during implementation. Collaboration with Mozambique Disaster Management

Agency inspired the creation of the CONPREC and of the local risk committees. South-South exchanges (with Comoros and Madagascar) have also been extremely useful to exchange good practices between fishermen (bringing enough water on board, designating a leader in charge of decisions in case of incident, and so on) and to provide trainings on weather information dissemination.

Factors outside the Control of Government and/or Implementing Entities

79. **Lack of local ownership by communities.** The tendency to not trust the Government and the rather individual mindset of local communities posed several challenges during project implementation. Communities tended to adopt a passive outlook toward adaptation, and additional efforts and resources were needed to ensure the realization of tasks such as cleaning and maintaining the construction works, nursing the mangroves, or registering canoes on official registries (which implied a small tax but helped finance support to fishermen and rescue operations).

80. **Natural disasters.** During the project implementation, new data became available showing that the coastline was receding faster than expected (with loss rates approaching 0.3–2 m per year and expected to accelerate further with climate change[24]). In addition, unusually severe storms caused very serious damage to vulnerable households in 2014–2015. These elements contributed to the changes in adaptation options (as explained in other sections) and in the desire of communities to envision relocation.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

81. The project design for the M&E was constrained by the limited ex-ante availability of data and local capacity, but overall is was satisfactory and represented a useful framework to monitor progress towards the PDO. The chosen indicators [25]allowed for an effective measurement of the increased adaptive capacity of the targeted population (particularly to measure actions taken to moderate the potential future impacts from the adverse impacts of climate change). It should be noted that in a small country with limited capacity like STP, it is particularly challenging to design and implement M&E systems. On the results framework, the PDO indicator on EWS would have benefitted from a corresponding intermediate indicator to capture generation of data. This would have allowed for timely actions if this failed instead of having one overall indicator only. The 'number of flooded days per flood event per year' indicator needed to be better defined as the project helped reduce the exposure (damage to the houses) but not the occurrence of rainy events. Little can be done to prevent the excessive rainfall, so the project focused on avoiding and minimizing impact on houses.

82. While most indicators were set in a simple and straightforward manner, few indicators were difficult to measure. Partly, due to the difficult context and partly due to the need to better define the indicators, such as the number of artisanal fishers 'lost at sea' (which led to some confusion between

[24] Maps showing the coastlines and the community expansion in 1956, 1990, 2003, and 2010/11 produced by GeoVille and the European Spatial Agency.
[25] Indicators were placed in the wrong columns in the PAD

fishers who got lost but came back and the ones who disappeared and were assumed to be dead after a year—although sometimes fishermen 'reappear' much later in neighboring countries). A revision of some indicators was done in 2015 and helped address this issue. However, other indicators (such as the number of equipment distributed or training completed) were well defined and were easy to track, owing to equipment inventories, receipts after each distribution, and training organized by MARAPA. The limitations in the monitoring of these indicators resulted from the limited capacity and the lack of enforcement of a systematic and rigorous monitoring process by the implementing agencies. Finally, some indicators (such as the 'number of flooded days per flood event per year', which aimed to assess the impact of adaptation measures to reduce exposure of targeted communities) were very difficult to track due to the lack of data on the ground, as there was no systematic process to record extreme weather events and damages, and there was no clear definition for flooding event. Indeed, in the absence of an insurance system in STP, targeted communities did not systematically report their losses systematically after a disaster, making it very hard to precisely assess the evolution of damages. These difficulties were partly addressed by the efforts to develop community-level M&E, which greatly contributed to get better data (through CONPREC and local risks committee for example).

M&E Implementation

83. Given the context, the monitoring of this project could have benefitted from a clearer and more robust M&E methodology and reporting system to more consistently collect and report information. Indicators were tracked for each Implementation Status and Results Report (ISR) and the World Bank team used the M&E framework to help the project and identify priority actions, as documented by the Aide Memoires. However, there were some shortcomings in the overall M&E implementation. While the PIU had developed, with its partners, a plan to report on the indicators on a quarterly basis, the ICR mission found that the process was not always followed and that staff were sometimes unaware of or not completing their responsibilities. These issues were flagged in the Aide Memoires, and the World Bank team made an effort to support the project by ensuring that data were accurately collected during supervision missions. In the second phase, a full-time M&E expert will be hired to provide training to the different actors in collecting and sharing data. Despite these issues, overall the M&E was used continuously during the project implementation and allowed for an effective tracking of its progress.

84. It is also important to note that compared to most adaptation projects in similar countries, M&E in this project was successful. This project had to experiment and successfully 'learned by doing' as it revised indicators based on lessons learned during the project. It also managed to establish baselines and have reasonably clear indicators and data, which most adaptation projects struggle to do.

M&E Utilization

85. Project management could have benefitted from a more robust and better-designed M&E framework, however the framework adequately reported project achievements and largely informed decision-making. Intermediate outcome indicators were used to track project implementation and were systematically discussed with the project team. These indicators were used continuously during project implementation, including to take decisions on the priority actions following each mission of the Bank team. Better implementation of the M&E framework would have helped achieve even better results in M&E utilization. For example, an up-do-date and accurate monitoring of the distribution of equipment and trainings in the various communities, along with a clearer definition of 'basic equipment' (as mentioned

previously), could have helped better plan and prioritize these distributions and avoid remaining stocks at the end. This equipment will be distributed under the WACA project once clarity on the new legislation is adopted.

86. The focus on community-based M&E allowed the Project to address the issues of lack of institutional data. The inclusion of an M&E specialist to the project team of the implementing agency for the second phase should allow for capitalizing on all of the M&E efforts and baselines prepared in the first phase and for further progressing on improving the M&E inn the second phase.

Justification of Overall Rating of Quality of M&E

87. The shortcomings in the design, implementation, and utilization of M&E led to a **Modest** rating for the M&E. The M&E was sufficient to assess the achievement of most of the objectives, but it did not allow for the testing of links in the results chain and presented some weaknesses. An early restructuring of the project indicators helped address some of these issues, and strong qualitative indications helped compensate the limits of the M&E, so these shortcomings did not cloud the ability to assess the PDO achievements (see section II).

B. ENVIRONMENTAL SAFEGUARD, SOCIAL SAFEGUARD, AND FIDUCIARY COMPLIANCE

88. This small project was considered relatively large for STP's capacities, and specific attention was placed on mitigating potential fiduciary and safeguards risks, which ensured a satisfactory environmental, social, and fiduciary compliance.

Environmental and Social Safeguards

89. The project triggered[26] OP/BP 4.01 on Environmental Assessment and OP/BP 4.12 on Involuntary Resettlement.

Table 3. Safeguard Policies triggered

Safeguard Policies Triggered	Yes	No
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)		X
Forests (OP/BP 4.36)		X
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)		X
Indigenous Peoples (OP/BP 4.10)		X
Involuntary Resettlement (OP/BP 4.12)	X	
Safety of Dams (OP/BP 4.37)		X
Projects on International Waterways (OP/BP 7.50)		X
Projects in Disputed Areas (OP/BP 7.60)		X

[26] Integrated Safeguards Datasheet - Appraisal Stage
http://wbdocs.worldbank.org/wbdocs/viewer/docViewer/indexEx.jsp?objectId=090224b080abb8b7&respositoryId=WBDocs&standalone=false.

90. The effort to reinforce PIU capacity included providing extensive trainings on safeguards to the Project Management Unit (PMU) and the Directorate General of Environment (they attended regional safeguard training sessions in Lusophone countries). As soon as relocation and compensation issues were raised, a Social Development Specialist joined the World Bank team to strengthen capacity on the social issues and a qualified Project Sociologist was added to the staff of the implementing team. A Grievance Redress Mechanism (GRM) was put in place at the community level, so that each person who would feel affected could report to the designated authority in each community. However, no complaint was formally filled, and any potential conflict was resolved at the community level. To facilitate the expression of concerns, the GRM will be strengthened during the second phase, to further promote.

91. Given its focus, the project brought significant positive environmental and social impacts, including reduced flood risks and vulnerability to natural disasters (and loss of lives and assets) improved general environmental conditions and quality of life of pilot communities. Environmental impacts were judged Modest (mainly related to temporary side effects of construction works), and the project was classified as Category B. The Government disclosed an Environmental and Social Management Framework (ESMF) in March 2011, including an Environmental Management Plan, and an RPF disclosed in March 2011 (and revised in April 2015, because of the restructuring). It disclosed the documents at the Directorate General of Environment, and summaries were published in São Tomé and Príncipe's digital newspaper *Téla Nón*. Impacts were considered to be "modest, short-term, site-specific, non-sensitive, or reversible."[27]

92. Given the initial limited knowledge on the pilot sites, located in sensitive coastal and hydrological systems, and to avoid maladaptation, geomorphological and hydrological modeling studies were realized in three of the pilot sites and a National Expert Engineer, as well as World Bank Flood and Coastal Engineers, was mobilized before the construction works.

93. **Environmental Assessment (OP) BP 4.01.** In application of the ESMF and the Category B-partial assessment of the project, Simplified Impact Environmental Assessments were prepared and publicly disclosed by the PIU before all constructions works were conducted in the pilot communities.

94. **Involuntary Resettlement Policy OP/BP 4.12.** In its design, the project had preferred to support the elaboration of risk mitigation measures and to develop incentives for people to move toward safer areas rather than relocation options. Involuntary resettlement was not planned as part of the project, but compensation guidelines had been prepared in the RPF at the time of the appraisal in case the project needed to acquire land.

95. An Abbreviated Resettlement Action Plan, aligned with the RPF, was prepared for the establishment of the expansion areas in Malanza and Santa Catarina[28] to compensate to the people affected. Some of the four affected persons (two in Malanza and two in Santa Catarina) were interviewed during the ICR mission and reported to be satisfied with the compensation.

96. It is important to note that, as mentioned in the restructuring section, in application of OP/BP 10.00, the project obtained Vice President's approval (in July 2015) to finance cash compensation for the

[27] Source: The ESMF.
[28] http://documents.worldbank.org/curated/en/528981468057321549/pdf/SFG1262-PORTUGUESE-RP-P111669-PUBLIC-Disclosed-8-4-2015-Box393180B.pdf.

lost assets and lost production of crops and fruit trees (totaling US$5,000 for the four affected people). Following a pioneering approach, this expense was considered as an intrinsic part of the adaptation investments of the project (as population relocation was finally one of adaptation solutions pursued by the project due to the absence of another satisfactory solution for the most vulnerable households settled on the beach frontline). To follow a similar approach as for the abovementioned compensation, it was decided to give cash, and for urgency matters and avoiding delaying the start of the construction works, it was decided to allow this expense under the project.

97. With regard to social protection, it is important to note that continuous public consultations were at the core of the project. It followed an extensive process of public consultation during project preparation (including through the preparation of the NAPA) at the community level to discuss the approach and the typologies of interventions. During project implementation, through the participatory approach followed to develop risk maps and climate-resilient development plans, local populations were fully included in the selection of adaptation options and the design of interventions.

Fiduciary

98. Procurement under the project was conducted in accordance with the World Bank's Procurement and Consultant Guidelines and policies, as well as the provisions of the Grant Agreement. The conditions for effectiveness were met, and the project became effective on September 26, 2011. Some procurement risks had been identified during the project preparation given the limited capacity of the country, and mitigation measures included hiring Procurement and Accountant Specialists as part of the PMU, developing a detailed Operation Manual (in September 2011) to clarify responsibilities and procedures and walk the team through each step of the procedures

99. Regular post procurement reviews were conducted in 2012, 2016, and 2017. They revealed some delayed processes, which could be explained by the small market size, and the need for regular archiving of the documents. In some cases, such as the purchase of the meteorological forecast studio, the number of bidders were too limited to ensure proper competition. There were no major issues with procurements, but given the highly specialized meteorological equipment, the PMU reached out for international expertise when procuring these goods. The procurement process for the TV studio, however, showed some shortcomings, as insufficient training and repairs were provided following the delivery of the TV studio.

100. Financial management procedures were reviewed periodically as part of the World Bank supervision. Project financial supervision missions were carried out in 2012, 2013, 2016, and 2017 and generally found the project to be satisfactory and in compliance with World Bank financial reporting and auditing procedures and policies. The PMU remained fully staffed, equipped, and operational for the duration of the project, with staff meeting the needed qualifications. Quarterly financial reports were most often submitted on time (some delays were noted at the beginning of the project). Besides an initial delay in contracting the audit firm, projects' statements for annual budgets were audited by independent auditors and their audits were unqualified. However, recurrent comments were made on the necessity to identify expenses by category and component.

101. As the Government was in the early stages of the Integrated Financial Management Information System to line ministries at the time of appraisal, it was recommended that the Government purchase an off-the-shelf accounting software. However, this was not budgeted for by the Government and could not

be covered as part of the project expenses, and the software was never acquired. Eventually, with the delegation of the fiduciary role to the centralized Project Fiduciary and Administrative Agency for the second phase, it does not make sense to buy the software separately, and the issue will be resolved in the second phase of the project. Accounting was done using Excel tables, but the use of the accounting software would have streamlined and improved the process.

C. BANK PERFORMANCE

Quality at Entry

102. The preparation of the project (2009–2011)—following the support to the preparation of the NAPA and part of a broader national adaptation program—was critical for the success of the project (as discussed in section III). The World Bank helped mobilize international experts specialized in climate change, coastal issues, or other relevant fields (such as the collaboration with the European Space Agency to use historical satellites pictures to assess coastal recession) and to conduct the NAPA process and subsequent preparatory studies to identify possible adaptation options in two of the pilot sites, and benefited from a close collaboration with other donors and adaptation programs. The team provided recommendations to ensure the adequacy of financial management and procurement arrangements and took measures to mitigate some of the identified risks (as described in the previous section). The World Bank Specialists reviewed the key documents related to environmental, social, and fiduciary compliance (including the EMSF, Procurement Plans, Operation Manual). From similar projects in SIDS, the World Bank had learned useful lessons, which were applied to this project preparation and ensured a good identification and mitigation of risks. In particular, the project followed a participatory approach to identify the best adaptation options with the population to ensure strong ownership and lower social risks. However, as discussed in previous sections, the M&E framework could have been improved with targets easier to measure and covering all the elements of the strategy of intervention of the project. Finally, while the project could have benefited from more funds, a conscious decision was made to proportionate funds available and dedicated support to the capacity of the country.

Quality of Supervision

103. The task team supported effective implementation through appropriate supervision. Its proactivity, availability, and efforts to include all stakeholders and coordinate with other donors was praised in all interviews during the ICR mission. Missions were carried out at least annually during the six years of project implementation and were often joined by technical experts. Regular contact was maintained through frequent emails and calls. The Aide Memoires and ISRs, which assessed the progress of the project with candor, tracked the activities and ensured timely delivery while also identifying shortcomings and suggested actions to overcome them.

104. The team included motivated and very committed staff with the required skills for the project and was led by a Task Team Leader (TTL) with solid experience in SIDS and coastal projects. The team's strong involvement and the relative small scale of the project allowed for testing new approaches, which will now be replicated in other countries (such as the community participatory approach and the recognition of voluntary relocation as a full possible adaptation solution for households faced with climate change impacts). Moreover, in the absence of a World Bank resident mission, the team made a specific effort to provide dedicated implementation support and financial and fiduciary risks mitigation measures (as

highlighted in section IV.B). The World Bank team was well aware of the limitations of the M&E framework and regularly identified it in the Aide Memoires and ISRs. Indicators were revised when needed to address issues of clarity and consistency (see section I.B) and to implement monitoring processes and methodologies.

105. Finally, as regularly flagged in the ISRs, the supervision budget was very limited (around US$45,000 per year for most of the implementation years, excluding budget for safeguards) while the limited level of capacity of the country, the SIDS environment, and the complex and specialized issues of the project would have required additional funding. With this amount, the task team would only able to do about one and a half supervisions a year when at least two would have been needed, and it led the team to limit its supervision actions to the essential (for example, no formal Midterm Review was conducted[29]). The project team had to request additional funding to maintain the quality of supervision needed and ensure adequate completion of World Bank fiduciary, safeguards, and technical standards.

Justification of Overall Rating of Bank Performance

106. Based on the World Bank's effectiveness in the preparation and supervision and the minor shortcomings, the World Bank's Performance is rated **Satisfactory**.

D. RISK TO DEVELOPMENT OUTCOME

107. The project was designed from the beginning to be part of a broader national adaptation program, to ensure sustained support to the different activities, as most of the outcomes of the project are elements of a long process, which would require consolidation and upscaling. It is with this perspective that the opportunity to prepare a second phase was identified already in 2015 to reinforce the outcomes of the project.

108. As identified early in this project, there is a concern about the sustained ability of the Government to maintain functioning EWS mechanisms developed by the project. The Government had established a new Disaster Contingency Fund, but its provisioning has been a constant concern and funds have mostly been released based on specific requests following special events. In addition, it is important to keep in mind that 90 percent of the budget of São Tomé and Príncipe is dependent on international aid, and the availability of funding could therefore be affected depending on changes in international community priorities.

109. The impact of infrastructure on disaster risk reduction is highly dependent on the conditions of these constructions. A potential issue in the longer term is the lack of maintenance of this built infrastructure, which could result from different causes: financial, political, or even environmental. For example, stairs in Praia Burra that were part of the river works were already destroyed due to the river current and erosion due to pedestrian traffic. In other sites (such as Santa Catarina), the impact of the drainage work could not be lessened due to the obstruction of the drainage canals by the accumulation of trash or lack of maintenance to keep the river mouths open. This prevents the water from properly flowing out and could lead to flooding in the event of heavy rains. This problem has been addressed for some

[29] However, the ISR done in March 2014 has been used to perform midterm stocktaking and identify the needs to adjust the project indicators.

canals of Santa Catarina and Malanza by regular cleaning organized and financed by the local authorities but would need to be extended to all construction works in all sites. To address this problem, local risks committees were provided with some tools to organize cleaning activities and a strengthened involvement of local governments and the Community Groups for Road Maintenance (*Grupo de interesse de Manutenção de estradas*). However, at the end of the project, maintenance remained a concern, as incentives for such activities prove not to be sufficient. The second phase will include conversations with the locals to ensure the transfer of responsibilities, against additional support in the communities.

110. Institutional risks seem limited as there is close ongoing coordination between the country's agencies and with the international donors. The CONPREC was temporally deactivated during a transitionary government in 2013–2014, but it was fully reinstalled thereafter, and it seems that it was a temporary issue. However, limited capacity and lack of proactivity of some agencies to actively fix or maintain over time the equipment they have received and have been trained to use could threaten the sustained impact of the project, most notably its ability to generate timely weather reports.

111. Additionally, until better fishery management is implemented (and clear fisheries exclusive zones and protected areas defined), halieutic resources will continue to be scarce near the coast, forcing fishermen to venture offshore and take high risks. Some progress has been made to adopt fisheries management practices, but the implementations of the practices are slow.

112. Social risks might arise in the future related to the relocation of some people in the safety area. The project paid specific attention to follow a community-led process to choose the future beneficiary of support for relocation, based on clear and transparent criteria (health, disability, disease, economic situation) to mitigate these risks. However, when the relocation process actually starts, given that the absorption capacity of the safety expansion zone is limited and will not be able to accommodate all the communities in need, some tensions could emerge, especially if communities experience other flooding events or if newcomers or most powerful people try to settle there. The lots have been allocated and will prioritize the most vulnerable people, who will be supported to move as part of phase 2 of the project. It is therefore very important that the organized settlement of these zones (including installation of public services and regular maintenance to avoid vegetation regrowth) starts soon and that the Government and partners help deliver the essential public service expected in these areas to maintain their long-term 'attractions'.

V. LESSONS LEARNED AND RECOMMENDATIONS

113. **Coastal adaptation projects require built-in flexibility.** The complexity and multiple dimensions of the risks faced by local coastal communities and of the solutions to address them make it impossible and ineffective to try to anticipate and include predefined solutions in the project preparation. The innovative approach followed in the project demonstrates the importance of assessing and constantly monitoring risks to adjust solutions based on observations, social and behavioral considerations, and lessons learned. It is important to highlight that the solutions found were not necessarily the ones initially anticipated and often consisted of a complex combination of adaptation strategies (between retreat, accommodation, and protection), which also makes community decision particularly important to arbitrate between options to determine what is best for the overall community. The approaches developed by the project have been applied by other technical and financial partners, such as the PRIASA II project, implemented by the AfDB,

providing some support to the safety at sea system, while also exploring the possibility to build some protection infrastructures for boats, following a risk-informed participatory process, as implemented by the project.

114. **This type of project has more chance to be successful if tailored communication approaches are used and if information tools are adapted to the level of understanding/education of their audience.** Reliance on traditional beliefs and traditional ways of predicting weather was still very strong in STP. Moreover, the ability to read or understand weather reports was rather limited. It should also be kept in mind that risks and probability are difficult notions to measure in any case. Using innovative communications tools (such as role play or pictograms) can be very useful to overcome these barriers as well as relying on peers to channel information to the beneficiaries (in the project, this approach was successfully undertaken through contact with fishermen from other countries during workshops, the president of the local fishermen organization, and representatives from the local risk committee).

115. **Community involvement is key for the success of this type of projects.** The involvement of the local community in the establishment of risk assessment maps allowed for the identification of the best suited adaptation options (including relocation, which was not initially considered by the project) and ensured ownership and a long term buy-in. The increased capacity, thanks to the project activities at the local level, also progressively enabled better reporting through community M&E, which can reveal very useful in environment like STP where communities can collect specific adaptation information that would otherwise not be available. Other adaptation projects could copy this model and include community-based M&E as part of strengthening the adaptive capacity of communities.

116. **Eco-system based adaptation solutions are an efficient and cost-effective measure to reduce the risk of flooding, while retaining sediment to fight against erosion.** But the implementation of such measures requires dedicated support. This process experienced some failures to learn from. Initially, species unfit to the sites were planted. In the second attempt, no maintenance system to ensure proper watering and protection against animals and children was put in place. and no specific responsibilities in protection were assigned. For nature-based solutions based on planting of palm trees and mangroves, it is necessary to select the most suitable species, to provide an enabling environment and dedicated care. These solutions will be scaled-up during the second phase under WACA, to benefit from this experience, to cover more communities and develop guidance for all intervention in the country.

117. **Adaptation requires long-term engagement to be effective**. Indeed, behavioral changes require long-lasting support, to become the new practices, and experience sharing between communities, especially when fishermen shared their experiences when faced by incidents at sea and survived thanks to safety at sea equipment, proved to be very efficient. Also, adaptation processes are learning processes, to build on lessons learnt and on-going adjustments made as part of the continuous evaluation process. Adaptation projects should utilize a programmatic approach, which combines medium term outcomes with long term objectives, to adequately reflect the different time scales, and to combine urgent needs while not preventing implementing adaptation solutions beneficial on the long-term.

118. **Lessons, including those from failures, should be shared between countries facing similar challenges, as countries can learn efficiently from their peers.** During the implementation of this project, a parallel support activity facilitated the exchange between the geological services of STP and its peer in Mauritius, for STP to learn about the experience to completely ban sand mining from beaches. Lessons

learned included (and important for STP as a total ban is required to achieve coastal resilience): strong political involvement, community engagement and awareness, but also launching of technical alternatives. The second phase will bring these three dimensions together, to allow the legislation to be implemented. In general, lessons learned from this project will be further detailed and disseminated in the region, within the WACA platform, but also under the Small Island States Resilience Initiative.

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Early Warning and safety at sea system reduces losses at sea during extreme weather events

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
At least 75% of the fishers have access to 12-hour weather forecasts during the fog/storm season	Percentage	0.00 15-May-2011	75.00 31-Dec-2016	75.00 31-Dec-2017	85.00 31-Dec-2017

Comments (achievements against targets): Achieved by 113.5%. Based on surveys with fishermen and beach supervisors, 85% of fishermen now have access to 12-hour weather forecasts during the fog/storm season. It is worth precising that for this indicator, data relied on fishermen community surveys. On the emitting end, it is possible to confirm that daily weather forecasts are being sent by the National Institute of Meteorology (INM), and this is done twice a day during the fog/storm season. Specific alerts are also issued in case of specific events. The reports are received (most often by radio) by local beach supervisors or coast guards who transmit it directly and orally to the community. A system of SMS (FrontlineSMS) has also been established by CONPREC and 1,478 fishermen' numbers are registered (representing around 50%) of the fishermen, but for reasons explained in previous sections, it is not a good proxy to measure fishermen's access to information as they mostly relied on local word of mouth to get the latest report. In addition, a weather service calling-free number has been established and fishermen can access it at any time to get real-time weather information. They have been increasingly doing so (the number of calls to this number has been steadily growing as per the records of the INM up to an average of 5 calls a day).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of beneficiary artisanal fishermen using mandatory safety at sea equipment	Percentage	0.00 15-May-2011	70.00 31-Dec-2016	70.00 31-Dec-2017	80.00 31-Dec-2017

Comments (achievements against targets): Achieved by 114%. The achievement of this indicator is two-fold. First, it depends on the successful delivery of equipment and trainings to fishermen. Second, it depends on the actual use of this equipment, which is harder to accurately measure and quantify. Based on observations and interviews with local communities, fishermen are now using this equipment and even ask to receive more of them. It should however be noted that the "rate of use" differs from the various component of the safety at sea equipment and also depending on the type of fishing done by fishermen (and its distance from the coast). Some equipment is used (and asked for) more often than others such as raincoats and first aid kits (for which use is estimated to 92-95% based on local surveys conducted by the project team) as well as GPS while other equipment like waterproof seal cases are less appreciated (use ratio is estimated around 64-70%). In addition, no formal definition existed for "mandatory safety at sea equipment". Efforts were made to further refine it (a strategy was developed for strengthening safety at sea) and a draft regulation was prepared to clarify it (and referred to the obligation to have ways of communication, compass and other safety equipment), but has not been adopted yet. The definition used for monitoring the completion of this indicator is aligned with this draft regulation.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of artisanal fishers officially reported as disappeared at sea due to extreme weather events (annual average)	Number	4.80 31-Dec-2010	2.00 31-Dec-2016	2.00 31-Dec-2017	0.00 31-Dec-2017

Comments (achievements against targets): Over achieved. According to the Port authority and the Ministry of in charge of Fisheries, there has been no disappearance at sea caused by extreme weather events since 2013. In 2015, two people disappeared but an investigation showed that it was not related to weather.

This indicator usefully measures some aspects of increased adaptive capacity, namely the ability of people to adjust, modify or change their actions (i.e. checking the weather before going at sea and using safety at sea equipment) to moderate potential future impacts from hazards so as to continue to function (i.e. maintain their economic activity of fishing) without major qualitative changes.

Objective/Outcome: Reduction of Risk of flooding for targeted communities

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Coastal Adaptation Measures Reduce Flooding Exposure of Target Communities	Number	3.38 15-May-2011	1.10 31-Dec-2016	1.10 31-Dec-2017	4.00 31-Dec-2017
Praia Burra	Number	0.70 15-May-2011	0.50 31-Dec-2016	0.50 31-Dec-2017	2.00 31-Dec-2017
Ribeira Afonso	Number	5.50 15-May-2011	1.80 31-Dec-2016	1.80 31-Dec-2017	5.00 31-Dec-2017
Malanza	Number	3.50 15-May-2011	0.00 31-Dec-2016	1.20 31-Dec-2017	2.00 31-Dec-2017
Santa Catarina	Number	1.50 15-May-2011	0.50 31-Dec-2016	0.50 31-Dec-2017	3.00 31-Dec-2017

Comments (achievements against targets): This indicator is badly labeled in the system and should read Average number of flooded days per flood event per year (day/year)

Partially achieved. It is hard to measure this indicator due to the lack of a systematic process to report flood damages so these numbers are based on estimates collected through interviews as well as CONPREC and local risk committees' data. It is also important to mention that the baseline was established when even less data was available. Overall, this indicator indicates a reduction of flooding exposure in communities where works have been done, but in others like Santa Catarina, some household (those located on the beach) will only suffer less from damages once they relocate to the safe expansion zone.

This indicator usefully measures some aspects of increased adaptive capacity, namely the ability of people and systems to adjust, modify or change their actions (i.e. protect against flooding) to moderate potential future impacts from hazards so as to continue to function (i.e. maintain and protect their houses) without major qualitative changes.

A.2 Intermediate Results Indicators

Component: Component 1. Coastal Early Warning and Safety at Sea

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Emergency Risk Management Committees established in high risk coastal villages	Number	1.00 15-May-2011	0.00 31-Dec-2016	12.00 31-Dec-2017	14.00 31-Dec-2017
Sao Tome	Number	1.00 15-May-2011	0.00 31-Dec-2016	10.00 31-Dec-2017	12.00 31-Dec-2017
Principe	Number	0.00 15-May-2011	2.00 31-Dec-2016	2.00 31-Dec-2017	2.00 31-Dec-2017

Comments (achievements against targets): Overachieved. Emergency Risk Management Committees have been established in all identified high risk

coastal villages.
It is worth mentioning that a UNDP project, inspired by the early success of the Committees created by the project, provided funding for the establishment of additional Emergency Risk Management Committees. 14 Committees have been directly funded by the projectand a total of 31 committees have been created.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Training in safety at sea and basic equipment provided to 70% of the artisanal fishers	Number	0.00 15-May-2011	1750.00 31-Dec-2016	1750.00 31-Dec-2017	2064.00 31-Dec-2017
Number of safety at sea sets distributed	Number	0.00 15-May-2011	1750.00 31-Dec-2016	1750.00 31-Dec-2017	2064.00 31-Dec-2017
Number of Fishers Trained	Number	0.00 15-May-2011	1650.00 31-Dec-2016	1650.00 31-Dec-2017	2064.00 31-Dec-2017

Comments (achievements against targets): These indicators have been achieved by respectively 125% and 118%. 2064 fishermen have received safety at sea equipment and training on how to use them. This was verified during the ICR mission and is documented by the project team inventory and receipts from each intervention and distribution signed by fishermen. It should be noted that the number of fishermen increased during the project (from about 2000 to about 3000), which represents a final and actual ratio of 66% fishermen who received training in safety at sea and basic equipment. We can therefore consider that indicator was achieved.
As noted above, it is difficult to report on an overall number for safety at sea and basic equipment as their refer to independent components that have not been distributed in the same proportion. 2064 refers to the basic components (safety vests and raincoats), but other equipments have also been distributed in smaller quantities, which would slightly lower the ratio indicated above. For example, only 1638 Waterproof Seal Phone Cases, 1964 first aid kits, 424 GPS and 1900 radar reflectors were distributed.

Component: Component 2. Coastal Protection for Vulnerable Communities

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Participatory vulnerability plans adopted for high-risk coastal villages	Number	0.00 15-May-2011	0.00 31-Dec-2016	4.00 31-Dec-2017	4.50 31-Dec-2017

Comments (achievements against targets): 112% achieved. All villages have elaborated participatory vulnerability plans. These plans are recorded and available at the CONPREC and local risks committees and partners of the projects also have a copy. Additionally, a plan had started to be prepared in Sundy (before the decision was made to replace this pilot community by Praia Burra), hence a slight overachievement of the indicator.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Climate Resilient Coastal Planning Policy	Text	0 15-May-2011	final draft 31-Dec-2016	final draft 31-Dec-2017	draft 31-Dec-2017

Comments (achievements against targets): Partly achieved. Based on its assessment of the local institutional context, the team had considered that instead of preparing a new law that would no be properly implemented due to a misfunctioning policy environment and lack of information, it would be more efficient to first assess the gaps in existing legislation and eventually putting these different pieces together to inform a broader legislation. The project therefore only funded local geomorphological analyses, initial consultations and examined steps to improve capacity to further develop the Coastal Planning .

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Sustainable Measures of	Meter(m)	300.00	3800.00	3800.00	4545.00

Adaptation/Coastal Protection Implemented		15-May-2011	31-Dec-2016	31-Dec-2017	31-Dec-2017
River flood protection works completed	Meter(m)	0.00 15-May-2011	2000.00 31-Dec-2016	2000.00 31-Dec-2017	3934.00 31-Dec-2017
Area of Coast Protected	Meter(m)	300.00 15-May-2011	350.00 31-Dec-2016	350.00 31-Dec-2017	611.00 31-Dec-2017
Community Based Adaptation Activities Implemented	Meter(m)	0.00 15-May-2011	10.00 31-Dec-2016	10.00 31-Dec-2017	16.00 31-Dec-2017
Flood protection drainage works completed	Meter(m)	0.00 31-May-2011	2000.00 31-Dec-2016	2000.00 31-Dec-2017	3934.00 31-Dec-2017

Comments (achievements against targets): All indicators achieved or overachieved. The lengths of the river protection works (achieved by 198%) are based on measurements conducted independently by the Environmental Observatory and the office of cadaster. Protection works include drainage canals and dikes alongthe rivers to avoid overflowing of water. These data were also confirmed by drone's observations, as well as direct observation from the team and during the ICR mission. In order to cover broader catchment areas to reduce flood risk, the drainage canals system has been extended, The length of protected coastal area (achieved by 163%) was also measured by the same team. They include a 570m break water, which was required to be longer than what was initially envisaged to cover all the coastline of Ribeira Afonso. The number of communities based adapation activities (achieved by 160%) were reported by the PIU, they include maintenance of risk reduction system, plantation of trees to reduce erosions, construction of gabions for river protections and reconstruction of damaged wall.

A. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1 Increase the adaptive capacity of fishermen in São Tomé and Príncipe to the adverse impacts of climate variability and change, with Early Warning and safety at sea system reduces losses at sea during extreme weather events	
Outcome Indicators	1. 85% of the fishers have access to 12-hour weather forecasts during the fog/storm season 2. 80% of beneficiary artisanal fishermen using mandatory safety at sea equipment 3. Zero artisanal fishers officially reported as disappeared at sea due to extreme weather events since 2013”
Intermediate Results Indicators	1. 14 Emergency Risk Management Committees established in high risk coastal villages 2. Training in safety at sea and basic equipment provided to 66% of the artisanal fishers
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	1. Early warning system to timely inform artisanal fishers prior to fog/storm events established 2. National capacity to conduct real-time weather observations through the acquisition and installation of Coastal Early Warning System equipment created 3. Interagency coordination and capacity for producing, issuing, and disseminating 12-hour coastal weather forecasts and for providing early warning strengthened 4. 2064 safety at sea kits and communication equipment to disseminate the warnings acquired and installed 5. 2064 fishermen trained for safety at sea

Objective/Outcome 2: Increase the adaptive capacity of coastal communities in São Tomé and Príncipe to the adverse impacts of climate variability and change, Coastal adaptation measures reduce climate risk for targeted communities	
Outcome Indicators	1. Coastal Adaptation Measures Reduce Flooding Exposure of Target Communities
Intermediate Results Indicators	1. Four participatory vulnerability plans adopted for high-risk coastal villages 2. Elements for Climate Resilient Coastal Planning Policy prepared 3. 4545 m of Sustainable Measures of Adaptation/Coastal Protection Implemented
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	1. Four participatory climate-resilient development plans (to encourage community growth to lower-risk areas) 2. Geomorphological analysis of the main risks in the four communities and identification of detailed engineering designs of possible flood-reduction measures completed 3. Participatory implementation of urgent and priority adaptation works 4. Community capacity built and commitment toward climate resilience and response to extreme weather events, through 16 small community-based coastal adaptation works 5. Community outreach and training in disaster preparedness and response delivered in the four pilot communities 6. Cross-community and island-wide exchange and dissemination of lessons learned through study four tours and workshops 7. Preparation of elements for climate-resilient coastal spatial planning and resource management policy

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Sofia U. Bettencourt	Team Member
Milen F. Dyoulgerov Vollen	Team Member (Coastal Adaptation)
Mark Tadross	Climatologist
Elvis T.B. Langa	Financial Management Specialist
Sonia C. Guilherme	Procurement Specialist
Gordon Appleby	Social Safeguard Specialist
Jayne Kwengwere	Program Assistant
Hellen Mungaila	Program Assistant
Eduardo Brito	Sr. Counsel
José Janeiro	Sr Financial Officer
Supervision/ICR	
Nicolas Benjamin Claude Desramaut	TTL(s)
Antonio Laquene Chamuco, Amos Martinho Malate, Laurent Mehdi Brito	Procurement Specialist(s)
Joao Tinga	Financial Management Specialist
Maria Isabel Nhassengo-Massingue	Team Member
Sofia U. Bettencourt	Team Member (Adaptation Specialist)
Milen F. Dyoulgerov Vollen	Team Member (Coastal Adaptation)
Emeran Serge M. Menang Evouna	Environmental Safeguards Specialist
Enagnon Ernest Eric Adda	Team Member
Jesus Alberto Lino	Team Member (Program Assistant)

Xavier F. P. Vincent	Team Member (Fisheries)
Paivi Koskinen-Lewis	Social Safeguards Specialist

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY08	5.463	33,667.31
FY09	3.525	40,951.55
FY10	10.236	66,495.54
FY11	13.625	146,191.62
Total	**32.85**	**287,306.02**
Supervision/ICR		
FY12	9.400	82,332.57
FY13	9.114	151,188.82
FY14	3.983	37,304.30
FY15	4.663	53,823.95
FY16	4.550	45,680.76
FY17	1.975	36,305.01
FY18	6.601	53,862.37
Total	**40.29**	**460,497.78**

ANNEX 3. PROJECT COST BY COMPONENT

A. PROJECT COST BY COMPONENT

Components	Amount at Approval (US$, millions)	Actual at Project Closing (US$, millions)	Percentage of Approval (%)	Percentage of the total budget (%)
1. Coastal Early Warning System and Safety at Sea	1.90	1.66	87	41
2. Coastal Protection for Vulnerable Communities	1.80	1.78	99	44
3. Project Management	0.40	0.61	153	15
Total	**4.10**	**4.06**	**99**	**100**

B. COMPARISON OF BUDGET BY COMPONENTS BETWEEN APPRAISAL AND ACTUAL

	Total Costs (US$, millions)		Percentage (Actual Costs/Planned Costs) (%)	Percentage of the total budget (%)
	Estimates	Actual		
Component 1. Coastal Early Warning System and Safety at Sea				
1.1. Establishment of an Early Warning System	1.400	1.004	72	24.7
1.2. Improvement of Safety at Sea	0.500	0.654	131	16.1
Subtotal Component 1. Early Warning System for Coastal Fishing Communities	1.900	1.658	87	41.0
Component 2. Coastal Protection for Vulnerable Communities				
2.1. Community Preparedness	0.400	0.268	67	6.6
2.2. Coastal Protection for Vulnerable Communities	1.300	1.441	111	35.5
2.3. Promotion of Coastal Resilience	0.100	0.076	76	1.9
Subtotal Component 2. Coastal Protection for Vulnerable Communities	1.800	1.784	99	44.0
Component 3. Project Management	0.400	0.611	153	15.0
Total project costs	**4.100**	**4.055**	**99**	**100**

ANNEX 4. EFFICIENCY ANALYSIS

Economic Analysis for São Tomé and Príncipe Climate Change Adaptation Project for Coastal Areas

Analytical Approach

1. STP is a SIDS with a fragile economy and high vulnerability to exogenous shocks. STP has a surface area of just 1,001 sq. km, and a population estimated at 163,000 in 2010. Artisanal fishers and coastal communities are particularly vulnerable to changing climate. With nearly 20 percent of the nation's workforce employed in artisanal fisheries (about 2,000 people directly and an additional 18,000 indirectly), they encompass the poorest and most exposed segment of STP's population and occupy its lowest professional status.

2. The economic approach adopted for this ICR follows the methodology developed for the second phase of the project (under the regional WACA project) for Component 1 and follows a similar approach to the one conducted at the time of the project's appraisal for Component 2.

3. Most of the beneficiaries are fishermen within vulnerable communities. Systematic data at the community (or fishermen) level are scarce and not easily available. Therefore, when no official data are available, additional or marginal benefits were calculated based on indicative intermediate indicators prepared by the local project preparation team combined with background reports prepared for the project.

4. In the case of Component 1, estimated benefits relate to (a) saved lives due to distribution of safe equipment for fishermen and (b) avoided losses due to premature death and forgone economic activity of the fishermen, as well as of his dependents left behind (fish saleswomen or *palayes*).

5. Fishermen losses is a major issue in STP. In 2011, the number of casualties at sea was 4.8 per year, or 240 per 100,000 people, three times as high as reported by the International Labour Organization's international average for capture fisheries (80 per 100,000) and nearly twice the rate of Australia (143/100,000). In 2010 alone, STP lost 16 fishers at sea. The project reduced the number of artisanal fishers officially reported as disappeared at sea due to extreme weather events to zero, since 2013 (except two deaths in 2015, but not caused by extreme weathers). Based on the Food and Agriculture Organization of the United Nations (FAO) estimates, the average income for local fishermen varies from US$20 to US$50 per day.[30] The number of fishing days could be up to 300 days per year. This analysis conservatively used a US$500 per month salary for fishermen. In coastal communities, women typically make their living by selling the fish. Based on FAO estimates, the average income for local saleswomen is US$330 per month.[31] Each fisherman works daily with two to three saleswomen (*palayes*), who, in turn, depend on this fisherman for their livelihood. This analysis assumed that the loss of a fisherman would

[30] FAO. 2017. *Etude de la filière des produits de la mer à São Tomé et Príncipe: Description qualitative/ quantitative des chaines d'approvisionnement et de valeur*.
[31] FAO. 2017. *Etude de la filière des produits de la mer à São Tomé et Príncipe: Description qualitative/ quantitative des chaines d'approvisionnement et de valeur*.

result in a loss of a third of income for two *palayes* for five years (time to recover and find a new fisherman to work with).

6. To estimate the saved lives due to the distribution of safety equipment for fishermen, the years lost (comparing the average age of dead fishermen to the World Health Organization average life expectancy for São Tomé and Príncipe) as well as the forgone salary were estimated based on the assumptions discussed in the previous paragraph. While this approach clearly underestimates the real value of individual lives, it was decided for practical reasons to combine the economic benefits for Components 1 and 2 and assess the economic return from the project as a whole.

7. In the case of Component 2, estimated benefits relate to the adaptation measures using avoided losses methods after investments were made. Avoided losses due to flooding are estimated based on (a) an average of property loss per flood event and damages made to the house and the number of flood events recorded, according to communities' assessments and damages reported after past events and (b) economic benefits associated with the availability of new services (proximity to water supply/school). The price of a house exposed varies from approximately US$3,000 to US$7,000. Average damages to the house associated to a flood event are conservatively estimated at US$30. The average material loss per house considered was US$15 and the loss of means of subsistence and animals was estimated at US$190. Overall, this analysis estimated the average total loss per event and per household to be US$250 (rounding up based on the fact that in some rare instances, damages can be much more devastating with some houses completely destroyed).

8. The economic benefits associated with proximity to water supply due to adaptation works was estimated based on the time saved by women daily to go to these water sources (pondered by their income). The average time saved by women every day owing to the river now coming closer to their home is approximately 1 hour. For the schools, the benefits were considered in two ways. First, in Io Grande, the project rebuilt a wall destroyed by the sea, resulting in saving a full year of school (which should have been closed otherwise). The marginal benefit of a year of schooling was therefore used in the analysis to determine the economic gains. Second, in Praia Burra, the preparation of the safety expansion zone made possible the construction of a school. Benefits were estimated by considering (a) the benefits associated with the time saved for students who used to go to another school much further away[32] and (b) the benefits associated with access to education for kids who were not attending a school at all before this one was built. According to Montenegro and Patrinos (2014),[33] returns to primary school on wages for African countries (average from Northern Africa and Sub-Saharan Africa) are estimated at 15 percent.

9. Finally, the economic analysis considers a time horizon of 30 years, to take into account the long-term benefits of the project related to coastal protection against erosion and floods. The analysis uses a baseline discount rate of 5 percent, as suggested by the World Bank,[34] and uses an annual growth rate of 2.5 percent, nearly half of the International Monetary Fund (IMF) projected economic growth,[35] and a 2

[32] Estimated at 1 hour and 30 minutes.
[33] Montenegro, Claudio, and Harry Patrinos. 2014. "Comparable Estimates of Returns to Schooling Around the World." Policy Research Working Paper 7020. *http://documents.worldbank.org/curated/en/830831468147839247/pdf/WPS7020.pdf*.
[34] World Bank. 2017. *Technical Note on Discounting Costs and Benefits in Economic Analysis of World Bank Projects*.
[35] IMF. 2013. *Democratic Republic of São Tomé and Príncipe. Staff Report for the 2013 Article IV Consultation and Second Review Under the Extended Credit Facility Arrangement – Debt Sustainability Analysis*. *https://www.imf.org/external/pubs/ft/dsa/pdf/2014/dsacr1402.pdf*.

percent maintenance cost (of the cost of the construction works, which is needed to maintain the adaptation works). The costs of safety at sea equipment used are the same as the costs for this equipment in the project, which is likely to be an overestimate as eventually this equipment should become available locally at much more affordable costs.

10. Other benefits of flood control—such as health benefits and general damages averted—were not taken into account, and hence, the benefits are considered to be underestimated.

Conclusions

11. The analysis concludes that the project had an estimated economic IRR of 15 percent. See Table 4.1. This analysis includes two components: (a) safety at sea and early warning equipment and (b) adaptation investments. The ex-ante economic analysis, in the Project Appraisal Document, when aggregated across the four pilot communities, had an estimated economic IRR of 15 percent. Ex post and ex ante economic analyses show comparable results. It is important to note that one of the pilot community was changed during the project, but it still makes sense to compare these numbers as both the costs of the planned constructions and the level of damages experienced are quite similar in both communities.

12. The economic analysis therefore shows that the project-supported investments have brought substantial economic benefits to the beneficiaries. Results are robust to adverse changes in the key parameters. Increasing project costs by 10 percent, reducing project benefits by 10 percent, and varying the default discount factor by 2 percentage units do not change the conclusions of the analysis. See Table 4.2.

13. It is important to keep in mind that relevant data are scarce and not easily available. Therefore, this economic analysis and its results should be interpreted with caution. More data collection at the fisher and community levels, as well as a better monitoring of losses in case of a flooding event, would be essential to creating a more precise picture of the associated benefits.

Table 4.1. Measures of Project Worth - Total Benefits, Costs, and Net Benefits (US$)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	…	Year 30
Benefits													
Component 1													
Avoided direct losses resulting from fishermen deaths				315,000	322,875	330,947	339,221	347,701	356,394	365,303	374,436	…	613,557
Avoided indirect losses resulting from fishermen deaths				7,920	8,118	8,321	8,529	8,742					
Component 2													
Avoided losses of goods due to flooding					52,250	53,556	54,895	56,268	57,674	59,116	60,594	…	99,290
Years of school saved due to protected school							62,828	64,398	66,008	67,659	69,350		113,638
Time saved due to school proximity to home							74,700	76,568	78,482	80,444	82,455	…	135,112
Time saved owing to proximity to clean water					11,314	11,596	11,886	12,183	12,488	12,800	13,120	….	21,499
Costs													
Project costs	11,786	283,318	617,510	797,762	1,378,905	493,605	471,929						
Maintenance costs								26,624	26,624	26,624	26,624	…	26,624
Total benefits	0	0	0	322,920	394,557	404,420	552,059	565,860	571,046	585,322	599,955	…	983,096
Total costs	11,786	283,318	617,510	797,762	1,378,905	493,605	471,929	26,624	26,624	26,624	26,624	…	26,624
Net benefits	−11,786	−283,318	−617,510	−474,842	−984,348	−89,185	80,129	539,236	544,422	558,698	573,331	…	956,472
NPV - IR (5%)	4,726,991												
IRR	16%												

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	...	Year 30
B/C Ratio	2.3												

Note: B/C Ratio = Benefit-cost ratio; NPV = Net present value.

Table 4.2. Sensitivity Analysis

Sensitivity Analysis	Change (%)	NPV (US$, millions)	IRR (%)	B/C Ratio
Baseline	5	4.73	16	2.3
Decrease in discount rate	3	7.50	16	2.9
Increase in discount rate	7	2.29	16	1.9
Increase in project costs	10	3.40	14	2.6
Decrease in project benefits	10	3.03	14	2.2

Table 4.3. Review of Costs and Implementation Times of the Major Procured Works

	Planned Cost (US$)	Real Cost (US$)	Difference (Additional Costs)	Planned Timeline	Delay
Construction works in Malanza	250,000	374,132	124,132	April 17, 2015–August 30, 2015 (4 months)	1 month (related to the opening of the safety expansion area, which had not been initially included in the timeline)
Construction works in Ribeira Afonso	360,000	298,179	−61,821	January 23, 2014–October 31, 2014 (11 months)	1 month and 19 days late (first-time construction of this scale was realized in STP along with heavy rains and sea turbulence)
Construction works in Santa Catarina	250,000	323,056	73,056	January 27, 2014–October 31, 2014 (9 months)	2 weeks (marshy areas along with intense rain and sea turbulence)
Construction works in Praia Burra	250,000	335,846	85,846	Phase 1: December 28, 2015–April 28, 2016 (4 months)	No delay
				Phase 2: August 17, 2017–September 21, 2017 (1 month)	No delay
Total	1,110,000	1,331,213	221,213		1 month and 2 weeks

ANNEX 5. BORROWER COMMENTS

This report clearly describes the actions taken by the project.

The document reflects all the activities carried out by the project and clearly shows the views gathered on the ground among the populations who are the real beneficiaries of the project on their implementation.

The development of data collection work on the ground enabled the report to reflect the consultant's assessment of the results produced by the Project implementation team, on the other hand, the report establishes a point of interconnection / confirmation of the results extracted from the project. report of the external consultant Mr. José Bettencourt.

For all this, it is an acceptable report that has no scope for comments or point omissions or even additions so we agree with the content of it.

The Coordinator

Arlindo de Carvalho

ANNEX 6. EXECUTIVE SUMMARY OF THE INDEPENDENT EVALUATION

Evaluation of the PAMCZC Phase I
(Project Adaptation to Climate Change in the Coastal Zone)
(Projecto de Adapção às Mudanças Climáticas na Zona Costeira)




Prepared by:
José de Bettencourt

September 2016

14. The main objectives of the evaluation are to collect lessons from Phase I and make recommendations for the Phase II of the project, which is currently under preparation.

15. The objective of the Coastal Zone Adaptation Project on Climate Change (*Projeto de Adaptação as Mudanças Climaticas das Zonas Costeiras*, PAMCZC) is to increase the climate change adaptation capacity of vulnerable coastal communities in STP. The expected results at the completion of the first phase are: (a) STP will have an installed weather and climate monitoring capability, including an EWS capable of providing fishers with reliable meteorological information every 12 hours during the storm season and fog; (b) procedures and practices of maritime safety have been adopted by artisanal fishermen on the islands of São Tomé and Príncipe resulting, in the long term, in the reduction of life losses due to extreme weather events; (c) coastal adaptation measures are being implemented in highly vulnerable areas that reduce their exposure to climate risks, while at the same time providing examples of a menu of possible measures that the STP Government may adopt in the future; and (d) a climate-resilient coastline process is initiated to foster community development outside the most exposed coastal areas.

16. Phase I began in September 2011, and PAMCZC was rolled out over five years with a budget of US$4.1 million from GEF and US$3.3 million from the State of São Tomé and Príncipe. The amount from the State of São Tomé was based on current expenses of the project office, as well as on activities that contributed to the project, for example, provision of a telephone helpline, urgent rehabilitation work to control floods, search actions and rescue, and infrastructure for improving the lives of populations. The project has been managed by the Directorate General for the Environment, with the main beneficiaries being the INM, CONPREC, and the Coast Guard, which includes the Port Authority, Committee for Management of Risk and Emergencies (*Comités [comunitários] de Gestão de Riscos e Emergências*, CGRE), the population of the four pilot communities, and fishermen and their families (in practically every fishing community in the country). The NGO MARAPA assists the project in the training of fishermen and in the distribution of materials and monitoring of maritime safety.

17. PAMCZC installed a maritime meteorological station and supported INM in its ability to produce meteorological information. The information is transmitted once a day in normal time and every 12 hours in case of inclement weather. National and local radios transmit weather information (although there is no record of the national coverage of the radios involved). The CONPREC transmits weather information by mobile phone to inhabitants of virtually all fishing communities. However, existing data do not allow the assessment of the percentage of artisanal fishermen who have access to updated weather forecasts every 12 hours during the fog/storm season. Developments in EWS are supported by the multidonor EWS project (SAP- Système d'Alerte Précoce) implemented with support from the UNDP. SAP has contributed to the strengthening of meteorological (INM) and hydrological monitoring (Directorate General of Natural Resources and Energy) capacity in the country and has established the system for the diffusion of high-frequency and very-high-frequency radio information, also managed by the CONPREC.

18. PAMCZC has distributed marine safety equipment to fishermen. PAMCZC's objective was to distribute equipment and train 25 percent of the total fishermen. However, in 2014, PAMCZC found that the number of fishermen had increased, increasing the number of beneficiaries to 1,750 (expecting to reach 70 percent of the total). The number of fishermen in 2016 is estimated at 3,250, with an annual growth rate of 4 percent per year. In this way, it can be said that at the moment, about 50 percent of the fishermen have benefited from equipment, accompanied by training for their use. It is undeniable that

the level of awareness of fishermen regarding the usefulness of safety equipment has increased, but the level of use by fishermen varies from equipment to equipment.

19. With the support of PAMCZC, the CONPREC established 19 CGREs in São Tomé and 4 in Príncipe, which is about double the amount originally planned. These CGREs strive to reduce community vulnerabilities, both from an infrastructural point of view and in response to disasters such as floods, and watch over the dissemination of meteorological information. CGREs have an average of 12 members. Once these CGREs have been established, the CONPREC will act as an advisory body to the communities and to the Government in the field of risk prevention.

20. The four pilot communities in which PAMCZC has implemented infrastructures for the protection and prevention of floods or invasion of the sea (Malanza, Ribeira Afonso, and Santa Catarina in São Tomé and Praia da Burra in Príncipe) increased resilience to extreme weather events. In these communities the CGREs participate in the maintenance of the infrastructures and ensure that they work, for example, by clearing the exits of the canals on the beaches. In fact, built infrastructure could prevent economic and property losses. The current challenge is the CGREs need to have the capacity to mobilize willing and volunteer work of the inhabitants to maintain the solutions found. Territorial development plans, developed in a participatory way in communities, instill a reinforcement of community organization and improve the capacity of the community to manage its problems and seek solutions. In sum, these plans improve capacity for adaptation and guide the mobilization of resources. Although voluntary relocation of families has not yet begun, there are conditions for this to happen when some incentive (placement of light and social equipment) is given by the district or central government (or regional in the case of Príncipe). In the case of Malanza, there is already an energy line to feed the area and future infrastructures. The PAMCZC policy and legislation component has only been partially implemented, and its effect is not yet noticeable. At the time of this evaluation, only the preliminary draft of a maritime safety diploma was prepared, which is being improved with the inclusion of the comments of the STP Council of Ministers. Nevertheless, PAMCZC has made an enormous contribution to a joint interagency work culture of the CONPREC, INM, and Coast Guard Port Authority which is not common in other countries.

21. As lessons learned, it can be said that the approach that was conducted in the communities has proven to be adequate and can be replicated to other locations. PAMCZC has shown that it is possible for different state institutions as well as different donors to join efforts to complement each other within their mandates toward a common goal. However, PAMCZC has also shown that the project should not take on objectives beyond its control. Although the project can draw up strategies and legislation, the process leading to its approval is outside the control of the project, and approval or entry into force of the project cannot be an objective of the project. PAMCZC also showed that strengthening the capacities of the communities through the establishment of the CGREs is essential, but that they need to be monitored more closely to become more autonomous and truly take their role in mobilizing volunteers and small funds to implement actions necessary for the common good. From the technical point of view, PAMCZC has pointed out that there are factors that exacerbate vulnerability to climate change. First, there is an immediate problem—that of sand extraction—that needs to be solved by identifying alternatives to sand sources and, on the other hand, more oceanographic studies are needed to identify the inert coastal transport regime and thus propose solutions feasible for the extraction of aggregates offshore and for the proposed coastal infrastructure solutions in the communities. Still in the scope of inert extraction, a future project may promote public works with materials alternative to sand in the safe areas. It is concluded

from the PAMCZC's assessment that, to maximize results, more articulation with other state organs not directly related to the project is required, but that they carry out complementary activities. Examples are the Planning Department (in particular, in the spatial planning component), public works (social equipment), energy, telecommunications (the free hotline for the dissemination of early warning information), the Fisheries Directorate (for a more comprehensive assessment of the needs and capacities of fishermen and greater involvement of fishermen's associations), district governments, health workers (environmental health and first aid), and schools (raising awareness among students—children and young people—and teachers and adult education). Coordination consists of joint meetings between the directorates of the *tutelas*, to develop some joint activities, through district-level meetings between different sectors, to what is already usually the case of people working in each community. The idea will be to institutionalize the synergies. Tables 5.1–5.3 show strengths and weaknesses for the different project components. The main conclusion is that Phase II is really necessary to consolidate what has already been achieved and to popularize some processes and procedures.

Table 5.1. Strengths and Weaknesses in the Project Design

Strengths	Weaknesses
Relevance of the project	Limited quality of indicators
Scope of the project	Not involving all entities related to the project
Integration into PAMCZC of ongoing reforms in the country	
PAMCZC took into account the specificities of Ilha do Príncipe	

Table 5.2. Strengths and Weaknesses in the Implementation Strategy

Strengths	Weaknesses
Participatory work with communities	Limited monitoring of communities undermined the performance of CGREs and the widespread use of safety equipment by fishermen. Note that over a period of more than a year, a transitional government dissolved the CONPREC, and only visits to target communities were possible and not to the other CGREs.
Interinstitutional work	Limited technical assistance to the CGRE - some of the interviewees are unaware of what they have to do now or in the future.
Regularity of financial report	The financial report can be improved, in particular by including government contributions to the project and not just the amount of GEF. Given the later phases of PAMCZC, this information may help the design/planning of future interventions.
	Quality control of the supply of goods within the scope of the project (for example, kits for maritime safety, contents of first-aid kits, and computer applications) can be improved.
	M&E of the project is delayed and in an ad hoc manner instead of being naturally implemented in the continuous assignments of the PMU.

Table 5.3. From a Phase II Perspective of the Project, Aspects That Must Be Taken into Account

Aspects	Reflection
Political importance	Managing risks related to climate change is a top topic on the political agenda, as evidenced by some government initiatives.
Legislation and implementation of legislation	The legal drafting process of draft regulations foreseen in Phase I is delayed. The capacity to implement legislation is limited.
Human resources	In general, there is still a shortage of human resources to meet the responsibilities of the institutions. In particular, there is a lack of human resources to work directly with communities on their empowerment (very frequent visits and activities are not possible).
Availability of current expenditure funds - INM/CONPREC and CGRE/Directorate General of Environment	There is a shortage of funds, and sometimes, it is not possible to work on the ground (community work) or to have funds for communication or employee training or to acquire data. The problem can be minimized through the promotion of environmental awareness actions for policy makers and technicians, strengthened planning and realistic budgeting, improved management, and creative ways of mobilizing funds, involving private initiative.
Contingency fund to respond to disasters	The contingency fund provided by the state was placed in the Social Security account. The CONPREC states that it should be its institution to manage the funds, since its mandate is prevention and response to any catastrophe and the fund serves that purpose.
Appropriation	Despite its limited capacity, the majority of CGRE members feel proud to belong to the entity. In communities where the project has not intervened, some people show an interest in doing something about cleanliness and protection of the environment. On the other hand, there is no manifest desire of the population to relocate in the safe zone. Most areas are still being delimited at the time of evaluation. Apparently, the population will not move until there is some incentive (electricity, water, a school, a health post, and so on) - the absence of the incentive may mean that the central and district governments have not yet grasped the importance of this aspect. Although there are other priorities in the country, when it comes to relocating populations, a signal is needed.
Autonomy of action	The CONPREC and INM are autonomous and have a vision of the objectives and goals to be achieved. CGREs are not yet autonomous. Beach managers have limited capacity and means to cover all areas under their jurisdiction.

22. As already mentioned, Phase II of PAMCZC is being prepared, based on a five-year project that will last until 2022–23. There is also a year of extension for Phase I, which will allow, among others, completion of some of the studies required for Phase II. The idea of a long-term project with Phase II and Phase III makes sense in such a project, which aims to change the minds of the population, technicians, and decision makers, a lengthy process. Only sustained support could consolidate the integration of climate change into coastal governance, development in safe areas, and the evolution of safety at sea.

23. In the line of preparation being carried out from Phase II (see annex 5), the following are recommended:

Component 1

24. Include in Subcomponent 1.1 studies for the characterization and modeling of the coastal currents responsible for the transport of sand to identify the best coastal protection solutions. It is also recommended that the country's capacity for physical oceanography be enhanced through scholarships for merit and committed students (selected by an equal opportunity competition).

25. The restructuring of proposed Subcomponent 1.2 is recommended so that the focus is on technical assistance and information, education, and communication in activities carried out at the community level or to the relief of communities. The actions would be carried out by the Directorate General of Fisheries, Coast Guard and Port Authority, MARAPA, and a team of field agents. The subcomponent should involve, among others, the support to the beach heads and the theme of the registration of the boats. The activities could involve the private sector, establishing synergies with the PRIASA II project financed by the AfDB, namely in the creation of markets for maritime safety equipment and the marketing and commercialization of 'legal sand'.

Component 2

26. It is recommended that Subcomponent 2.1 (community preparedness) targets the communities in a holistic approach. The approach includes all studies, technical assistance, and support to communities, including in the relocation process. This implies that item on technical assistance of Subcomponent 2.3. (promotion of coastal resilience) is transferred to Subcomponent 2.1.

27. It is recommended that item (b) of Subcomponent 2.2. (community awareness) apply to all CGREs that were established in Phase I, both in target communities and outside them. The role of field agents is critical in this activity. The activity should include sensitization to coastal communities on the role of the CGREs. On the other hand, the activity will include technical assistance and capacity building of the CGRE in mobilizing funds, managing funds, and mobilizing volunteers to perform work—trench cleaning, openings at sea, revegetation, and so on—of interest throughout the community.

28. Specifically, in target communities, but as far as possible in other communities as well, small-scale community actions can be designed to respond to concrete challenges. This will generate good reputation for CGREs. Examples of actions are (a) community-led total sanitation activities involving schools and health workers; (b) promotion by CGREs of adult education/awareness raising in relation to financial management applied to the household or micro-business; and (c) creation of saving habits (for example, fishermen celebrate a little less good fishing and set aside some money for acquisition of safety equipment at sea). This requires a more continuous presence of agents in the communities.

29. It is recommended that Subcomponent 2.2 include other actions to increase coastal adaptation. An example will be to make sand accessible along the islands at the appropriate price and from a safe and sustainable source. Another will be to encourage the use of alternative materials in the expansion zones as well as in Phase II protection works.

Component 3

30. Capacity building of the PMU is recommended in the following components:

(a) Community work, which may involve strengthening field staff, at least initially, to work with communities and above all with fishermen and members and volunteers of the CGRE, print pace and strengthen the autonomy of groups (in line with the interest groups of road maintenance). The PMU may hire a specialist to train the team of field agents, who could be directly hired by the PMU or CONPREC and MARAPA if there is a financial reinforcement of the PAMCZC II-CONPREC and PAMCZC II-MARAPA agreements in relation to Phase I;

(b) Hiring a Specialist in Social Integration and Gender Equality (Sociologist) to coordinate activities at the PMU level on the ground—depending on the characteristics of the person hired, may accumulate the functions referred to in (a);

(c) M&E through the establishment of a robust system with a definition of how to implement (it may involve hiring an M&E Specialist for initial definition and timely support) and by financing annual technical audits; and

(d) Quality control of the goods and services delivered, through the establishment of a mandatory procedure (which the different beneficiaries, not only the PMU, must comply with) and specific training to the Procurement Specialist.

31. As a general recommendation, PAMCZC II should establish/strengthen partnerships and synergies with other ongoing projects; for example, PRIASA II (private sector development—sand, safety equipment, and land-use planning), Principe Trust (community development), and others that exist or will exist during implementation and that can contribute in some way to achieving the objectives of PAMCZC II.

32. A final recommendation in the PAMCZC II design is the improvement of indicators. The limited quality of the indicators used in Phase I made it difficult to have an effective M&E system, that is, to be part of and follow the project so as to generate information on time to make actions more efficient and effective. SMART[36] indicators for adaptation to climate change remain a challenge. However, it is important that Phase II use more appropriate indicators. It is important that the achievement and outcome indicators are more realistic, which is now possible given the experience gained from Phase I.

[36] Specific, measurable, achievable, relevant, and time-bound.

ANNEX 7. SUPPORTING DOCUMENTS

1) Key World Bank documents (for example, disclosed ISRs)

Official Documents

Project Appraisal Document, Adaptation to Climate Change Project (English), May 2011

Second Amendment to GEF Grant Agreement, TF099869 (English), August 2015

Restructuring Report (English), December 2011

GEF CEO Endorsement Memo, April. 2011

ISRs

Implementation Status and Results Report: Sequence 10 (English), June 2017

Implementation Status and Results Report: Sequence 09 (English), June 2016

Implementation Status and Results Report: Sequence 08 (English), December 2015

Implementation Status and Results Report: Sequence 07 (English), June 2015

Implementation Status and Results Report: Sequence 06 (English), December 2014

Implementation Status and Results Report: Sequence 05 (English), May 2014

Implementation Status and Results Report: Sequence 04 (English), August 2013

Implementation Status and Results Report: Sequence 03 (English), January 2013

Implementation Status and Results Report: Sequence 02 (English), May 2012

Implementation Status and Results Report: Sequence 01 (English), September 2011

Safeguard Documents

ESMF: Environmental and Social Management Plan : *Marco de gestão ambiental e social do projecto* (Portuguese), March 2011

RPF: Resettlement Plan (Vol. 3) : *Quadro de políticas de reassentamento* (Portuguese), April 2011

Resettlement Action Plan: *plano de reassentamento para as comunidades de Malanza e Santa Catarina* (Portuguese), August 2015

2) Borrower ICR

Jose Bettencourt, Evaluation of the PAMCZC Phase I, September 2016

Relatório Final das atividades do projeto de adaptação às mudanças climáticas para as zonas costeiras em São Tomé e Príncipe 2011–2017, December 2017

3) Data Sets Used to Assess Outcomes

Report on Construction Works (*Relatório De Medição Das Obras De Engenharias E/Ou Adaptação Implementadas No Quadro Do Projecto Pamczc*)

Inventory of Safety at Sea Material

Inquiries on Losses at Sea

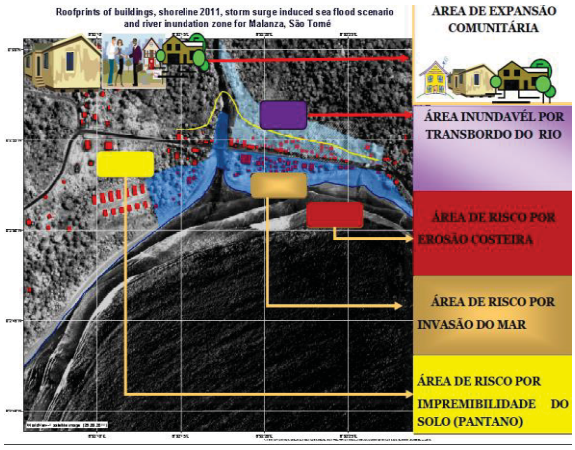
4) Analytical Studies Related to the Project

UNESCO-IHE and Deltares, Coastal Geomorphology and Adaptation Options Study: São Tomé and Príncipe, 2011

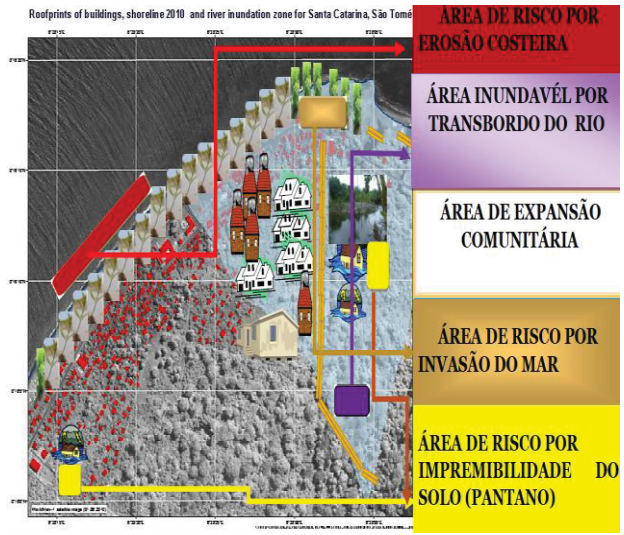
NAPA: National Adaptation Programmes of Actions on Climate Change, 2006

ANNEX 8. PARTICIPATORY RISK AND LAND-USE PLANNING MAPS IN THE FOUR PILOT COMMUNITIES, AND PICTURES

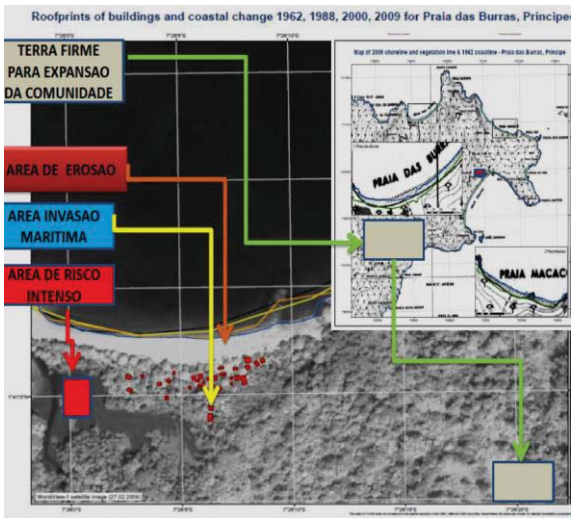
Ribeira Afonso



Malanza



Santa Catarina



Praia Burra

Source: Relatório Final das atividades do projeto de adaptação às mudanças climáticas para as zonas costeiras em São Tomé e Príncipe 2011–2017, December 2017

Malanza (before)

Malanza (after)

Praia Burra (before)

Praia Burra (after)

ANNEX 9. MAP OF SÃO TOMÉ AND PRÍNCIPE, INCLUDING THE FOUR PILOT COMMUNITIES