



ADAPTATION FUND

**REQUEST FOR PROJECT/PROGRAMME
FUNDING FROM THE ADAPTATION FUND**

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
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ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular
Country/ies:	Suriname
Title of Project/Programme:	Urban Investments for the Resilience of Paramaribo: Building adaptive capacity of Paramaribo communities to climate change-related floods and sea level rise through strategic urban planning and sustainable infrastructure investments.
Type of Implementing Entity:	Multilateral Implementing Agency
Implementing Entity:	Inter-American Development Bank
Executing Entity/ies:	Ministry of Public Works, Government of Suriname
Amount of Financing Requested:	\$9,801,619 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

INTRODUCTION

CONTEXT AND VULNERABILITY AT A NATIONAL LEVEL

1. Suriname, one of the smallest countries in South America, is located on the north-eastern coast of South America and shares borders with French Guyana (east), Brazil (south), Guyana (west) and Atlantic Ocean (north). The country has a large variety of biological species and owns natural resources that represent a total forest area of 50 million hectares. Suriname also has substantial reserves of petroleum, bauxite, gold, granite and other minerals. Approximately 400 million tons of bauxite deposits are located in Suriname and together with gold and production of crude oil represent the major economic sectors in the country (MLTDE, 2008). Mineral and energy sectors (gold, oil and alumina) account for approximately 30% of the GDP.

2. Suriname is a small, open, commodity-based economy that is vulnerable to external shocks. On the back of high international commodity prices, Suriname grew at a high average yearly rate (3.8% or a total real per capita income growth of 65%) over the past decade, and as a consequence was one of the Caribbean's best performing economies given its rich endowment in natural resources (World Bank 2016). Growth is driven by exports from the extractive sector (gold, oil, and bauxite), which generate 90% of foreign exchange earnings and 45% of government revenues. Suriname (in common with other small economies) relies on imports to satisfy most domestic demand for goods (imports account for more than 80% of consumption), while total trade has averaged around 145% of GDP over the past five years. The transmission mechanism of the wealth generated in the extractive sector to the rest of the economy relies highly on public spending on goods and services, infrastructure and, importantly, wages and salaries of employees in the public sector and in public enterprises. The domestic private sector, limited by the small size of the economy, is geared towards satisfying domestic demand mainly with imports. As a consequence, the private sector expands or contracts responding to changes in public spending that drive aggregate demand (IDB, 2016).

3. The recent historical growth in Suriname's per capita income has not translated into a significant improvement in social indicators. Suriname has a literacy rate of 94.7% and life expectancy of 71 years. The country ranks 103rd out of 186 countries in the 2015 Human Development Index (HDI), with slight improvements over the previous years. The country's HDI rank is mostly due to improvements made in income levels over the past decade, however, both the education and health indicators fall below comparable countries categorized with a high HDI. Only 45.9% of the population has a secondary education compared to 66.6% for comparable countries while there are only 9.1 physicians per 1,000 people in Suriname compared to 20 in other high HDI countries. Data on poverty and inequality are scarce but offer indications that Suriname is somewhat in line with regional averages. Conventional income-based poverty and inequality indicators are fairly outdated, while a recent household survey of the General Bureau of Statistics did not produce any new estimates due to low response rates. Although robust growth in income per capita over most of the past decade may have reduced absolute poverty, its impact on inequality in recent years is more uncertain. A 2013 United Nations inequality-adjusted human development indicator (HDI) estimated that the loss in human development due to inequality in 2006 was broadly in line with the regional average (IMF 2014). The 2015 Human Development Report published by the United Nations Development Program indicated that about 7.4% of the population lived in multidimensional poverty at end-2010, which is below the regional average of 12%. The unemployment rate in Suriname is estimated at 8.9% in 2015 (IMF 2016). Female unemployment is higher than male (about 4 percentage points), and youth unemployment is significantly higher (above 20% in 2013).

4. According to UNFCCC (2015) and the Environment Statistics (2016), the total population of Suriname is estimated on 558,773 habitants but it is expected that the population reach 2.5-3 million at the end of this century. The Surinamese population is presently multi-ethnic and multi-religious including ethnic groups such as Hindustani (from India), Creoles (African descent), Javanese (from Indonesia), Maroons (descendants of runaway slaves), Amerindians (the original inhabitants), Chinese, Lebanese and descendants of European settlers. The largest part of the Surinamese population is found within the Paramaribo and Wanica districts (74.4% of households). In 2004, the population density across Suriname was estimated at 3.0 people per square kilometre, making Suriname a very lowly populated country. However, the most densely populated districts are Paramaribo and Wanica with population densities of 1,335 and 194 people per square kilometre respectively, as shown in

Figure 1 (SNC, 2013). In addition, more than 90% of the diverse economic activities in production, manufacturing, horticulture, agriculture, financial and banking services, community, society and public services occur within the Paramaribo and Wanica Districts (MLTDE, 2008).

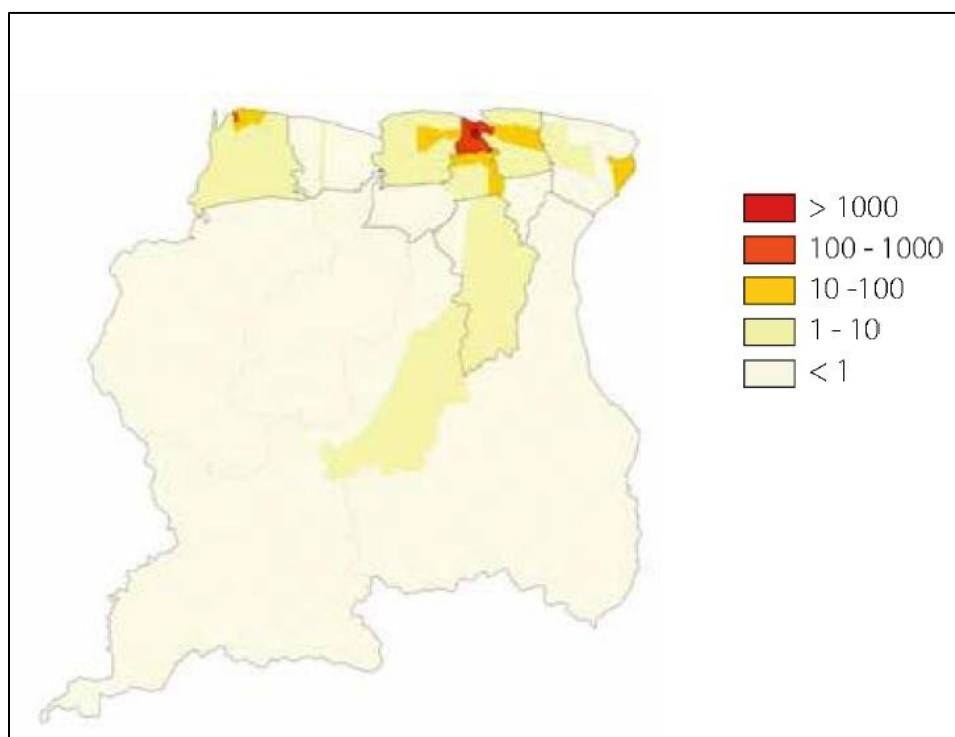


Figure 1: Population Distribution and Density per District on 2004 (Source: Figure 1.12 of SNC, 2013).

CLIMATE CHANGE VULNERABILITY CONTEXT AT A NATIONAL LEVEL

5. Suriname is a highly vulnerable country to the effects of climate change. Firstly, the country is exposed to a number of natural and climate change-influenced hazards. Secondly, the low-lying lands most vulnerable to these hazards also coincide with the areas of highest population density and also economic activity. And thirdly, the low income status further increases the population's vulnerability to climate change.
6. Suriname is susceptible to natural and climate change-related disasters, as detailed in its Second National Communication to the UNFCCC (SNC, 2013). These include flooding (both coastal and inland), drought, heat exposure, strong winds and groundwater salinization. Scientific analysis projects that temperatures will increase, sea level will rise, and the proportion of total rainfall that falls in heavy events will increase (though average rainfall will decrease). *Table 1* presents the future climate change projections for Suriname based on the A2 IPCC (Intergovernmental Panel on Climate Change) scenarios. It is projected that climate change impacts would affect over 40% of Suriname's GDP (UNFCCC, 2015). Some of the main socio-economic sectors being impacted by climate change include agriculture, livelihoods, water availability, health and biodiversity.

Table 1: Climate Change Projections for Suriname based on A2 IPCC Scenarios

Parameters	Value	Year	Source
Air Temperature overall annual mean	+2.6 °C (annual); +2.6 °C (December, January and February); +2.7 °C (March, April and May); +2.6 °C (June, July and August); +2.7 °C (September, October and November)	2050s	The Caribsav Climate Change Risk Atlas (CCCRA, 2012)
Precipitation	-6% (annual); -3% (December, January and February); -8% (March, April and May); -8% (June, July and August); -8% (September, October and November)	2050s	The Caribsav Climate Change Risk Atlas (CCCRA, 2012)
Wind Speed	+0.30 m/s (annual); +0.30 m/s (December, January and February); +0.20 m/s (March, April and May); +0.30 m/s (June, July and August); +0.30 m/s (September, October and November)	2050s	The Caribsav Climate Change Risk Atlas (CCCRA, 2012)
Weather extremes, including intensity	+8% (annual); +10% (December, January and February); +9% (March, April and May); +7% (June, July and August); +21% (September, October and November)	2050s	The Caribsav Climate Change Risk Atlas (CCCRA, 2012)
Sea Level Rise (SLR)	+0.5 meter	2050s	Estimated based on info from CCCRA, Sea Level Rise in the Caribbean and The Second National Communication.

7. Flooding and sea level rise (SLR) presents a significant threat to Suriname given this extensive low-lying coastal zone and the concentration of socioeconomic activities within this area. Suriname's vulnerability is exacerbated by the fact that its main low lying coastal areas also coincide with the main population centers and areas economic activity. Suriname possesses a significant deltaic region related to four main rivers: Suriname River, Saramacca River, Coppename River, and Nickerie River. This includes sizeable north coastal plains (low-lying coast) where over 80% of the population live and where the major economic activities and infrastructure are concentrated (SNC, 2013; UNFCCC, 2015). *Figure 2* shows the low-lying flat areas at the north part of Suriname that are prone to floods (approximately 2,000 km²).

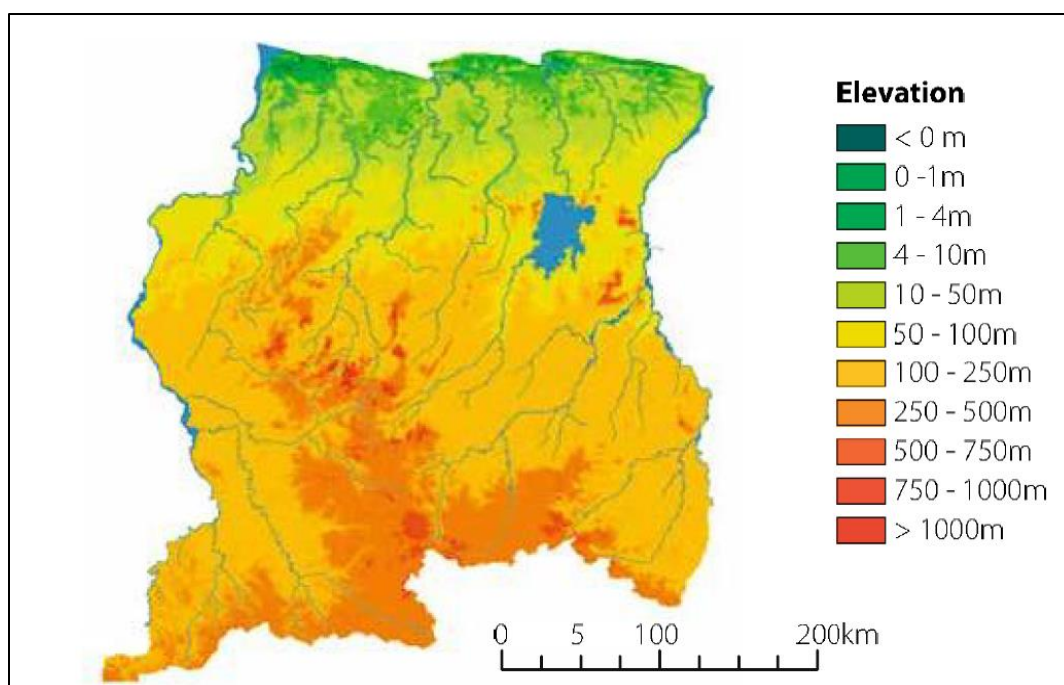


Figure 2: Topography of Suriname (Source: Figure 1.3 of SNC, 2013).

8. Even though Suriname is located outside of the hurricane area, hurricane effects are often experienced in the form of heavy rainfall. Meteorological conditions in Suriname are also influenced by climate systems including Sibusies's (Sibi = sweep, Busie = forest), Inter Tropical Convergence Zone (ITCZ) and the El Niño phenomenon (Environment Statistics, 2016). Flooding occurs through a number of mechanisms including when sea level rises during spring tide, during tropical storms by impacting low-lying coastal and riverine development and/or by rainfall-induced accumulation of water due to outdated and insufficient drainage systems. As a consequence, Suriname experiences frequent flooding, particularly in the northern coastal plain and riverine areas which are generally of low elevation and flat. Table 2 shows a summary of the historical floods in Suriname between 2004 and 2015 based on information obtained from the Environment Statistics (2016).

Table 2: Historical Flooding Events in Suriname (Source: Adapted from Environment Statistics 2016 and NCCR Situation Analysis).

Date	Natural Disaster	Affected Areas	Population
9/7/2004	Floods associated with rainfall from Hurricane Ivan	Not specified	Unknown
6/5/2006	Flood due to excessive rainfall	Gran Rio and Pikin Rio rivers, Paramacaans on the Marowijne River, upper Marowijne, Tapanhony and Lawa, (Mofina) Suriname and Sipaliwini River	25,000 people
June 2006	Floods due to heavy rainfall	Villages along the upper Marowijne river and the upper Suriname River	20,000 people
2006/2007	Flood	Coropina triangle, Vier Kinderen, La Prosperite and Republiek	500 people
29/4/2007	Floods due to continuous rainfall	Paramaribo	
28/5/2007	Flood due to	Sipaliwini, Northern Marowijne,	5,000 people

Date	Natural Disaster	Affected Areas	Population
	excessive rainfall	Tapanahony River, Lawa and Curuni	
6/8/2008	Flood due excessive rainfall	Southern part of the interior: Djumu, Asidonhopo, Semoisi, Awaradam	Unknown
1/10/2009	Flood due to excessive rainfall	Paramaribo	Unknown
2/4/2009	Flood due to excessive rainfall	Paramaribo	Unknown
10/3/2009	Flood due to excessive rainfall	Paramaribo	Unknown
5/3/2009	Flood due to excessive rainfall	Paramaribo	Unknown
14/7/2010	Coastal flooding as a result of dam fail	Saramacca: La poule, Peperhol, north part of Wayambo	Unknown
24/4/2010	Flood due to excessive rainfall	Paramaribo	Unknown
16/4/2010	Flood due to excessive rainfall	Paramaribo: Margarethalaan	unknown
22/4/2010	Flood due to excessive rainfall	Paramaribo: Poelephantje	Unknown
17/5/2013	Flood due to excessive rainfall	Saramacca: Misgusnst	Unknown
16/5/2013	Flood due to excessive rainfall	Commewijne: Frederikdorp	Unknown
16/5/2013	Flood due to excessive rainfall	Para, Paramaribo, Marowijne (Cottica)	Unknown
20/6/2013	Tail of a heavy tropical storm/flooding (heavy rainfall)	Paramaribo, Wanica, Saramacca, Marowijne (Galibi). Roof were torn away (30 houses), trees uprooted and damaged power poles, advertising signs and Street lighting	300 people affected
27/12/2013	Flood due to excessive rainfall	Paramaribo, Wanica, Saramacca	Unknown
6/7/2014	Storm	National: Paramaribo, Coronie, Commewijne, Saramacca en Nickerie	150+
7/6/2014	Storm	Nickerie: Nieuw Nickerie	100 houses
2/5/2015	Flood	Marowijne: Alale Kondre	Unknown
18/5/2015	Persistent rainfall	Wanica: Hanna's Lust	
21/6/2015	Storm	Paramaribo: Zorg en Hoop	1 injured and 35 homes affected
28/6/2015	Storm	Paramaribo	1 (death)
27/7/2015	Flood	Saramacca	unknown
16/1/2016	Hailstorm	Paramaribo and surroundings	

9. The flooding risk of local communities living in costal and/or riverine areas of Suriname is amplified when considering the vulnerability of the areas that flood. For example, as discussed above, about two thirds of the Surinamese population live and work in the Paramaribo/Wanica area, which is prone to significant flooding. A 1999 study entitled "Country Study Climate Change Suriname" (and also known as the Netherlands Climate Assistance Programme Phase 1, NCAP-1¹) identified risk zones for inundation from the sea

¹ <https://www.weadapt.org/knowledge-base/national-adaptation-planning/methodology-of-suriname-ncap-project>

and rivers, as shown below in *Figure 3*, showing the current vulnerabilities of the northern coastal areas to flooding.

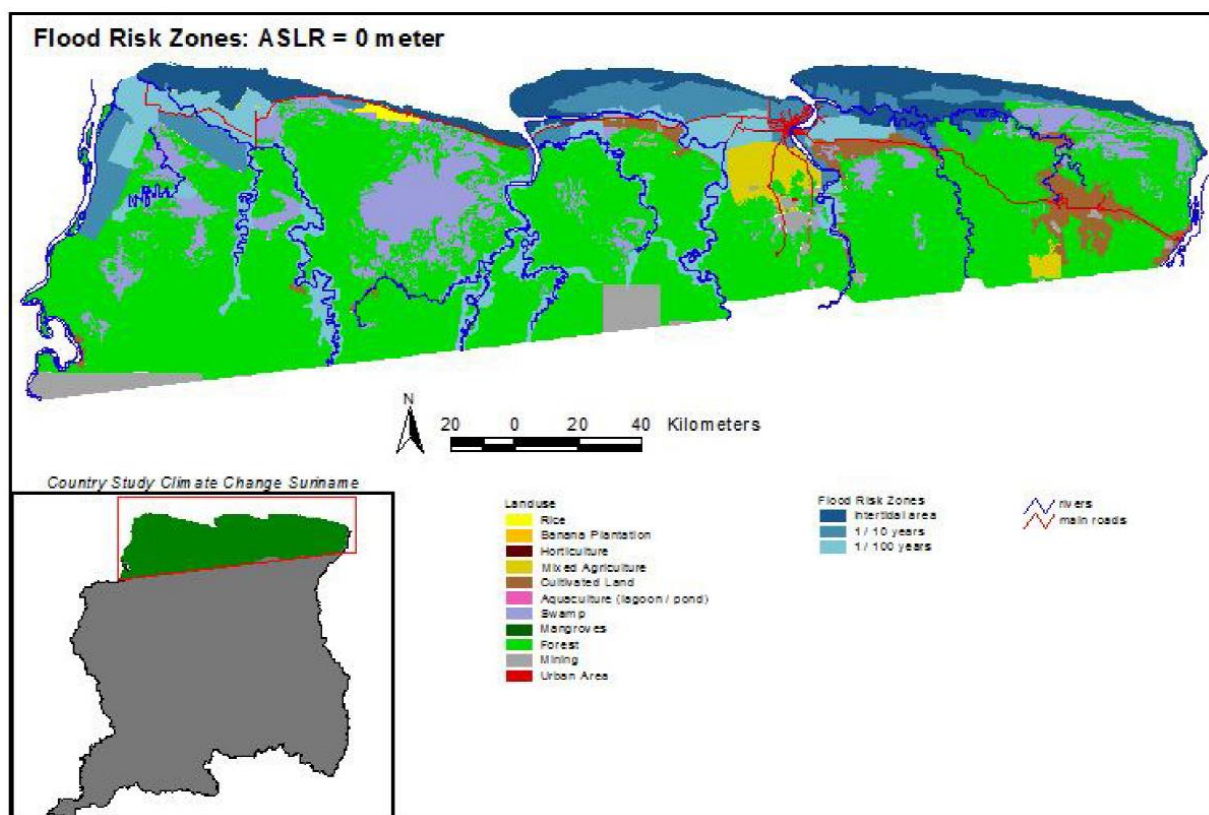


Figure 3: Flood Risk Zones for the Suriname coastal plain (Source: Figure 6-4 of Country Study Climate Change Suriname).

10. In a comparative analysis of the impacts of SLR on land, population, GDP, urban and agricultural extent, and wetlands in 84 developing countries, Suriname was ranked highest in Latin America and the Caribbean in terms of population and GDP impact, and was second only to Guyana and the Bahamas in terms of urban and agricultural extent (World Bank 2007 cited on IDB and IIC, 2016). At the global level, Suriname ranks among the top most affected countries overall. Suriname's entire economic zone is located within its coastal areas. Estimates of impacts of 1 meter SLR and storm surge in CARICOM member states, including Suriname, show that nearly 1,300 km² of land will be lost, over 110,000 people will be displaced, at least 149 multimillion dollar tourism resorts (including beaches) will be damaged or lost together with over 550 km of roads lost (Simpson et al, 2010). Other expected impacts include loss and damages to the agriculture, forestry and fisheries sectors as a result of increase ambient temperatures. Adaptation efforts so far remain insufficient and the continued impacts of climate change could further intensify the country's vulnerabilities, negatively affecting key sectors such as agriculture, water, energy, health and tourism.
11. The low income segments of the population are disproportionately affected by climate risks. This is mainly due to poorer quality housing in environmentally sensitive areas and generally lower coping mechanisms in the case of hazard events. Lower income households often work in agriculture or informal activities that depend on the climate and are more exposed to

communicable diseases that could become more prevalent as climate changes. Expected temperature increases, coupled with changes in rainfall patterns, will have significant impacts on human health through potential increases in the incidence of parasitic and infectious diseases (including a possible increase of vector diseases such as malaria in the interior and dengue in the coastal zone) (Government of Suriname 2013 cited on IDB and IIC, 2016). Of note in relation to these vulnerabilities is the expected disparity in impact among certain groups in society, such as women in the country's interior and farming communities (UNDP 2009 cited on IDB and IIC, 2016). Similarly, critical social infrastructure is also highly vulnerable to the effects of climate change.

12. Recognizing the vulnerabilities faced by Suriname to natural hazards and the additional effects of climate change, the United Nations Development Programme (UNDP) will develop a National Adaptation Plan (NAP) in 2017 based on UNDP's Suriname National Climate Change Policy Strategy and Action Plan (NCCPSAP). While this is under development, it can be confirmed that the proposals and interventions contained in this application are aligned and consistent with the NAP / NCCPSAP and also with IDB-funded climate change vulnerability assessment for Paramaribo city.

URBAN VULNERABILITY: A FOCUS ON PARAMARIBO

NATIONAL IMPORTANCE OF PARAMARIBO

13. Paramaribo is the capital city of Suriname and is located on the banks of the Suriname River along the northern coast of the country. Paramaribo and the surrounding urban areas is the main population center of Suriname, and where more than 70% of the country's population resides. Furthermore, Paramaribo is the main commercial and economic center, and also the location for the majority offices and activities of the GoS, which as reported earlier, is a key driver of the country's economy (IDB and IIC, 2016).
14. Paramaribo is the business and financial center of Suriname. Even though it does not produce significant goods itself, almost all revenues from the country's main export products (minerals, oil, agriculture and forestry) are channelled through the city, where the majority of banks, insurance corporations and other financial and commercial companies are headquartered. It is estimated that approximately 75 percent of Suriname's GDP is centered in Paramaribo (IDB and IIC, 2016).
15. Tourism is also an increasingly important sector for Paramaribo, both as a destination in its own right, and also as a gateway to the inner country areas. Paramaribo is a former Dutch colonial town dating from the 17th and 18th centuries. The Historic Inner City of Paramaribo is a UNESCO World Heritage Site and its certification is based on the following criteria:
 - Paramaribo is an exceptional example of the gradual fusion of European architecture and construction techniques with indigenous South American materials and crafts to create a new architectural idiom; and
 - Paramaribo is a unique example of the contact between the European culture of the Netherlands and the indigenous cultures and environment of South America in the years of intensive colonization of this region in the 16th and 17th centuries.
16. Paramaribo is therefore critical to the economic and development success of Suriname.

VULNERABILITY OF PARAMARIBO

17. Paramaribo sits in the lower elevation norther area of the country and is highly vulnerable to flooding and sea level rise, consistent with what has been described above. Table 2 shows the frequency with which flooding has affected Paramaribo, and this represents the principal hazard and risk facing Paramaribo.
18. A follow-up to the NCAP-1 study, the study “Promotion of Sustainable Livelihood within the Coastal Zone of Suriname, with Emphasis on Greater Paramaribo and in the Immediate Region”, known as the Netherlands Climate Assistant Programme Phase 2 (NCAP-2) (Naipal and Tas, 2016), demonstrated that a significant part of the Paramaribo area is highly vulnerable. For example, it cites that along the riverbank of the Suriname River and also in the southern part of the Paramaribo/Wanica area, the ground level is low, varying between 1.50 to 1.80m NSP, whereas the 1 in 10 year high water in the Suriname River is 1.93m at the north of Paramaribo and 2.00m near the center and south of the city.
19. Paramaribo does have some existing defences and protection measures in place, however these are not always sufficient for current levels of flooding, and are insufficient when considering future implications of projected climate change (see *Figure 4*). For example, along the Suriname River from the north to the south, local protection measures in the form of earthen dams exist which aim to prevent flooding of the river at high tide. However, at locations the elevation of the top of the available structures and infrastructure is lower than the current high water levels and as a consequence, flooding occurs (NCAP-2).

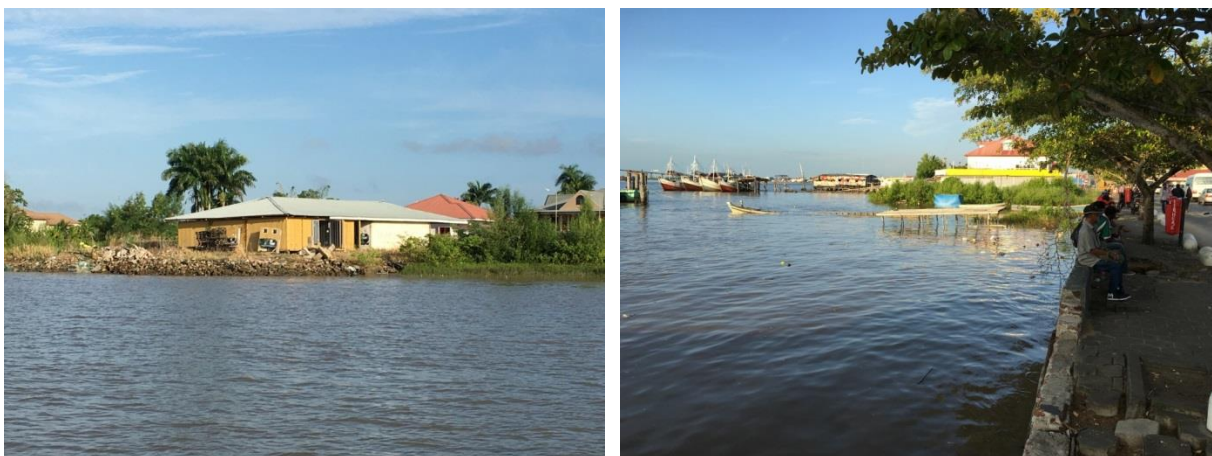


Figure 4: Examples of existing Flood Defences along the left bank of the Suriname River (Source: IDB, 2016).

20. Another key contributing factor to the flooding experienced in Paramaribo is the fact that the drainage system is undersized and poorly maintained. The current system is largely based on the original drainage design from colonial times to support the former plantation network, and is therefore inappropriate for the city as it is today. Thirty five open and closed drainage canals and channels form the current drainage system of Paramaribo. The canals can be characterized as a mixed system because in addition to rainwater, they also receive discharges of domestic waste water (partially treated by septic tanks). Interviews with local experts and government officials, and site visits as part of the IDB’s Emerging and

Sustainable Cities Program, revealed that flooding within Paramaribo's drainage system occurs due to a combination of poor maintenance of the existing canal network (including waste deposition), lack of maintenance of outlet structures (sluices and pumping stations), unregulated development in areas intended to support drainage such as retention areas, and additional growth of the urban area meaning drainage infrastructure may be under-sized (MOGP, 2001).

21. Flooding and drainage issues in Paramaribo are therefore a noted priority for the GoS², as highlighted in Suriname's National Development Plan 2012-2016. The GoS has undertaken several initiatives to address climate change adaptation challenges, including the formulation of: the Climate Action Plan for the Coastal Zone of Suriname; the Integrated Coastal Zone Management Plan (ICZM), which provides several recommendations on several adaptation solutions for the North Paramaribo-Wanica coastline; National Contingency Plan; and the Second National Communication to the UNFCCC (2013). Furthermore Suriname has participated in Phases I and II of the Netherlands Climate Assistance Program;; and the European Union Global Climate Change Alliance Program (2011-2015). The latter has led to the formulation of the National Climate Change Policy, Strategy and Action Plan of 2015 and the strengthening of the Meteorological Services, as well as training in climate modelling and vulnerability and risk assessments.
22. More specifically for Paramaribo, the GoS has been conducting several studies to identify appropriate adaptation measures for the city. In 2009 the GoS conducted a river protection study, which proposes the construction of a river dike to the north of Paramaribo to protect the city's historical center against flooding due to increasingly high water levels in relation to global sea-level rise. In fact, the ICZM Plan backs this proposal and further recommends the construction of dikes along the left bank of the Suriname River from Leonsberg to the Saramacca canal. Based on these recommendations and earlier studies as mentioned above, the GoS partially (incomplete due to lack of funding) built the dike and river protection (flood wall) on different parts of the Suriname River bank in 2011.
23. In addition, the Inter-American Development Bank (IDB) has developed a partnership with the GoS with respect to supporting the sustainable development of Paramaribo. This includes the application of the IDB's Emerging and Sustainable Cities (ESC) assessment methodology to Paramaribo (the ESC Study). The ESC Study is a systematic approach to assessing the current baseline situation in a city with respect to a host of key topics, sectors and sustainability indicators, and to use this information through analysis and extensive engagement with city stakeholders to develop key urban sustainability priorities for a city. Climate vulnerability and risk is a critical lens of the ESC Study through which a city's sustainability challenges and opportunities are considered. In the case of Paramaribo, the IDB has commissioned a hazard and risk analysis for the greater Paramaribo area (see *Figure 5*) with the aim of identifying areas of vulnerability and highest risk to natural hazards, and also proposing adaptation recommendations to build resilience (ESC Risk Study). This is ongoing work and will be completed by February 2016; however key findings to date have been integrated into this project proposal.

² While administratively Paramaribo forms its own district in Suriname, it does not have its own municipal or city government. The GoS maintains governance and management over the city.

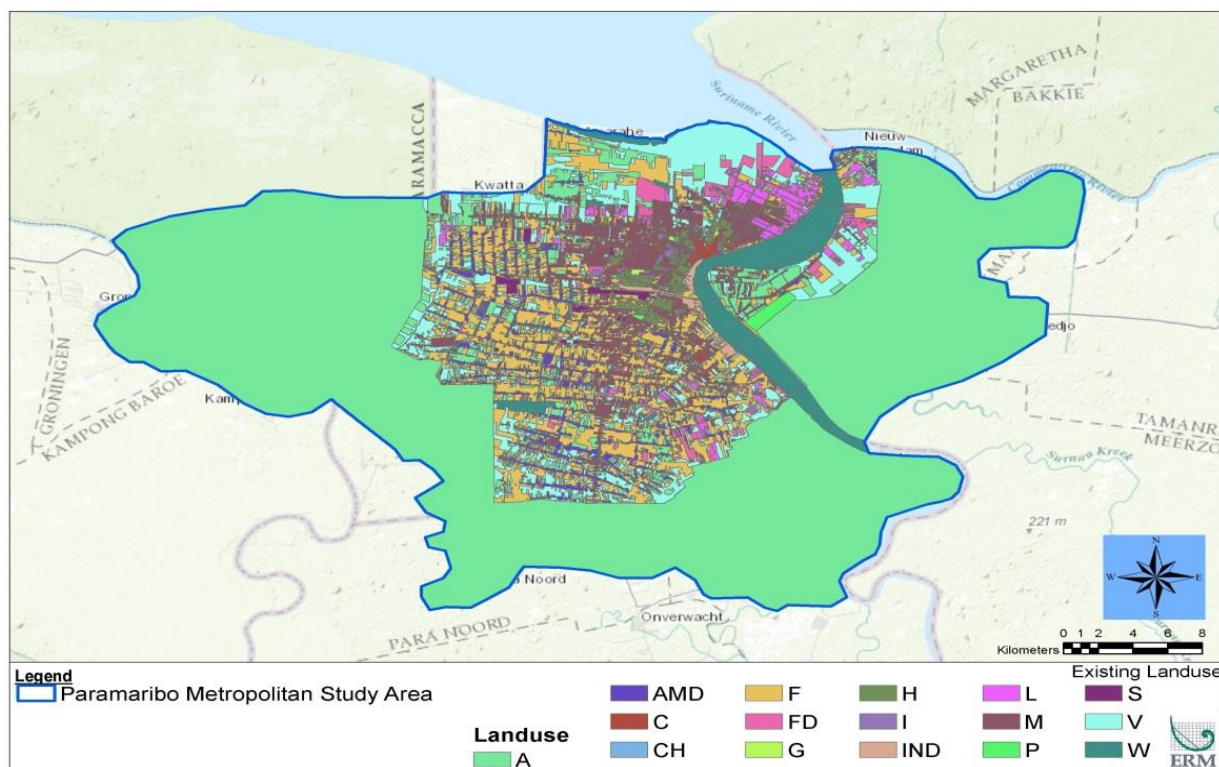


Figure 5: Paramaribo Metropolitan Study Area for the IDB's ESCI (Source: IDB, 2016).

24. In addition, the IDB is also funding a loan for the Revitalization of the Historic Centre of Paramaribo (IDB Urban Rehabilitation Program), which has been conceived to tackle the most urgent problems affecting the historical downtown and promote a sustainable urban revitalization process. This area embraces Paramaribo's UNESCO world heritage site (see Figure 6). The IDB also commissioned focused hazard and risk studies in this area (Downtown Risk Study).

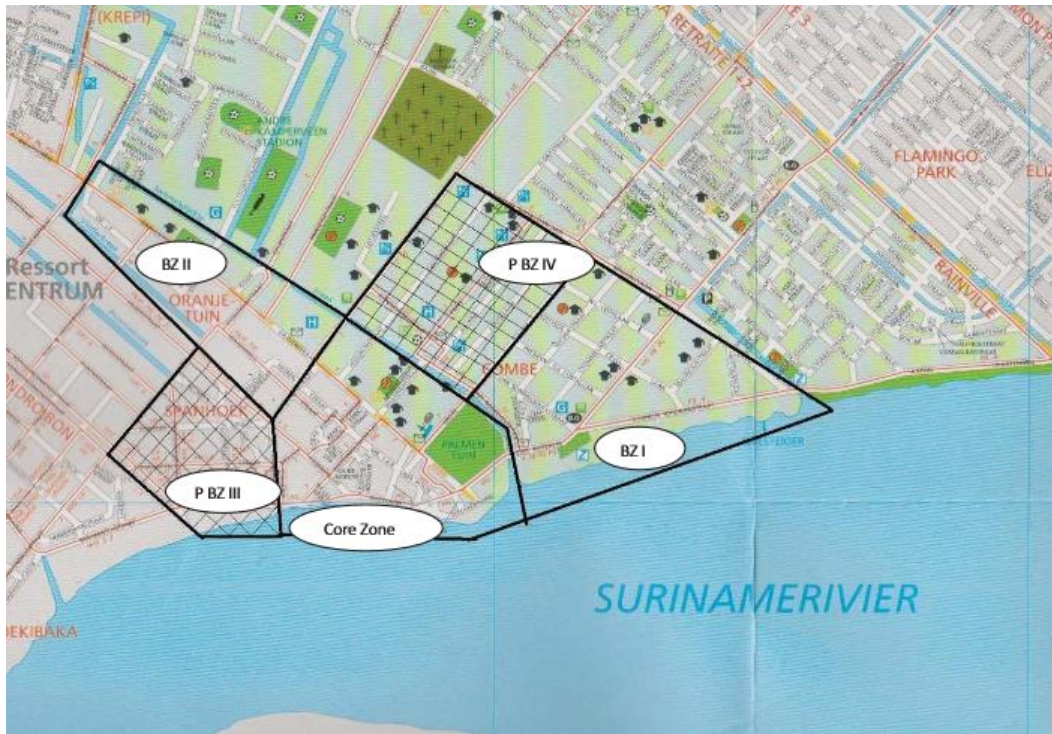


Figure 6: Program Area (Core Zone of Paramaribo World Heritage Site)

25. The ESC and Risk studies included a focus on flooding (which was prioritized as a hazard through engagement with the city stakeholders) and used the climate change projections presented in *Table 1*). The studies modelled inland and coastal flooding hazards both for the current situation and also for the future (out to the year 2050) when considering climate change projections for a series of different return periods. These results were then used to generate hazard maps for the city, such as the one shown in *Figure 7* which presents the 1 in 100 year costal hazard map for the Paramaribo Study Area with climate change projections integrated for 2050.

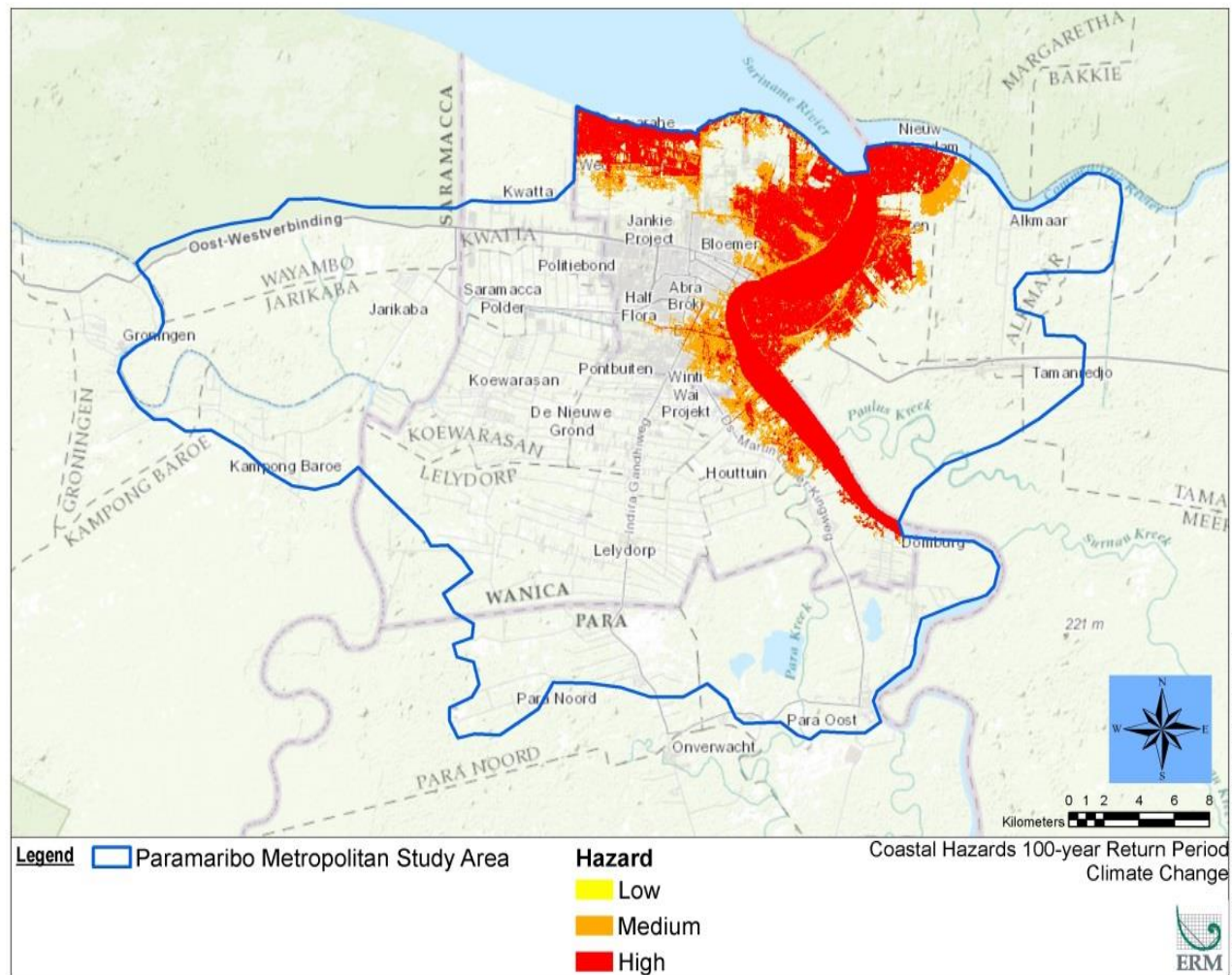


Figure 7: 100-year coastal hazard map for Paramaribo with climate change projections for 2050 horizon (Source: IDB 2016)

26. As can be seen in *Figure 7*, the modelling shows areas of high vulnerability for Paramaribo along the Suriname River and for the emerging urban areas along the northern coast. Risk maps have also been generated by linking the coastal and inland flooding hazard findings to population areas and also economic land-value. For example, *Figures 8* and *9* show the economic and population-based risk maps created for the ESC Study area, which is the larger Paramaribo Metropolitan area. These risk maps serve as basis to identify areas of Paramaribo where climate adaptation measures are needed to increase climate resilience into the future.

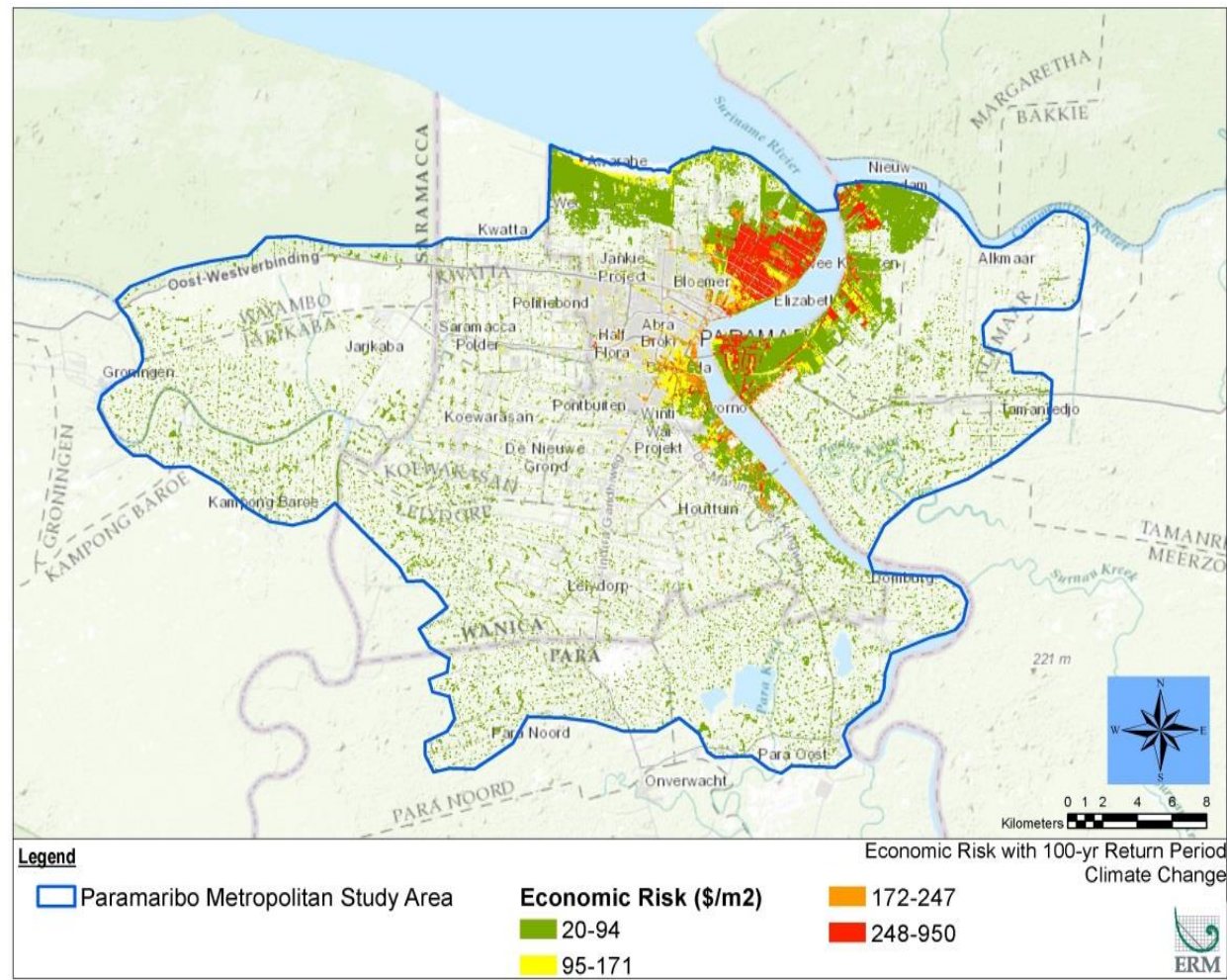


Figure 8: Paramaribo Metropolitan Economic-based risk map with Climate Change for 100-year return period (Source: IDB, 2016)³

³ Economic-based risk refers to the level of potential asset loss due to hazards and vulnerability. The color codes refer to the economic risk of the area, where high (red) and low (green) damage costs are identified as results of natural events including climate change for a return period of 100 years.

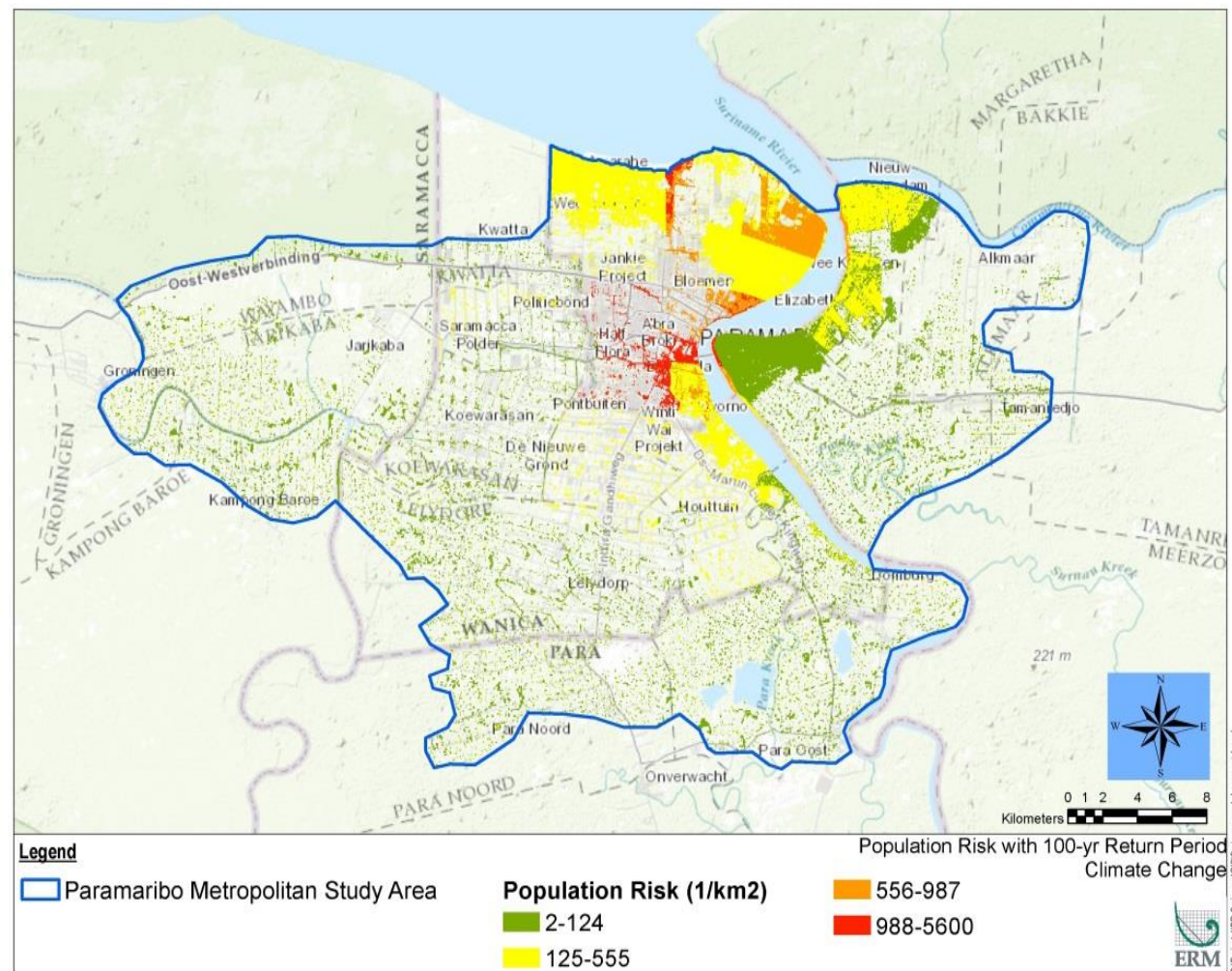


Figure 9: Paramaribo Metropolitan Population-based risk map with Climate Change for 100-year return period (Source: IDB, 2016)

27. Based on the information presented in *Figures 7 to 9*, Paramaribo and its broader metropolitan area has six priority areas which have higher vulnerability and risks to flooding and sea level rise including:

- Along the east bank of the Suriname River at (i) New Amsterdam and also (ii) Meerzorg;
- Along the west bank of the Suriname River at (iii) Noord and (iv) Downtown (the Historic Center of Paramaribo);
- Along the northern coast following the (v) canal that serves Munder; and
- West of the Downtown area (vi) adjacent to Tammenga.

28. Stakeholder discussions and workshops with GoS agencies and also non-governmental agencies have also been undertaken as part of the risk studies to understand current capacity, management plans and resources for managing and responding to natural hazards and disasters. This analysis also overlaps with the ESC Study city indicator process. While this process is ongoing, some current insights and conclusions include:

- The GoS does not have existing risk maps for natural hazards;
- The GoS has an emergency contingency plan, however this does not appear to be widely disseminated and is also limited in its extent due to budget and resource constraints;
- There is only a basic infrastructure in place for an early warning system; and
- Disaster risk management has not currently been carried through to any broader city development planning;

29. The above studies were performed at the metropolitan level and a summary to the final ESC Risk Study report will be appended to the final version of this project proposal for informational purposes. The Downtown Risk Study on the Revitalization of the Historic Centre of Paramaribo allowed one of the high risk areas (the Downtown area) to be studied further, and the risks are summarized in Figures 10 and 11. These economic and population based-risk maps reinforce the urgent need for the implementation of a group of adaptation measures that go from the development of capacity building activities at different government levels and local communities, to the deployment of key infrastructure to protect the coast along the waterfront of this area.

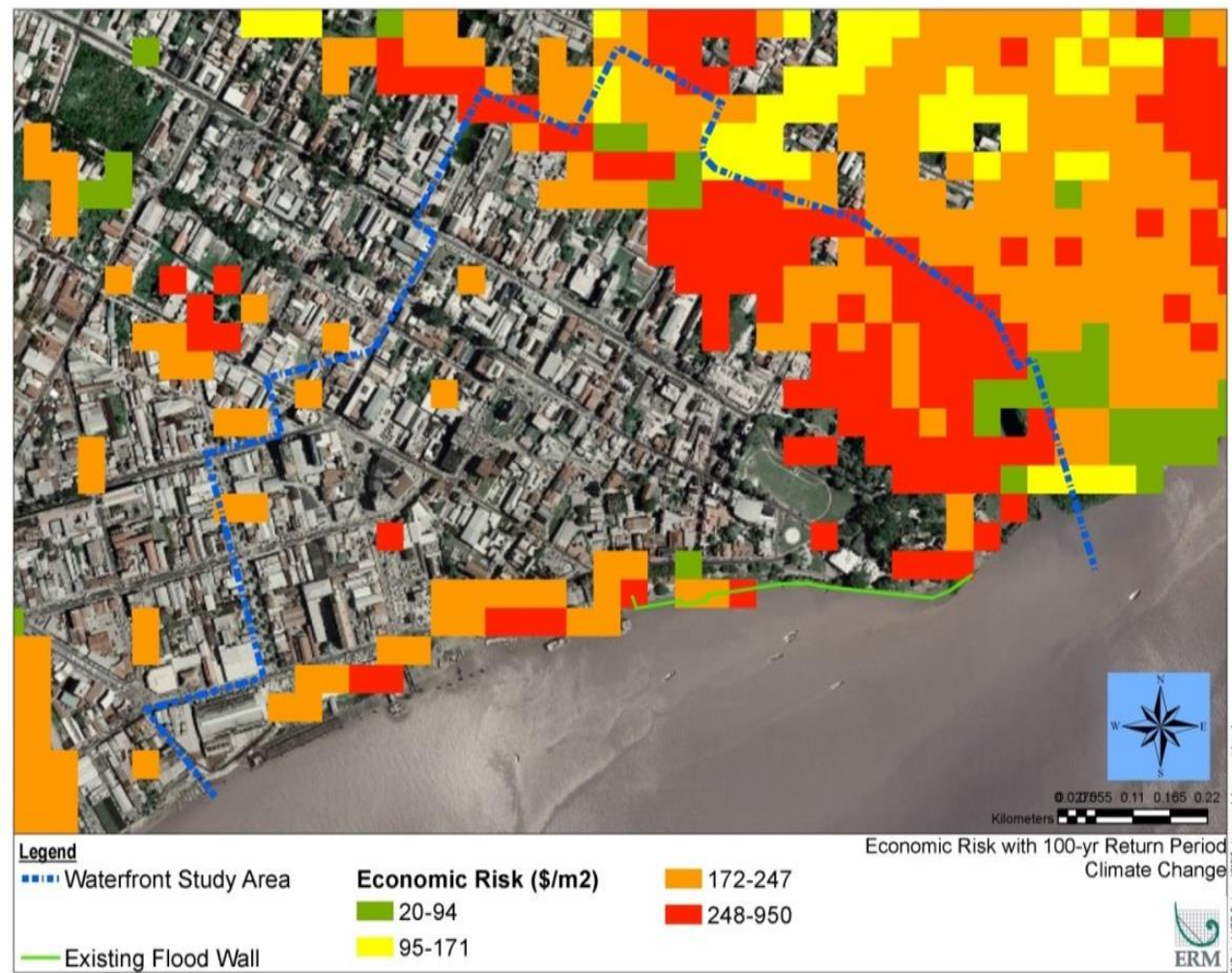


Figure 10: Waterfront Economic-based risk map with Climate Change for 100-year return period (Source: IDB, 2016)

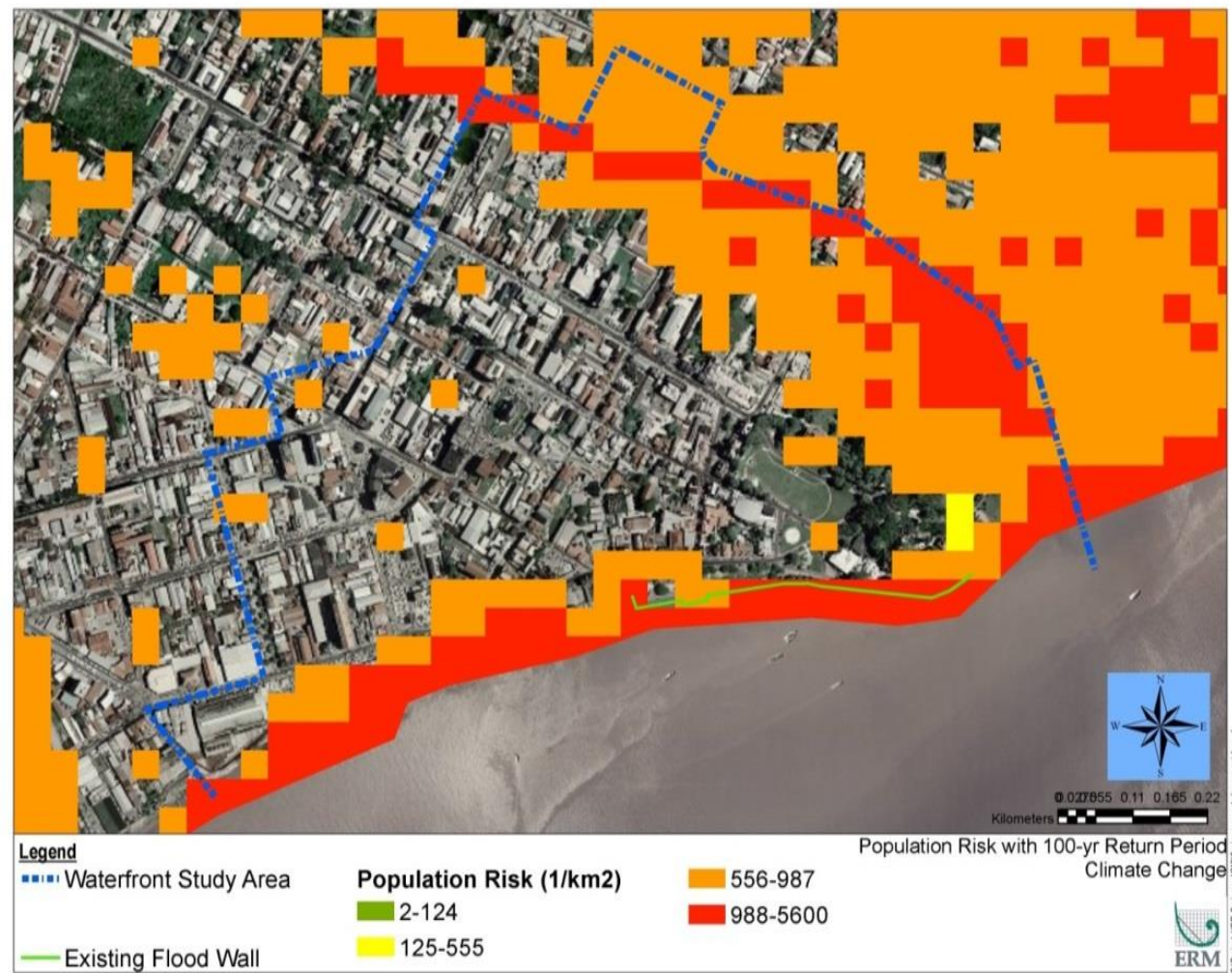


Figure 11: Waterfront Population-based risk map with Climate Change for 100-year return period (Source: IDB, 2016)

30. In summary, Paramaribo is highly vulnerable to climate change and natural hazards (floods), and given the prominent and integral role Paramaribo plays at the national level, Paramaribo's vulnerability has national consequences in terms of economic and social impacts. The challenges Paramaribo faces include:
- Vulnerability (both in terms of population and economic exposure) to flood hazards which will be further compounded by projected sea level rise;
 - This vulnerability is largely in areas of the city that are important population centers and also economic hubs; in order to put in place a sustainable growth plan for the city, it is necessary to better know the river and how it would interact under new hydrological conditions posed by a changing climate- that is, additional knowledge of gradual changes to local hydrology need to be monitored, filed and analyzed.
 - There are a number of challenges that threaten Paramaribo's capacity to effectively cope with observed and anticipated effects of climate change on the frequency and magnitude of floods and sea level rise, namely limited resources; limited institutional capacity; the low-income status of much of the population limits their own ability to build resilience; and absence of a coordinated understanding and resulting action plan to build adaptive capacity.
31. The adaptation and resilience requirements identified through existing GoS and IDB studies suggests that over \$60 million of investment is needed to support a city-wide fully implemented adaptation strategy. It is recognized that this level of capital expenditure is not feasible given the current economic situation in Suriname. This Proposed Project therefore seeks to incrementally respond to Paramaribo's challenges and complement current efforts lead by the GoS to protect the city by initiating a first phase of adaptation measures to demonstrate the benefits to be accrued through adapting to climate change and create an enabling environment to facilitate a long term participative and dynamic adaptation process. The Proposed Project takes advantage of the existing studies and analysis performed by the IDB and GoS to date in order to implement a focused adaptation solution (specific to the Downtown area), as well as create an overarching city framework to build capacity and structure in support of further adaptation and resilience building.

Proposed Project Objectives:

PROGRAMME OBJECTIVE

32. The general objective of the proposed project is to contribute towards increasing the adaptive capacity of communities living in the Paramaribo city and adjacent metropolitan vulnerable areas to cope with observed and anticipated impacts of climate change on floods and sea level rise. The specific objectives of this Proposed Project are to generate:
- i. ***Downtown Adaptation Measures:*** Implement a group of strategic and cost-effective adaptation hard measures in the historic downtown area of Paramaribo that illustrate the benefits of building climate resilience as part of a long-term planning strategy for the city and its metropolitan area;
 - ii. ***City Adaptation Framework and Plan:*** Establish a framework for managing knowledge and disseminating lessons learned that could be used in future resilience

- programs for the city of Paramaribo and that could be part of a city-level Adaptation Plan;
- iii. **Capacity Building:** Build capacity across local communities and GoS stakeholders responsible for decision making in Paramaribo to ensure strong implementation and enforcement of the Adaptation Plan; and
 - iv. **Monitoring and Evaluation:** Ensure there is a robust plan and implementation structure to allow the Proposed Project to be implemented, monitored, evaluated and lessons learned disseminated.

PROPOSED PROJECT STRATEGY

33. To deliver on the identified objectives, the GoS and IDB are proposing under this Proposed Project four main components (noting the components are not necessarily sequential), as described below.

(i) DOWNTOWN ADAPTATION MEASURES

34. The work of IDB and the GoS undertaken in 2016 identified the key areas in Paramaribo where hard adaptation measures are needed. One of the identified priority areas is the Historic Downtown Area (HDA) which vulnerability to floods will be exacerbated by climate change anticipated impacts. This area is also the focus of GoS and IDB investments to try and reinvigorate the area both to protect its historic character and also to act to stimulate economic growth through increased vibrancy and use of the area.
35. Moreover, risk studies financed by IDB have assessed the vulnerability of the downtown area, consulted with key stakeholders and through this process identified an initial suite of adaptation measures that would allow the area to be protected and therefore build resilience to this historic and strategically important part of Paramaribo. These measures will include the following components:
- a) **Physical Measures:** The major cause of identified flooding within the downtown area is the inadequate design and extent of the existing flood wall on the Suriname River when considered against current and future changes being induced through climate change. The wall does not extend long enough and in some parts is not high enough to protect against high water level events. The presence of the existing flood wall is seen by some parties as inappropriate in that it partially blocks views of the waterfront due to its height. Considering these aspects, the main focus of the proposed adaptation measures is to identify urban space solutions that build upon the existing infrastructure and planning decisions to ensure an appropriate level of flood protection accounting not only for today's events, but also future events when considering climate change. Physical measures will be considered that fulfil the same functions as a traditional floodwall but with more sustainable and aesthetic urban design considerations. These will address the need to consider the current inadequate height and extent offered by the existing flood wall. The suite of solutions being considered will:
 - Consider urban design options to maximize integration and usability within the context of the waterfront as a destination, such as use of viewing platforms and elevated walkways so that the solution becomes a feature rather than a barrier;
 - Install subtidal breakwaters and design flood protection topographies along the length of where protection is needed;

- Integrating, where possible, green infrastructure measures into the solutions (see below);
 - Ensuring a full hydrological and sediment transport analysis of the Suriname River is performed that includes scour computations, geomorphic analysis and use of historical data regarding river movement. This will help determine the precise design parameters for any final solution and to also verify that it will not result in worsening of conditions downstream; and
 - A complementary environmental assessment may need to be performed for the final solution, in particular to manage potential biodiversity impacts associated with the river.
- b) Complementary Green Infrastructure Measures: The flood solution as proposed in (a) could be enhanced and made more sympathetic with its setting and location by integrating green measures. In particular, reinforcement of the existing riprap streambank protection located along the left bank of the Suriname River should be considered using options such as vegetation and woody material for bank stabilization; pole plantings (or live stakes) and coir rolls. As possible, preserve the mangrove forests along the river and create conditions for mangrove growth.
- c) Drainage Maintenance and Upgrades: The Paramaribo city area is served by an inland network open and closed drainage canals and infrastructure with a total length of over 1,450 km. As explained above, the canals can be characterized as mixed system receiving rainwater and domestic waste water. Each main canal owns outlet facility such as sluice, pumping station or a combination of these two (MOGP, 2001). The main drainage canals, which are part of the waterfront area, discharges their waters to the Suriname River near the Kleine Water Straat next to the Hotel Royal Torarica and near the southern border of the “Core area”, locally known as Knuffelsgracht. Based on anecdotal comments, flooding within the area has been identified to be occurring through a combination of poor maintenance of the existing canal network (including waste deposition), lack of maintenance of outlet structures (sluices and inadequate supply of spare and replacement parts for the pumping stations), unregulated development in areas intended to support drainage such as retention areas, and additional growth of the urban area meaning drainage infrastructure may be under-sized. The IDB recommends that a localized drainage study and survey is performed for the catchment and network serving the area, and maintenance and upgrade plan be developed taking into consideration the results of the climate change vulnerability assessment already financed by IDB.
- d) Management and Maintenance Measures: A drainage and management plan should be prepared and implemented for urban Paramaribo which details the management and maintenance needs for the various measures described. This will need to include roles, responsibilities and frequency of actions. It will also need to consider potential training and capacity needs in support of the government entities that will be responsible for this plan. This management plan must also be synchronized with existing and future urban development plans prepared for Paramaribo and storm water management activities and plans (e.g., MOGP) conducted and prepared by the Ministry of Public Works (Department of Hydraulics). For instance, the runoff capture within the area should be conveyed directly to the Suriname River and/or to the drainage canal. These types of designs and activities should be coordinated together with current storm water management activities conducted by the Minister of Public Work to avoid creating new flooding areas or worsen existing flooding areas.

36. As part of the study performed for the Downtown Risk Study, an Environmental and Social Assessment (ESA) was prepared for the IDB Urban Rehabilitation Program. While it is anticipated that said Program would have a benefit to the community, the potential exists for environmental and social impacts to occur, and this document seeks to identify these potential impacts and recommends an environmental and social management framework to be put into place to mitigate, manage, and monitor these impacts and risks for the life of the Program. The ESA considered the following potential risks and impacts:

- A livelihoods assessment has been performed to determine whether livelihoods of local businesses and traders might be affected by the proposed Historic Downtown Program;
- A stakeholder engagement event was held and was a useful event which allowed the Program to be presented and feedback to be solicited from stakeholders;
- The Program is not anticipated to worsen or intensify the natural risks; however it will introduce more visitors and residents into the areas of higher risk, as well as bring new infrastructure and construction, thereby increasing the exposure profile. These negative impacts could be minimized, however, by the implementation of mitigation and adaptation measures developed in consultation with the relevant government and non-governmental stakeholders;
- The Program is intended to positively impact the physical integrity of the city's cultural heritage, however it is also recognized that if the design and construction is unsympathetic, it could adversely affect the historic character or authenticity of individual listed monuments and/or the historic landscape as a whole; and
- Other potential impacts such as traffic, noise, air quality and pedestrians have also been assessed.

37. Based upon these findings, a framework for an Environmental and Social Management System (ESMS) has been prepared as part of the IDB Urban Rehabilitation Program, along with outlines for a series of key management plans, namely a Livelihood Restoration Plan, a Disaster Risk Management Plan (DRMP) and a Stakeholder Engagement Plan (SEP) including a grievance process.

(ii) City ADAPTATION FRAMEWORK AND PLAN

38. This component is seen as an enabling step to ensure that decision makers and stakeholders have a robust framework to ensure investments on climate resilience are implemented in a structured manner and promote long-term adaptation in the city. The absence of such a plan will mean an on-going piece-meal approach to resilience planning, which will not be of benefit to the city or its residents. This framework and plan will be aligned to the National Adaptation Plan being prepared by the UNDP.

39. The studies carried out by the GoS and IDB for the city of Paramaribo to date, including recent ESC and Historic Downtown Study, provide solid foundations for a city-broad Adaptation Plan. Therefore the focus of this component will be to build consensus and agreement on the objectives, priorities, actions and responsibilities that need to be built into the Paramaribo Adaptation Framework and Plan. Key steps will include:

- Workshops with local communities and other Paramaribo stakeholders including government officials to outline and discuss the requirements of the Adaptation Plan for the city and its metropolitan area;

- Broader community engagement activities to build awareness and understanding of the Plan and to ask for feedback and additional input to fill in existing information gaps;
- Establish a coordination and cooperation framework for the Plan to define main actors and ensure responsibilities for its implementation and tracking of performance are fully understood and established;
- Build key priorities, focus areas and definition of goals for the Plan; and
- Ensure alignment of the plan with existing planning documents and other relevant information and pre-agreed actions with local communities and city developers.

(iii) CAPACITY BUILDING AND KNOWLEDGE MANAGEMENT:

40. Based upon the final structure of the Paramaribo Adaptation Plan, the requirements within the GoS and other key stakeholders for capacity building will also need to be identified and actioned. It is expected that this will fall into the following two areas:

- Training and capacity building for the key individuals and departments tasked with specific actions and responsibilities within the Adaptation Plan – under this programme, it is expected that initial training needs will be delivered, and a broader training plan will be provided to the GoS for ongoing delivery; and
- Institutional strengthening needs will be identified and shared with the GoS with respect to ensuring climate change and adaptation is mainstreamed into relevant policies, development planning and regulations – under this programme, the institutional strengthening will be identified and then the implementation will be a separate responsibility of the GoS;

41. In addition, a Knowledge Management Plan will also be developed in order to ensure that:

- Information, data and lessons learned are captured;
- This information is appropriately managed and stored so that it is readily accessible and understandable;
- This information is shared among stakeholders and appropriate training sessions are delivered; and
- A review and evaluation step is included to ensure this data management process is working effectively and also evolving as the data and information sets develop.

(iv) MONITORING AND EVALUATION

42. Monitoring and evaluation is critical to the successful implementation of a project. A monitoring and evaluation plan will be developed as per the following:

- **Monitoring** - The purpose of monitoring activities will be to follow up as the Proposed Project progresses in order to ensure that it is meeting the original expectations and achieving the expected results. A Results Matrix (RM) will be developed which will enable the identification of issues and problems during execution that can be corrected in due time. The monitoring program will be based on the RM, and on the associated project plans.
- **Indicators** - Monitoring activities will be guided by a series of selected Key Performance Indicators (KPIs) that will be defined in the RM. Each defined indicator

- will include a unit of measure, frequency of measurement and a means of verification.
- **Progress Reporting** – The required frequency of periodic monitoring reports will be defined.
 - **Coordination and Monitoring** - The requirements for relevant administration and management requirements for the Proposed Project's monitoring activities, which will include: (i) to develop, maintain and update the data regarding monitoring indicators; (ii) coordinate the collection and processing of information on project actions and prepare progress reports; (iii) identify problems, delays and external factors affecting the project and proposing, where appropriate, remedial measures; and (iv) support monitoring meetings and program evaluation.
 - **Monitoring Plan** – The frequency of monitoring will be defined.
 - **Evaluation** – The evaluation of the Proposed Program will be done once the Proposed Program has been completed in order to determine if its objectives have been achieved based on a specified and agreed criteria.

Project / Programme Components and Financing:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

The following Table presents an overview of the Project's components, outcomes, main outputs and their costs.

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
(i) Downtown Adaptation Measures: Implement a group of strategic and cost-effective adaptation hard measures in the historic downtown area of Paramaribo that illustrate the benefits of building climate resilience as part of a long-term planning strategy for the city and its metropolitan area	Enhanced flood protection measures along the Suriname River next to the Historic Downtown area, including: (i) the construction of a 650-700 meters long wall to prevent flooding and erosion along the left bank of Suriname River, and (ii) the improvement of approx. 5.0 km of the Historic Downtown drainage canal including the Sommeldijkse drainage canal.	Reduced flood risk exposure of communities and businesses serving the historic downtown area. A consequential outcome is that implementation will act as the enabler for the broader regeneration program proposed by the GoS and IDB.	\$7,300,000
(ii) City-level Adaptation Framework and Plan: Develop a city-broad plan to build climate resilience in the city in line with a long-term adaptation process. Said plan will guide policy makers and city planners in prioritizing investments and programs to achieve climate resilience.	City-wide Adaptation Plan developed and endorsed by city major and local vulnerable communities.	Strengthened awareness and ownership of adaptation and climate risk process by Paramaribo citizens including the metropolitan area.	\$200,000
(iii) Capacity Building: Build capacity across the GoS stakeholders responsible for decision making in Paramaribo to ensure strong implementation and enforcement of the Adaptation Plan; and development and implementation of Knowledge Management Plan for local vulnerable communities in the metropolitan area.	Training materials for key stakeholders in Paramaribo in adaptation planning and management.	Strengthened GoS institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses caused by flooding and sea level rise.	\$500,000
(iv) Monitoring and Evaluation: Develop a robust plan and implementation structure to allow the Proposed Project to be implemented, monitored and evaluated.	Monitoring and Evaluation plan developed	Practical knowledge about adaptation processes in cities is increased.	\$250,000
1. Total Project Cost (TPC) - Total of (i) to (iv) above			\$8,250,000
2. Total Project Management (TPM) Cost (9.5% of TPC)			\$783,750
3. Project Cycle Management Fee charged by the Implementing Entity (8.5% of TPC + TPM))			\$767,869
Amount of Financing Requested			\$9,801,619

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Submission of Concept to AF	01/09/2017
Approval of the Concept by the AF Board (Estimate)	03/2017
Submission to AF of a Full Programme Proposal	10/2017
Approval of the Full Programme Proposal by the AFB (Estimate)	11/2017
Start of Project/Programme Implementation	07/2018
Mid-term Review (if planned)	07/2020
Project/Programme Closing	07/2022
Terminal Evaluation	07/2022

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

43. The table below describes the proposed project components and details how these will contribute to climate resilience.

Project Component	Description	Contribution to Climate Resilience
Downtown Adaptation Measures	Implement a group of strategic and cost-effective adaptation hard measures in the historic downtown area of Paramaribo that illustrate the benefits of building climate resilience as part of a long-term planning strategy for the city and its metropolitan area	These measures will provide (subject to the final design and construction solutions): <ul style="list-style-type: none"> - Flood protection through physical adaptation measures along the west bank of the Suriname River; - erosion control measures to minimize impacts in the subtidal zone; - data knowledge and exchange with a greater understanding and data sets regarding hydrological and sediment transport in the Suriname River; - Sympathetic flood control measures through complementary green infrastructure measures; - Drainage maintenance and upgrades to reduce inland flooding; and - A drainage and management plan.
City Adaptation	Establish a framework for managing knowledge and	-The adaptation plan will provide a framework for managing, prioritizing and implementing

Framework and Plan	disseminating lessons learned that could be used in future resilience programs for the city of Paramaribo and that could be part of a city-level Adaptation Plan	adaptation and resilience measures along with a standardized approach. -Local vulnerable communities increase their knowledge about: (i) the evolution of floods and sea level rise associated-risks under climate change in Paramaribo and metropolitan areas and (ii) potential adaptation measures to cope with observed and anticipated changes in the local hydrology.
Capacity Building	Build capacity across the GoS stakeholders responsible for decision making in Paramaribo to ensure strong implementation and enforcement of the Adaptation Plan	-Strengthened institutional capacity of GoS on adaptation; -Access to the use of materials and tools that facilitate the management, dissemination and transfer of knowledge on climate change adaptation issues for the city of Paramaribo and its metropolitan area.
Monitoring and Evaluation	Ensure there is a robust plan and implementation structure to allow the Proposed Project to be implemented, monitored and evaluated	-Stepwise methodology/procedure to monitor and evaluate the successful implementation of proposed measures while building local capacity to monitor long term effectiveness of implemented measures to cope with observed and anticipated climate change impacts on floods and sea level rise.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

44. With respect to Benefits, the proposed project will provide a number of prominent social, economic and environmental benefits as follows:

Benefits	Contribution to Climate Resilience
Economic	<ul style="list-style-type: none"> - Prevention of damage and business interruption from flooding events; - Increase interest and use of the waterfront area; and - Facilitation of rehabilitation of the Downtown Historic Area which in turn will attract more visitors and residents to the area as well as investment.
Social	<ul style="list-style-type: none"> - Reduced flooding impacts to homes and personal wellbeing; - Increased income and job opportunities in the waterfront area; - Facilitation of rehabilitation of the Downtown Historic Area which will increase the protection of the country's cultural heritage; - Improve safety of the waterfront area; - Improved public health through maintenance of drainage systems; and - The Downtown area is used by vulnerable populations such lower-income traders, and the measures will provide them with greater certainty on

	continuity of trading activities.
Environmental	<ul style="list-style-type: none"> - Protection of the Suriname River through sediment and erosion control; and - Better knowledge of the dynamics and parameters of the Suriname River.

45. With respect to potential Impacts, as described earlier, an Environmental and Social Assessment (ESA) has been financed by the IDB for the broader Historic Downtown Area for the broader program of works. While it is anticipated that overall benefits will accrue to the community, the potential exists for environmental and social impacts to occur if the works, including the adaptation measures described in this Proposed Project are not managed carefully. The ESA findings have been described earlier, and a series of mitigation measures have been proposed to ensure potential impacts are appropriately managed, minimized and where possible eliminated.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

46. Cost Benefit Analysis (CBA) was estimated for two main proposed adaptation measures, namely the extension of the existing floodwall (river defence), and upgrading of the Sommeldijkse drainage canal. The CBA included the use of information from the deterministic hazard and risks assessment conducted as part of the ESC Study described above and shown in Figure 10. Annual Average Loss (AAL) was used as the risk metric and benefits of the proposed adaptation measures were estimated by taking the difference between direct and indirect losses with and without the proposed adaptation. The benefits were estimated at present value (PV) of future (recurring) benefits considering the life of the asset that is being proposed. A discount rate of 3% was assumed as part of the CBA. The costs of adaptation were also estimated including the other costs such as structural intervention, setting up systems and recurring maintenance costs. Finally, the benefit cost ratio (BCR) was computed by taking a ratio of PV of all benefits and the total costs of the adaptation actions.

47. Extension of the existing floodwall (or river defence) is expected to benefit the infrastructure and population located within the Waterfront area. Estimated costs associated with the expansion of the flood wall considers the following activities:

- Exiting floodwall at the Waterfront (Waterkant);
- Steel sheet pile of a length between 15 m and 18 m with coating for the protection against salty water;
- Placing of a pre-fabricated concrete slab on the top of the sheet pile;
- Pile-driving from the water because of ongoing activities and buildings located near and along the shoreline;
- the use of rock boulders on geotextile along the floodwall at riverside for erosion protection and dissipation of energy; and
- Landscaping works at the land side including street titles and storm water drains.

48. The total cost was calculated from the length of approximately 700 m along the west bank of the Suriname River (south of the existing floodwall) and is estimated to be US\$7.28 million⁴.

⁴ Information provided by local engineering firm SUNECON.

Benefits were estimated by assuming a loss reduction of 90% of the AAL within the left bank of Suriname River. The costs, benefits, and PV for the expansion of the floodwall (or river defence) are summarized in Table 3 below. The base case is the status quo, losses without adaptation. The results from the climate change analysis of the deterministic risk assessment were used to establish this CBA. The results from the defined beneficiary area suggest that AAL for buildings due to floods is US\$1.86 million. The PV of future flood AAL to buildings in the base case is estimated over 30 years to be US\$36.48 million.

49. **Benefit-Cost Ratio of the adaptation action:** Since the total cost for expanding the existing floodwall is estimated to be USD\$7.28 million, the total PV of the benefits with the proposed adaptation is estimated to be USD\$32.83 million. Considering these total estimated costs and PV of the benefits, the CBR for this adaptation is 5.

Table 3: Cost-Benefit Analysis of Floodwall expansion (in millions USD \$)

Particulars	Details	Base Case	Adaptation
Basis	Life (years)	30	
	Growth factor	19.6 (a discount rate of 3% was assumed)	
Flood AAL	Left bank of Suriname River within the Waterfront site	US\$1.86	US\$0.186
Present Value of Future Losses	Left bank of Suriname River within the Waterfront site	US\$36.48	US\$3.65
Costs	Cost of floodwall at left bank of Suriname River within the Waterfront site TOTAL COST		US\$7.28
Present Value of Benefits	Left bank of Suriname River within the Waterfront site TOTAL BENEFIT		US\$32.83
Cost Benefit Ratio	Cost Benefit Ratio		5

50. The proposed upgrading of the Sommeldijkse drainage canal is expected to benefit the infrastructure and population located within the Waterfront area. Estimated costs associated with upgrading the Sommeldijkse drainage considers the following activities:

- Rehabilitation of the sluice gates and pumping stations;
- Dredging of the canal;
- Installing steel or concrete sheet wall for stabilization of the canal banks and protection from further erosion;
- Backfilling with sand;
- Lay out of the backfilled area;
- Removal and expansion (enlarging) of some of the existing culverts; and
- Partial change of the course of the canal (parts of the canal goes through private domains; proposed change of the course through the Cato street through construction of an enclosed strand of culverts).

51. The total costs were calculated for a length of approximately 5.0 km of the Sommeldijkse drainage canal (from Suriname River until beginning of the canal at Boerbuiten road) and is

estimated to be US\$6.24 million⁵. Benefits were estimated by assuming a loss reduction of 50% of the AAL within the Waterfront site. The costs, benefits, and PV for upgrading the Sommeldijkse drainage canal within the Waterfront area are provided in Table 4 below. The base case is the status quo, losses without adaptation. The results from climate change case analysis of the deterministic risk assessment were used to establish this CBA. The results from the defined beneficiary area suggest that AAL for buildings due to floods is US\$12.35 million. The present value (PV) of future flood AAL to buildings in the base case is estimated over 30 years to be US\$242.03 million.

52. **Benefit-Cost Ratio of the adaptation action:** Since the total cost for upgrading and improving the Sommeldijkse drainage canal is estimated to be US\$6.24 million, the total PV of the benefits with the proposed adaptation is estimated to be US\$121.01 million. Considering these total estimated costs and PV of the benefits, the CBR for this adaptation is 19.

Table 4: Cost-Benefit Analysis of Upgrading and Improving section of the Sommeldijkse drainage canal (in millions USD \$)

Particular	Details	Base Case	Adaptation
Basis	Life (years)	30	
	Growth factor	19.6 (a discount rate of 3% was assumed)	
Flood AAL	Waterfront site	US\$12.35	US\$6.17
Present Value of Future Losses	Waterfront site	US\$242.03	US\$121.01
Costs	Waterfront site		
	TOTAL COST		US\$6.24
Present Value of Benefits	Waterfront site		
	TOTAL BENEFIT		US\$121.01
Cost Benefit Ratio	Cost Benefit Ratio		19

53. As described above, the proposed adaptation could be enhanced and made more sympathetic with its setting and location by integrating green measures such as vegetation and woody material for bank stabilization; pole plantings (or live stakes) and coir rolls. As possible, the preservation of mangrove forests along the river and creation of conditions for mangrove growth would be considered during final designing works.
- D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.
54. This project is fully aligned with Suriname's Multi-Annual Development Plan (Nationaal Ontwikkelingsplan) of 2012-2016, which calls for action to address the negative impacts of climate change, and prioritizes the protection of Suriname's vulnerable coastal zone from sea level rise through the effective implementation of adaptation measures, as highlighted in

⁵ Information provided by local engineering firm SUNECON.

Suriname's Second National Communication to the United Nations Framework Convention on Climate Change. Proposed actions are also in line with priorities set forth in the National Climate Change Policy, Strategy and Action Plan and Suriname's Intended National Determined Contribution (INDC).

55. As previously emphasized, downtown adaptation measures will directly reduce flooding in Paramaribo's historical center (due to rising sea level). In addition, the project will enhance the GoS' capacity to properly identify and prepare climate change adaptation projects compatible with the Multi-Annual Development Plan.

E. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

56. The Proposed Project will fully comply with the Adaptation Fund's Environmental and Social Policy Statement. As the proposed implementing entity, IDB will ensure that the Proposed Project is fully aligned with its own Environment and Safeguards Compliance Policy, which mirrors the requirements of the Adaptation Fund's Policy. IDB has already undertaken assessments as part of its wider portfolio of work to ensure the environmental and social aspects are appropriately characterized, managed and protected. For example, IDB has categorized the Proposed Project (as part of the wider waterfront redevelopment) as a Category B project, and has also commissioned an Environmental and Social Assessment as previously described. From this work and the commitments both IDB and the GoS, the Proposed Project will not unduly harm the environment, public health or vulnerable communities, and the Proposed Project will meet the following relevant principles:

- It will be in compliance with all applicable domestic and international law;
- It will be fair and equitable and respect human rights. It will not exacerbate existing inequities, particularly with respect to marginalized or vulnerable groups. The IDB has already established frameworks for a Livelihoods Restoration Plan, a Grievance Mechanism and a Stakeholder Engagement Plan. The Livelihoods Restoration Plan includes a mechanism for ensuring if limited involuntary resettlement is unavoidable, due process is observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation;
- It is not expected to involve unjustified conversion or degradation of critical natural habitats, and through the adoption of green solutions as part of the flood protection measures, it is the intent to enhance the biodiversity benefit of the Proposed Project;
- It is not anticipated to result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change;
- It will be designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants;
- It will be designed and implemented in a way that avoids potentially significant negative impacts on public health – in fact the very nature of the Proposed Project will improve public health by the minimization of flooding and improvement of the local drainage network; and
- As previously described, the Proposed Project will occur within the UNESCO designated area of Paramaribo, and will have a net benefit on the cultural heritage by supporting its protection and maintenance.

57. The Proposed Project will be implemented by IDB, which will ensure that the Proposed Project is assessed and managed through the IDB's environmental and social safeguards process. This will ensure a robust application of risk management principles throughout the Proposed Project's lifecycle by the IDB's safeguards team ensuring a commitment to reducing environmental and social risks. The IDB has already undertaken an ESA of the broader project (based on its B categorization), and it will continue to screen the Proposed Project as it evolves from design to construction to implementation to determine the extent to which it presents environmental or social risks.
58. Based on the ESA performed by the IDB, a framework for a project-level environmental and social management plan has been defined focusing on the areas of potential impact and required mitigation. This includes a Livelihoods Restoration Plan, a Grievance Mechanism, a Stakeholder Engagement Plan, a Disaster and Risk Management Plan, as well as more general Environmental Management Plan. As per the detail of this application, a clear and robust Monitoring, Reporting, and Evaluation plan will also be established.
59. As described in the paragraphs below, the Proposed Project so far has been subject to a number of public disclosure and consultation exercises with key stakeholders and the public.
- F. Describe if there is duplication of project / programme with other funding sources, if any.**
- Not Applicable
- G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.**
60. This has been integrated into the proposed project application.
- H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.**
61. The GoS and the IDB have undertaken a series of consultation exercises in order to assess the potential impacts, gain views and insights from stakeholders and also to get technical inputs on the likely adaptation measures. These consultation events have included:
- Workshops with Government and non-Government stakeholders on hazards and risks and the potential impacts of climate change;
 - A livelihoods survey of all businesses and traders in the Waterfront area; and
 - A public consultation exercise as part of the Historic Downtown Area program.
- I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.**
62. As previously highlighted, Paramaribo is susceptible to natural disasters exacerbated by climate change. One of main areas that get affected by these events is its city center including the historic inner city. The historic center was designated by the UNESCO as a

World Heritage Site in 2002 and accommodates currently mainly governmental offices and institutes, banks, educational facilities and tourist attractions. However, the area has been undergoing physical, social, and economic deterioration, which has been a growing source of concern for the GoS, given that this area concentrates historical and cultural heritage buildings, monuments, and urban sites. In addition to the deterioration of the WHS, the area gets frequently flooded which also contributes to the decay of historic buildings, public spaces and exacerbates the accessibility from and to the city center. People residing, working in or traveling through this area experience mayor difficulties. On the latter, it's important to underline that the city center of Paramaribo is the city's mayor public transport hub.

63. As a result, the GoS asked for IDB's support to address some of these challenges and is currently negotiating a US\$20 million loan –expected for approval in early 2017-- to contribute to the revitalization of the area by means of (i) renewal of urban spaces and restoration of key heritage buildings; (ii) improvement in urban mobility; (iii) promotion of economic and residential activities; and (iv) strengthening the institutional framework for managing the area's sustainable development.

64. Therefore, funding for the adaptation measures included in this proposal is critical, as it would help deliver complementary interventions to those set forth in the IDB's Urban Rehabilitation Program for Paramaribo. In absence of funding from the Adaptation Fund, the GoS, which is currently under macro-fiscal stress, would need to resort to other sources of funding to invest in climate change adaptation in the downtown area.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme.

65. The main identified actions that need to be enforced during project preparation and execution to guarantee sustainability of project outcomes are:

- *Build capacity across the GoS stakeholders:* The Proposed Project will allow the GoS stakeholders responsible for decision making in Paramaribo to develop capacity to design, implement and monitor climate change adaptation measures. This build capacity will also allow the ownership of the project by GoS and local communities. Long term sustainability of project outcomes is guaranteed as long as these are aligned with current and planned strategies to urban development plans prepared for Paramaribo metropolitan area.
- *Prevent floods:* The Proposed Project will minimize and in some cases eliminate flooding risk areas within the waterfront site representing reductions in economic losses and create resilience against natural hazards and climate change. Also, the proposed project will improve the existing physical conditions of the west bank of the Suriname River and the Sommeldijckse drainage canal. The proposed project includes the incorporation of green infrastructure that will make the hard measures being more sympathetic and preserve its sustainable balance.
- *Reduce and monitor sources of pollution:* The Proposed Project will create opportunities to reduce sources of pollution. For instance, upgrading the Sommeldijckse drainage canal will include the removal of wastes and illegal wastewater pipelines connected to

the canal. These two sources contribute to contaminate the storm water captured by the canal. As part of the activities associated to the proposed project include water quality monitoring in the Suriname River. This monitoring will be part of the Environmental and Social Management Plans (ESMP) for the project to prevent any impact during construction and operation phases. Also, the monitoring activities will be used to evaluate the performance of proposed mitigation measures and propose new measures if they are needed.

- *Contribute to different sectors in Paramaribo.* The Proposed Project will develop a more detailed picture of the vulnerabilities to floods of the different socio-economic sectors in Paramaribo urban area, particularly within the Waterfront site. It also contributes to the national climate change policy and raise awareness of the issue of climate change among policy makers and the general public.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

66. The environmental and social impacts and risks of the project have been presented in the previous sections. The following table presents the environmental and social impacts and risks of the project.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>	Will be compliant	n/a
<i>Access and Equity</i>	Will be fair and equitable and respectful of marginalized/vulnerable groups, human rights and gender	Final Proposed Project proposals will be re-assessed through the IDB's ESA process
<i>Marginalized and Vulnerable Groups</i>		
<i>Human Rights</i>		
<i>Gender Equity and Women's Empowerment</i>		
<i>Core Labour Rights</i>	Will be compliant	n/a
<i>Indigenous Peoples</i>	No significant impacts on Indigenous Peoples	n/a
<i>Involuntary Resettlement</i>	Significant involuntary resettlement is not anticipated	The Livelihoods Restoration Plan drafted by the IDB includes a mechanism for ensuring if limited involuntary resettlement is unavoidable, due process is observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation
<i>Protection of Natural Habitats</i>	The Proposed Project is not expected to involve unjustified conversion or degradation of critical	Final Proposed Project proposals will be re-assessed through the IDB's ESA process, and where necessary supplemental studies will be undertaken (see below).

	natural habitats, and through the adoption of green solutions as part of the flood protection measures, it is the intent to enhance the biodiversity benefit of the Proposed Project	
<i>Conservation of Biological Diversity</i>	Inventory of existing species and habitats in Suriname River	Pre-construction habitat surveys in the Suriname River to minimize impacts on natural/aquatic habitat.
<i>Water resources</i>	Design and implement Environmental and Management Plans (ESMPs)	The Proposed Project will develop a Soil Erosion and Sediment Control Plan, including erosion controls such as minimizing the extent of disturbed areas and stabilizing/revegetating disturbed areas as soon as possible, and sediment controls such as hay bales, silt fences. Develop a Waste Management Plan that identifies acceptable methods for handling and disposing of solid and hazardous wastes, including any contaminated soils. Provide designated areas for fuelling and maintenance that have containment and spill control capabilities
<i>Climate Change</i>	No significant GHG emissions are expected	n/a
<i>Pollution Prevention and Resource Efficiency</i>	The project will have a net benefit through the drainage improvement measures. No impacts are expected	n/a
<i>Public Health</i>	The project will have a net benefit through the drainage improvement measures. No impacts are expected	n/a
<i>Physical and Cultural Heritage</i>	The project will have a net benefit on cultural heritage. No impacts are expected	Final Proposed Project proposals will be re-assessed through the IDB's ESA process
<i>Lands and Soil Conservation</i>	Design and implement Environmental and Management Plans (ESMPs)	Develop a Soil Erosion and Sediment Control Plan, including erosion controls such as minimizing the extent of disturbed areas and stabilizing/revegetating disturbed areas as soon as possible, and sediment controls such as hay bales, silt fences. Develop a Waste Management Plan that identifies acceptable methods for handling and disposing of solid and hazardous wastes, including any contaminated soils. Provide designated areas for fueling and maintenance that have containment and spill control capabilities

PART III: IMPLEMENTATION ARRANGEMENTS

- A. Describe the arrangements for project / programme implementation.
- B. Describe the measures for financial and project / programme risk management.
- C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.
- D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.
- E. Include a results framework for the project proposal, including milestones, targets and indicators.
- F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Objective(s) ⁶	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)

⁶ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

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G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

H. Include a disbursement schedule with time-bound milestones.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government⁷ *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

(Enter Name, Position, Ministry)	Date: (Month, day, year)
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B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans: National Climate Change Policy, Strategy and Action Plan of 2015, Multi-annual Development Plan 2012-2016 and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Name & Signature Implementing Entity Coordinator	
Date: (Month, Day, Year)	Tel. and email:
Project Contact Person:	

⁶. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Tel. And Email:

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