Meeting of the Board
12 – 14 October 2016
Songdo, Incheon, Republic of Korea
Provisional agenda item 11(f)

GCF/B.14/07/Add.04

27 September 2016

Consideration of funding proposals – Addendum IV

Funding proposal package for FP021

Summary

This addendum contains the following three parts:

a) A funding proposal titled "Senegal Integrated Urban Flood Management Project " submitted by Agence Française de Développement (AFD);
b) A no-objection letter issued by the national designated authority or focal point; and
c) Environmental and social report(s) disclosure.

The documents are presented as submitted by the accredited entity, and national designated authority or focal point, respectively.

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GREEN
CLIMATE
FUND

Funding Proposal

Version 1.0

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

GREEN CLIMATE FUND

Contents

Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:
"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project Information

A.1.1. Project title		**Senegal Integrated Urban Flood Management Project**	
A.1.2. Project or programme		Project	
A.1.3. Country(ies) / region		**Republic of Senegal**	
A.1.4. National designated authority(ies)		**Ministry of Environment and Sustainable Development**	
A.1.5. Accredited entity		**Agence Française de Développement**	
A.1.5.a. Access modality		☐ Direct ☒ International	
A.1.6. Executing entity / beneficiary		Project Sponsor: Republic of Senegal Executing Entity: MRUHCV; APIX; ONAS; ANACIM; DGPRE (see section C.4. for more details).	
A.1.7. Project size category (Total investment, million USD)		☐ Micro (≤10) ☒ Medium (50<x≤250)	☐ Small (10<x≤50) ☐ Large (>250)
A.1.8. Mitigation / adaptation focus		☐ Mitigation ☒ Adaptation ☐ Cross-cutting	
A.1.9. Date of submission		GCF board of October 2016	
A.1.10. Project contact details	Contact person, position	Laurent Raspaud, Task Team Leader	
	Organization	Agence Française de Développement	
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	Mailing address	5 rue Roland Barthes – 75598 Paris Cedex 12	

A.1.11. Results areas *(mark all that apply)*

Reduced emissions from:

- ☐ Energy access and power generation
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- ☐ Low emission transport
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- ☐ Buildings, cities and industries and appliances
  (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- ☐ Forestry and land use
  (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- ☒ Most vulnerable people and communities
  (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- ☐ Health and well-being, and food and water security
  (E.g. climate-resilient crops, efficient irrigation systems, etc.)
- ☒ Infrastructure and built environment
  (E.g. sea walls, resilient road networks, etc.)
- ☐ Ecosystem and ecosystem services
  (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project Executive Summary

In the past few decades, demographic growth and rural exodus have been the cause of a major development of urban population in Senegal. Among other development challenges linked to fast-growing cities in Africa, damages caused by heavy rainfalls and coastal erosion are of increasing importance. Floods have been a major concern for the Government of Senegal since 2005, when rainfall began to cause serious flood problems in major cities. Projections on the effects of climate change lead to believe that, in spite of a global decrease in precipitation, events of intense rainfalls will be more frequent and might cause heavy damages to most vulnerable areas and population.

Confronted with these challenges, the Government of Senegal has set up flood management as one of its top priorities, initiating a major shift in policy-making. The INDC submitted in September 2015 sets flood management as one of its top priorities, with an estimated investment budget around 2 billion dollars. As the first stage of emergency response to the growing flood concern has been completed in 2015, Senegal now faces the medium- to long-term perspective for effective flood management.

The **Senegal Integrated Urban Flood Management** project will aim at supporting Senegalese policy on flood risk management through a disaster risk reduction perspective. It will participate in the drainage infrastructure investment that is necessary in one of the most vulnerable areas of the capital city (Pikine Irrégulier Sud), but will also contribute to establishing a national-scale integrated policy for disaster risk management in order to optimize investment at national scale and most importantly deal with the risk that will never be cost-efficiently covered by infrastructure.

The proposed project will be instrumental in making the shift in policy-making regarding flood management that has been initiated by the Government of Senegal a reality. Through an integrated approach, not limited to hard-engineered infrastructure investment but aiming at (i) building knowledge of flood risk at national and local-scale, (ii) reducing vulnerability in existing and future urban centers, (iii) reinforcing prevention, especially for drainage infrastructure management and (iv) tackling the difficult challenge of trans-sectorial governance, Senegal has the opportunity to be at the cutting edge of flood-management policy in West Africa.

A.3. Project Milestone	
Expected approval from accredited entity's Board	01/10/2015
Expected financial close	02/12/2015
Estimated implementation start and end date	Start: January 2017 End: December 2021
Project lifespan	Five (5) years

B.1. Description of Financial Elements of the Project

Based on the feasibility studies of the Project, the estimated budget breakdown is as follows.

Component	Sub-component	Amount	Currency of disbursement	Amount	Local currency	Funding
Component 1 Knowing the risk	Sub-component 1.1 Flood risk mapping	5.15	million euro (€)	3.4	billion XOF	GCF
	Sub-component 1.2 Flood risk awareness	0.55	million euro (€)	0.4	billion XOF	GCF
Component 2 Reducing the risk	Sub-component 2.1 Structural and non-structural measures for flood risk reduction	3.2	million euro (€)	2.1	billion XOF	GCF
	Sub-component 2.2 Tools for adequate investment in flood management infrastructure	0.65	million euro (€)	0.4	billion XOF	GCF
	Sub-component 2.3 Drainage and sanitation infrastructure in *Pikine Irrégulier Sud*	50	million euro (€)	32.8	billion XOF	AFD
		6	million euro (€)	3.9	billion XOF	Government of Senegal
Component 3 Preventing the risk	Sub-component 3.1 Real-time hazard monitoring in Greater Dakar	2.1	million euro (€)	1.4	billion XOF	GCF
	Sub-component 3.2 Protocols for infrastructure management under extreme rain events	1.2	million euro (€)	0.8	billion XOF	GCF
Component 4 Governance	Sub-component 4.1 Support to integrated flood risk management policy-making	0.4	million euro (€)	0.3	billion XOF	GCF
	Sub-component 4.2 Institutional strengthening and capacity building	0.25	million euro (€)	0.2	billion XOF	GCF
	Sub-component 4.3 Project Management Assistance	1.5	million euro (€)	1.0	billion XOF	GCF
Total		71		46.6		

AFD will bring 50M€ of concessional loan financing in order to propose soft financing conditions (35% grant-element equivalent) for the non-commercial public service drainage infrastructure to be built in the framework of Sub-component 2.3. The Government of Senegal (GoS) will provide the 6M€ needed for the Resettlement Action Plan linked to the establishment of the drainage infrastructure in Pikine Irrégulier Sud. GCF 15 M€ grant requested contribution will be focused on the soft activities, which aim at supporting a shift in policy making and crisis management regarding floods. The grant element is critical to set up the institutional, technical and political framework needed to improve flood management from basic hard-engineered solutions towards integrated management and crisis reduction.

The budget breakdown by expenditure type for sub-components financed by GCF is as follows.

Component	Sub-component	Expenditure type	Amount	Currency of disbursement
Component 1 Knowing the risk	Sub-component 1.1 Flood risk mapping	Services	5.15	million euro (€)
	Sub-component 1.2 Flood risk awareness	Services	0.55	million euro (€)
Component 2 Reducing the risk	Sub-component 2.1 Structural and non-structural measures for flood risk reduction	Services	3.2	million euro (€)
	Sub-component 2.2 Tools for adequate investment in flood management infrastructure	Services	0.65	million euro (€)
Component 3 Preventing the risk	Sub-component 3.1 Real-time hazard monitoring in Greater Dakar	Supply	1.5	million euro (€)
		Services	0.6	million euro (€)
	Sub-component 3.2 Protocols for infrastructure management under extreme rain events	Services	1.2	million euro (€)
Component 4 Governance	Sub-component 4.1 Support to integrated flood risk management policy-making	Project consultants	0.4	million euro (€)
	Sub-component 4.2 Institutional strengthening and capacity building	Project consultants	0.25	million euro (€)
	Sub-component 4.3 Project Management Assistance	Project consultants	1.5	million euro (€)
Total			15	

The tentative disbursement schedule of GCF funds is as follows.

Year 1 – 4.0 M€
Year 2 – 4.0 M€
Year 3 – 4.0 M€
Year 4 – 2.5 M€
Year 5 – 0.5 M€

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	**(a) = (b) + (c)**	71	million euro (€)		
(b) Requested GCF amount	(i) Senior Loans (ii) Subordinated Loans (iii) Equity (iv) Guarantees (v) Reimbursable grants * (vi) Grants *	0 0 0 0 0 15	million euro (€)		
	Total requested (i+ii+iii+iv+v+vi)	15	million euro (€)		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
(c) Co-financing	Senior Loans Equity	50 6	million euro (€) million euro (€)	AFD Repu blic of Senegal	20 years	1-1.5%	senior
	Lead financing institution: Agence Française de Développement						

B.3. Fee Arrangement

Fee arrangement for the proposed project is aligned with the GCF Board's decision number B11/10 about the interim policy on fees for accredited entities.

B.4. Financial Market Overview

Not applicable.

C.1. Strategic Context

Surging flood risk worldwide. Of all natural disasters, flood is the most frequent and recurring, and the number of flood events has been steadily increasing over the past 50 years. Recent history has demonstrated the dramatic increase in loss of human lives and economic damages caused by urban floods, especially in the most vulnerable developing countries. In 2010, it is estimated that 178 million people were affected by floods worldwide, and associated economic losses amount to more than 40 billion USD.

This phenomenon can be explained by two combined factors: (i) the increasing vulnerability of urban zones, caused by uncontrolled demographic growth and unplanned land use and (ii) the surging hazard linked to expected climate change, including extreme meteorological events and sea-level rise. In Senegal, those two factors apply with major intensity.

Flood risk in Senegal. In 2014, urban population was estimated to be 43% of the total population and is growing at an annual rate of 3.9%[1]. Greater Dakar region is the main urban center with almost 25% of the country's population concentrated in an area representing less that 1% of the territory. Also, up to 80% of the country's economic activity is located in Dakar. Rapid urban-coastal migration as well as natural population growth induces strong land pressure and often unplanned urban fabric in the suburbs of the main cities.

Climate change in Senegal is predicted to manifest as a decrease in the amount of rainfall, however with increased intensity, increased temperatures, and sea-level rise. Drought and saline intrusion threaten water supplies, while sea-level rise along with coastal erosion threaten cities and infrastructure. Different climate models in the ensemble project a wide range of changes in the mean annual rainfall averaged over the country, from -41 to +48% by the 2090s—but more models show decreases. It is difficult to draw robust conclusions of changes in precipitation; however, it is likely that a greater proportion of precipitation will occur in heavy rainfall events.

Growing vulnerability and seemingly increasing hazard pave the way for more frequent disasters. Indeed, major flood events have been witnessed in 2005, 2009 and 2012, in the capital city Dakar, the latter affecting around 500 000 people and caused more than 100 million USD worth of damages. Subsequently, floods have been a continuous concern for Senegalese authority, as flood events now occur almost each year during the rainy season (June to October), leading to some casualties and affecting first and foremost the most vulnerable people. Dakar is the most heavily touched part of the country but cities like Kaolack, Saint-Louis, Diourbel or Bakel also suffer from floods.

Flood management strategic framework in Senegal. Taking action on this observation, the Senegalese Government progressively set Disaster Risk Reduction (DRR) as part of its national development strategy in accordance first with the Sendai Framework, ultimately through the national development plan (called *Plan Sénégal Émergent*). The Sendai Framework for Disaster Risk Reduction for the 2015-2030, which was adopted by 187 Member States of the United Nations (including Senegal), identifies four priorities: (i) understanding disaster risk, (ii) strengthening disaster risk governance to manage disaster risk, (iii) investing in disaster risk reduction for resilience and (iv) enhancing disaster preparedness for effective response and to "build back better" in recovery, rehabilitation and reconstruction.

Operationally, this led to the elaboration of a 10-year Flood Management Program for the 2012-2022-period (*Programme Décennal de Gestion des Inondations – PDGI)*. This PDGI accounts for structural measures including mainly hard-engineered drainage infrastructure to reduce the vulnerability to flood risks but also non-structural measures. In September 2015, Senegal submitted its Intended Nationally Determined Contributions (INDC), which estimates at USD 2.136 billion for the period 2016 to 2035 the amount of investment required to build resilience to floods.

On-going projects on flood management. Since the occurrence of disastrous floods in Dakar and other major cities, many projects have been launched by the Senegalese government to increase resilience and leverage public investment in infrastructure. Among other projects, the most important ones are the Jaxaay

[1] Source: World Bank Development Indicators, 2015

Plan, that aims at resettle people living in low-lying, flood-prone areas, launched in 2006 and the emergency phase of the PDGI that also included 100 million USD worth of investment in infrastructure.

In 2010 was also launched the storm water management and climate change project (*Projet de Gestion des Eaux Pluviales – PROGEP*), financed mainly by the World Bank, that includes investment in drainage infrastructure in priority areas of the suburbs of Dakar but also institutional strengthening for storm water management.

Project strategic consistency. Given the human and economic challenges posed by floods in Senegal, and given the funds needed to address this problem through infrastructure-only solutions, it appears necessary to support Senegal's transition to an integrated urban flood management policy to ensure maximum cost-effectiveness of the Government's investment in this sector.

The present project aims at supporting the Senegalese government by taking a step back on its risk mitigation strategy and support a transformation of the national policy framework towards an integrated urban flood risk management. It will address each and every strategic objective of the Sendai Framework for Action to establish a long-term strategy on flood management.

The project will act as the necessary link between local investments made in storm water drainage infrastructure and operations (for instance through PROGEP) and future regional hydrological and meteorological data production (for instance through an up-coming regional Hydromet Program).

Overview of the projects mentioned in the Funding Proposal. This present document makes reference to various projects related to flood management in Senegal. To ensure clarity and good understanding of these operations, an overview of each important project mentioned in this Funding Proposal is provided in the box below.

Box 1. Overview of relevant projects

- **1. Urban Restructuring of Pikine Irrégulier Sud– GoS, AFD, WB – 41M€**

This project has been designed as a component of the large Dakar-Diamniadio Highway Project co-financed by the Government of Senegal (7M€), AFD (14M€) and World Bank (20M€). The highway construction has been seen as an opportunity to contribute to the urban redevelopment of Pikine Irrégulier Sud, located on the alignment of the highway, which is an informal area gathering around 200.000 persons. This project is articulated around three major components including rehabilitation of primary and secondary roads, construction of social equipments and drainage infrastructure in frequently flooded areas. The part financed by the government was dedicated to the payment of compensations for persons to be resettled. The project, started in 2010, is promoted by APIX and is currently under implementation with an end date in September 2018.

- **2. Drainage and Wastewater Management in Pikine Irrégulier Sud – GoS, AFD - 56 M€**

The design of this project is strongly linked with the component dedicated to drainage infrastructure in the above-mentioned project. Taking into account the important needs in terms of rainwater and wastewater in the Greater Dakar, this project aims at improving drainage, wastewater and flood management in Pikine Irrégulier Sud. Financed by the Government of Senegal (6M€ on compensations) and AFD (50M€), the implementation involves two promoters: APIX is in charge of the drainage component while ONAS is responsible for the wastewater component. Started in 2015, this project has a lifespan of 5 years.
The ESIA produced in 2013 for the drainage infrastructure included in Project 1 covered in its scope of action the drainage infrastructure planned in Project 2. For this reason, the feasibility study is referring to Project 1 when presenting details of Project 2, which is the subject of the sub-component 2.3 in this Funding Proposal.

- **3. Hann Bay Depollution – AFD, EIB – 52,5 M€**

The depollution project of Hann Bay was launched in 2009 and is co-financed by AFD (32,5M€) and EIB (20M€). The Hann Bay is known to host approximately 60% of the national manufacturing industry with limited treatment facilities causing important pollution of the environment due to a direct discharge of

domestic and industrial effluents into the Bay. The objective of the project is to restore the water quality of the bay by financing the infrastructure to collect (with a 15km long collection channel), treat (via a wastewater treatment plant) and discharge using a 3km long submarine pipeline. The project is under implementation with ONAS as a promoter and is estimated for completion in April 2019.
After commissioning of the facilities, it is expected that the domestic effluents from households located in Pikine Irrégulier Sud will be treated by the treatment plant located in Hann Bay.

C.2. Project Objective against Baseline

Impacts of flood in Senegal. Between 1980 and 2009, floods have affected around 900 000 people in Senegal, and killed 45 persons. The evaluation of damages to economic assets amounts to 142 million USD[2]. Given the impact of floods in the past 30 years and the impact of the last major events, the trend has clearly been accelerating:

- In 2009, major flood events have affected between 485 000 and 507 000 people in Senegal. Throughout the national territory, the economic evaluation of damages amounts to 104 million USD, mainly on the following assets: private housing (49%), health (14%), agriculture (11%), education (10%) and transport (10%). Greater Dakar area has suffered the most from those events, with almost 360 000 people affected and 82 million USD worth of damages (33 million USD on habitat).
- In 2012, floods caused the death of 26 people. Approximately 264 000 people were affected; more than 7 700 houses were damaged and more than 5 000 families had to be resettled.

The Senegalese coastal area is particularly prone to flood risk. The capital city Dakar is installed in a geographical area characterized by the « Niayes » landscape – fresh water bodies situated in depressions between dunes that spread on a 180 km coastline from the Cap-Vert peninsula to the estuary of the Senegal River. Most of Senegal's population lives in coastal areas and almost one quarter of the overall population lives in the Cap-Vert peninsula.

The return period of the rain events that caused the 2009 and 2012 floods are quite short – 1.5 years for the 2009 event. Those events and their impact have been subject to extensive studies for the Greater Dakar Region. However, knowledge of the actual risk flood risk on the national territory still shows some gaps and there is no evaluation of the potential impact of extreme events, like 100-years return period rains.

Impacts of floods in Greater Dakar. Unplanned urban growth and soil sealing have had a major impact on the natural hydrographic network and had provoked the disappearance of natural talweg and evacuation of rainwater to the sea. During exceptional droughts in the 70ies, houses were built in the dry Niayes low-lying grounds that should not have been occupied. Groundwater is heavily polluted by infiltrations from pit latrines and cannot be used for drinking water purposes. As a consequence, the piezometrical level of the groundwater table is very high, causing the apparition of lasting water bodies polluted by pathogenic bacteria of fecal origin, even in case of low-intensity precipitation.

Pikine Irrégulier Sud is one of Greater Dakar's main informal settlement zones, with around 300 000 people today. The population of Pikine Irrégulier Sud falls in the low-income category and has little access to public services. Moreover, the neighborhood is regularly and heavily affected by floods. Polluted and stagnant water surfaces may persist weeks or months, causing health problems (it is estimated that half of the population is affected by waterborne diseases), damage to existing assets and decrease in economic activity. Those problems drive people already living in poverty to leave their unhealthy habitat.

[2] Source : *Rapport d'évaluation des besoins post-catastrophe – Inondations urbaines à Dakar 2009,* Government of Senegal and GFDRR, 2010,

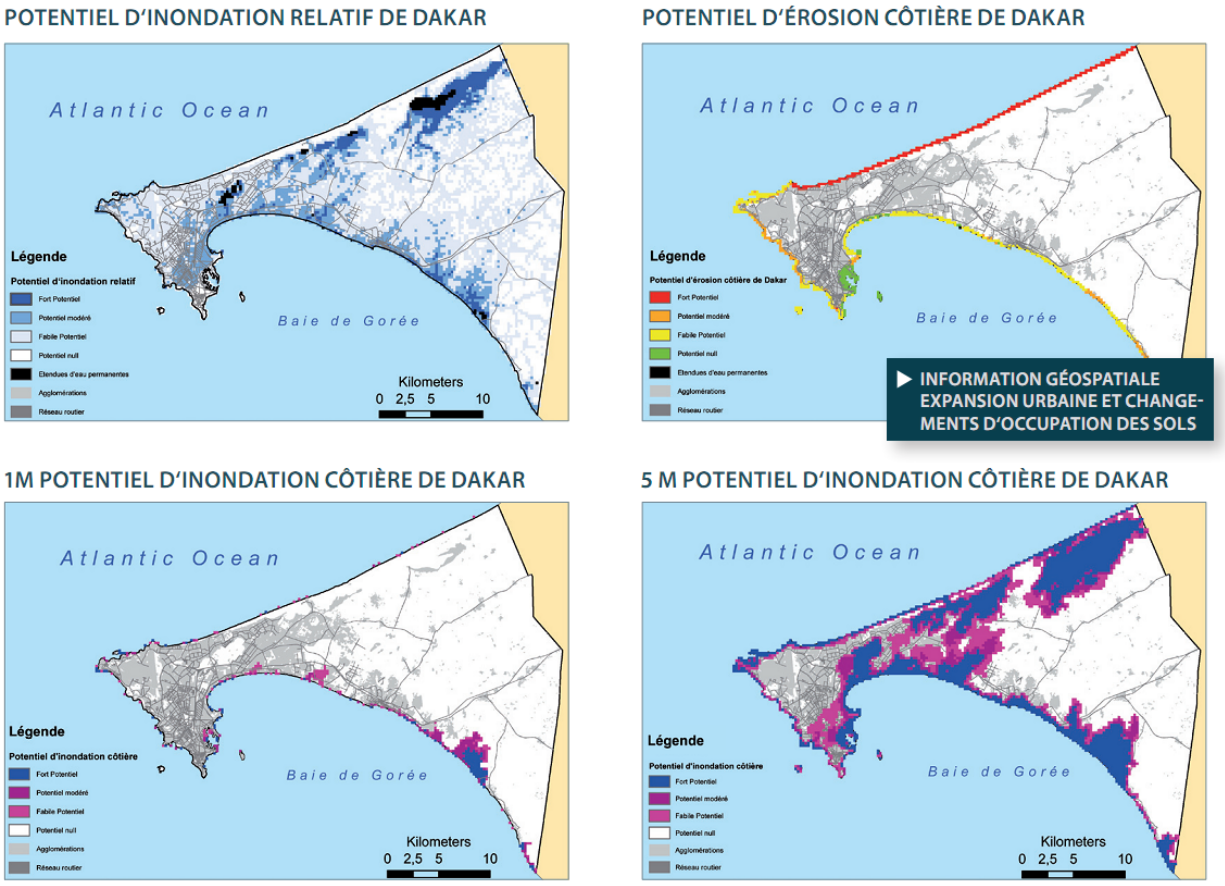


Figure 1 – Evaluation of flood risk in 2009 in Greater Dakar region[3]

Projected impacts of climate change. Major uncertainties remain as to the effect of climate change in Senegal in general and in particular on the amount and frequency of rain events. However, models tend to show that there will be a general decrease in rainfall but an increase in heavy rain events. This is actually the worst-case scenario for flood risk, as overall dry weather might continue to cause urban migration, mislead on the evaluation of hazard in low points otherwise prone to floods. Subsequent heavy rain events would cause massive damages.

While a majority of Senegal has a tropical climate, the country's northern regions - located in the Sahel - are arid. The country experiences one long rainy season, which varies along a latitudinal gradient (north-south), from June/July to September/October, and is driven by the movement of the Inter-Tropical Convergence Zone (ITCZ). While the arid zones receive a rainfall under 300 mm per year, the forested south receives an average of 1200 mm per year. The average annual temperature for Senegal was 27.8°C for the period 1960-1990, with monthly averages in the hottest seasons of up to 35°C.

Rainfall in Sahel is characterized by high variability on inter-annual and inter-decadal timescales, which can make long-term trends difficult to identify. A period of particularly high rainfall occurred in the early 1960ies, whilst the period between 1970 and the end of the 1990ies was very dry. Observers tend to agree on a significant return of high rainfalls since the beginning of 2000, but this does not constitute a consistent scientific trend.

[3] Source: *Préparation à la gestion des périls naturels et des risques liés aux changements climatiques à Dakar, Sénégal*, IAGU, 2009

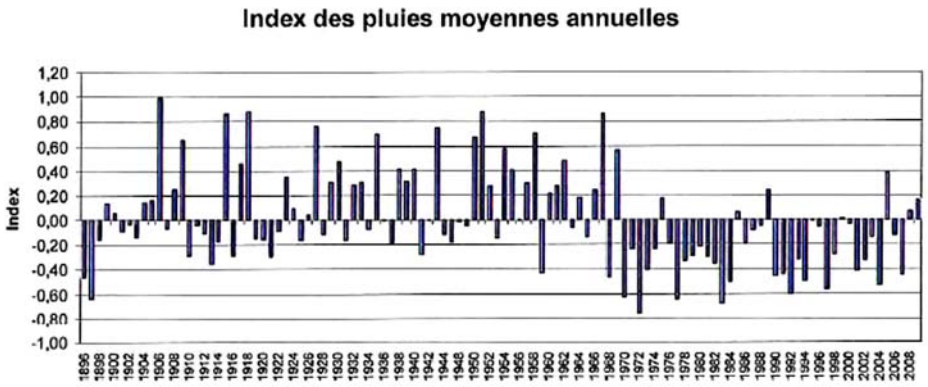


Figure 2 – Variation index on mean annual rainfall in Senegal, 1896-2008

As far as global climate change is concerned, General Circulation Models project a wide range of changes in precipitation for Senegal, but tend towards overall decreases, particularly in the wet season. However, despite the projected decreases in total rainfall, the proportion of total annual rainfall that falls in heavy rain events tends towards increases in the ensemble projections.

The document "Vulnerability, Risk Reduction and Adaptation to Climate Change – Country Profile of Senegal" of 2011 financed by World Bank, GFDRR and Climate Change team describes Senegal current and future climate profile.

The past climate variability is characterized by the following patterns:

- Mean annual temperature has increased by 0.9°C since 1960, an average rate of 0.20°C per decade.
- Available data indicates that the average number of 'hot' nights per year increased by 27 (an additional 7.3% of nights) between 1960 and 2003.
- A period of particularly high rainfall occurred in the early 1960s, while the early 1980s were particularly dry. Statistically significant decreases of around 10 to 15 mm per decade have, however, been observed between 1960 and 2006 in the southern regions of Senegal (during the wet season of June through September).
- Some unusually high rainfalls have occurred in the dry season in recent years (2000-2006), but this has not been part of a consistent trend.
- Senegal has experienced a statistically significant decrease in wet season rainfall between 1960 and 2006, with the 500 mm isohyets regressing about 100 km to the south.

The current models that describe the future of Senegalese climate project the following trends:

- Mean annual temperatures are projected to increase by 1.1 to 3.1°C by the 2060s, and 1.7 to 4.9°C by the 2090s, with projected rates of warming faster in the interior than in areas closer to the coast.
- All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate, with such increases occurring more rapidly in the south and east of the country.
- All projections indicate decreases in the frequency of days and nights considered 'cold' in current climate.

Different models in the ensemble project a wide range of changes in the mean annual rainfall averaged over the country, from -41 to +48% by the 2090s – but more models show decreases. It is difficult to draw robust conclusions on changes in precipitation; however, it is likely that a greater proportion of precipitation will occur in heavy rainfall events.

Description of baseline scenario. If the present trend persists, it is expected that in years to come vulnerability will continue to increase. Indeed, urban population will continue to grow at a fast rate. Today, urban growth is estimated to 3.9% per year, which represents over 35 years 16.7 million new urban dwellers, and over 2.3 million new houses.

If urban planning still fails to integrate – by lack of knowledge or adequate tools – flood management concepts, the number of people exposed to flood risk will continue to increase faster than population growth. In this case, it is likely that public investment in drainage infrastructure will be lagging behind urban expansion leaving most vulnerable people in a situation of extreme vulnerability and dramatic sanitary living conditions.

Project objectives against baseline. Against this baseline scenario of increasing urban vulnerability in Senegal and potential risk elevation due to climate change, the general objective of the project will be to initiate the shift from an infrastructure-oriented policy to an integrated and transversal national policy of flood risk management, with expected benefits tackling the problem from a two-fold perspective: (i) optimize investment for resilience in already urbanized areas and (ii) take preventive action to include flood-risk in urban planning.

Derived from the priorities set by the Sendai Framework for Action, the specific objectives of the project are (i) to improve knowledge on floods and flood-prone zones, (ii) to optimize investment in risk mitigation measures, (iii) to upgrade monitoring and response for better risk prevention and (iv) to strengthen flood risk governance.

C.3. Project Description

Following the priorities set out in the Sendai Framework for Action, the project is structured in four components: (i) knowing the risk, (ii) reducing the risk, (iii) preventing the risk and (iv) governance. Each component is described in the present section.

COMPONENT 1 – KNOWING THE RISK

This component of the project will aim at enhancing and making available knowledge about flood risk in Senegal. The objective is to make a map of flood risk in Senegal, at national scale and at local scale in six priority urban areas – those most affected by the floods. The knowledge thus produced can then be disseminated, both towards institutions involved in flood management policy-making as well as towards affected populations in order to create a real risk culture.

Sub-component 1.1 – Flood risk mapping. A comprehensive Geographic Information System (GIS) on flood risk will be developed to gather information for adequate policy-making, land planning and infrastructure design. The GIS will present information at the national scale and – to much finer details – at the local scale, for six pilot urban areas to be determined.

First, based on the compilation of the existing information and on-going studies, a digital terrain model (DTM) with a 50 meters mesh covering the national territory will be developed. This basic topographical data will be processed to establish a precise knowledge of watersheds and their dynamics. This DTM will be the background map of the flood-risk GIS, which would be composed of two main layers:

- Hazard layer. This layer will pinpoint flood-prone areas for ten-year floods (standard design floods protection infrastructure in Senegal) and hundred-year floods (extreme hazard). This layer will also represent data on watershed limits, aquifers, large linear infrastructure that may alter the response of hydraulic flows, the maximum flow for natural and artificial outlets.
- Vulnerability layer. This layer will represent the urban fabric, highlighting sensitive areas and buildings (hospitals, schools, public places such as bus stations or mosques), the population density, business and industrial zones, and an estimation of the risk to human lives and economic assets.

The combination of those two layers within the GIS will allow for precise knowledge and localization of flood-risk on the Senegalese territory. This nationwide mapping will be the base for the identification of six pilot urban areas where a similar but more detailed risk mapping (scale of 1:5000) could be achieved. These urban areas would be selected according to their exposure to flood risk and representativeness with respect to different types of floods affecting Senegal. Those pilot areas will be chosen from the 25 urban localities pre-identified by the Government of Senegal in the framework of the National Program for Development and Restructuring of Flood Zones (*Programme National d'Aménagement et de Restructuration des Zones Inondables – PNARZI*). Given the stakes in the Dakar region, there is no doubt that it would be among the six pilot areas.

The information gathered in the GIS will need to be regularly updated to take into account the ever-changing situation of flood risk, particularly rapid evolution of vulnerability in the context of rapid urbanization and changing hazard due to climate change. The administration, maintenance and update of the GIS will be implemented by the Ministry of Urban Renewal, Housing and Living Environment (*Ministère du Renouveau Urbain, de l'Habitat et du Cadre de Vie – MRUHCV*). It will also ensure its availability to all stakeholders (ministries, local governments, public institutions, firefighter brigades, consulting firms, universities, associations, etc.). The equipment and training for administrators will be provided under the project.

In localities where hydrological and meteorological historical data is insufficient for the assessment of flood hazard, the project could include the supply and installation of basic measuring equipment (rain gauges, staff gauges or piezometers). The new equipment will be used to gather the minimal historical data necessary for the proper understanding of the flood hazard.

Outputs: Flood risk GIS

Sub-component 1.2 – Flood risk awareness. Taking advantage of the data made available through the flood risk GIS developed in Sub-component 1.1, communication activities – both institutional and towards the general public – will be funded under the project. A communication plan for both aspects would be developed, validated and implemented.

As for corporate communications, the objective will be to define relevant indicators to serve as a decision-making tool in the development of public policies to fight against floods. These indicators could, among other things, include: the ratio of total population subject to decadal and centennial floods ratio of total economic activities subject to decadal and centennial floods.

Awareness- campaigns for the general public will also be arranged for the most vulnerable populations in order to create a genuine risk culture in the most flood-prone areas. Indeed, appropriate behavior on the part of the people concerned is the guarantee of a better preparation and a significant reduction of negative impacts of flooding. Besides the intrinsic hazard of water, ignorance of the risk may have a negative impact on the protection capacity – including inadequacy of buildings – or a more active vulnerability resulting in risk behaviors, conscious or unconscious.

Outputs: Awareness-raising campaign

COMPONENT 2 – REDUCING THE RISK

This component aims at reducing the vulnerability of the territory by (i) making recommendations to improve the resilience of urban areas, (ii) optimizing the design of drainage infrastructure and (iii) developing "no regrets" infrastructure in a particularly vulnerable area of the outskirts of Dakar (*Pikine Irrégulier Sud*).

Sub-component 2.1 – Structural and non-structural measures for flood risk reduction. Based on the information compiled in the GIS and additional field surveys, the activities under this sub-component will aim at providing the Senegalese authorities with a collection of measures, other than large drainage infrastructure, that can be implemented by public or private stakeholders to mitigate flood risk in most vulnerable urban areas.

First, a thorough analysis of urban planning practices in force in Senegal would make recommendations to improve the consideration of flood risk in the future urban fabric. Particular attention would be paid to the protection against the installation of habitat in areas identified as flood-prone, in particular through the installation of public facilities that are not affected by floods (for instance parks, sports fields or ponds).

At the plot level, and for each of the major types of risk areas, a diagnostic will be led and recommendations will be issued as to structural and non-structural measures that can be implemented locally by residents, businesses or public institutions to reduce vulnerability. These would include both measures for the existing urban fabric (for instance threshold increase, cofferdams or small pumping stations) as well as for future urban developments (for instance regulations for new buildings materials and techniques).

These recommendations in terms of urban planning as well as structural and non-structural measures will be accompanied by a regulatory and economic analysis to identify any existing barriers to their implementation and steps required for their effective implementation: changes in legal framework, economic incentives…

Outputs: Regulatory recommendations – Guidebooks – Proposition of incentives

Sub-component 2.2 – Tools for adequate investment in flood management infrastructure. Topographical, hydrological and meteorological data collected in the framework of component 1 will be processed to develop the information needed to enhance effectiveness of public expenditure in drainage infrastructure. This information will be made broadly available to policy makers, project sponsors and engineers to ensure maximum appropriation and diffusion of good practices.

For each watershed, the appropriate tools will be developed for large scale risk-mitigation infrastructure design. Studies under this component will thus determine adapted design storm patterns, rainfall-flow and rainfall-runoff models. Those tools need to be updated on a regular basis to take into account new hydro-meteorological data and topographical data on urban areas, which tend to change rapidly. Protocols and trainings will be set up to ensure that responsible entity will be capacitated for this task.

Information collected in the GIS will be used for setting adequate priority, for each watershed, to investment in large-scale drainage infrastructure. This information will be used to set up a strategic planning for investment at national scale, and will be used on a smaller scale by entities responsible for the elaboration of local drainage master plans.

Outputs: Investment plans – Models – Protocols – Training programs – Communication program

***Sub-component 2.3 – Drainage and sanitation infrastructure in* Pikine Irrégulier Sud.** This sub-component will include investment in infrastructure aiming at building resilience to flood risk of Pikine Irrégulier Sud, one of the most vulnerable areas of the suburbs of Dakar, through a “no-regret” approach to adaptation to climate change.

In terms of storm water drainage infrastructure, and in accordance with the principles identified in the Drainage Master Plan for Pikine and Guediawaye (elaborated in the framework of the PROGEP, financed by the World Bank), the works planned consist of:

- The transformation of depressions and existing ponds in storm basins that will regulate the flow during rain events, thus significantly reducing the required sizing of spillways. In total, the project involves the construction of 18 pools of rainwater retention basins covering a surface of nearly 30 hectares. In accordance with the orientations of the Drainage Master Plan, these ponds should be able to integrate into the urban space, while addressing with fences the concerns of the people about the risk of drowning due to the size and depth of these works;

- The installation of gravity collectors to let the rainwater flow to the outlets in the sea and the adjacent forest area. These collectors, installed on a draining bed and equipped with weep holes at regular intervals in the raft, are also designed to reduce the water table's piezometrical level. In total, 20 km underground collectors will be built.

This infrastructure is designed for a 10-year return period, which corresponds to standards for drainage infrastructure. In the local context of extreme vulnerability, this infrastructure will bring adequate protection against storm events. The drainage system was also designed to be resilient to climate change as the outlet was placed to take into account sea level rise. This sub-component will also tackle the problem of wastewater intrusion in drainage infrastructure through installation of sewer pipes along the drainage linear infrastructure that will be connected to the Hann bay wastewater treatment plant.

This sub-component will also include Information, Education and Communication (IEC) services aimed at Pikine Irrégulier Sud populations, that will aim at (i) ensuring acceptance and proper usage of the infrastructure by the population and (ii) adapting retention ponds to enhance their integration in the urban structure.

Finally, this sub-component will include the displacement and resettlement of the people installed in flood-prone area that cannot be protected by the drainage infrastructure. Although the drainage infrastructure has been designed to minimize impacts on people, the Resettlement Action Plan (RAP) will structure the urban fabric to drastically reduce vulnerability. The number of People Affected by the Project is estimated to be 700 during the elaboration of the RAP, however as the urban fabric is rapidly changing in Pikine Irrégulier Sud, this number might be slightly revised during actual resettlement.

Outputs; Drainage infrastructure – Sanitation infrastructure – Training programs – IEC campaign

COMPONENT 3 – PREVENTING THE RISK

This component aims at enhancing risk detection and prevention with a focus on drainage infrastructure management, with the objective to maximize its efficiency.

Sub-component 3.1 – Real-time hazard monitoring in Greater Dakar. Rain events in Dakar and its suburbs are characterized by a strong spatial and temporal variability. Moreover, flood risk in this area is strongly linked to the piezometrical level of the water table which has a direct impact on the runoff coefficient. This subcomponent of the project will include supply and installation in Greater Dakar of precise meteorological and hydrological monitoring tools to ensure real-time knowledge of local climatic phenomena and quick response capacity.

A polarization diversity X-band radar antenna (frequency range 8.0 to 12.0 GHz), less expensive and bulky than standard equipment will be installed. This meteorological radar will measure precisely located accumulated rainfall on an 80 kilometers range, covering most of the Cap Vert peninsula. Coupled through an operating software with a network of rain gauges – new or existing –this new equipment will give precise and real-time knowledge of rain events, and predict heavy rainfalls with two or three hours anticipation.

According to existing and operational piezometers in Greater Dakar, some equipment will be rehabilitated, replaced or extended to extend knowledge of the water table. Water quality will also be tackled to address the health issues caused by stagnant flood water.

This Sub-component will also provide inclusive support to the National Agency for Civil Aviation and Meteorology (*Agence Nationale de l'Aviation Civile et de la Météorologie – ANACIM*) and Directorate for Water Resource Planning and Management (*Direction de la Gestion et la Planification des Ressources en Eau – DGPRE*) to enhance their capacities to forecast flood risk and ensure sustainable use of the new equipment.

Outputs: Monitoring equipment and software – Forecasting models – Training programs

Sub-component 3.2 – Protocols for infrastructure management under extreme rain events. The activities financed under this sub-component will aim at increase preparedness of the drainage infrastructure national operator – the Senegal National Office for Sanitation (*Office National de l'Assainissement du Sénégal, ONAS*) through curative and preventive action.

Based on a precise database of existing drainage infrastructure which is currently being developed in the framework of the PROGEP, and their hydraulic behavior in various rain events, the first activity under this sub-component will be to identify bottlenecks and weak points of the systems. Derived from this identification, preventive actions to be implemented by the operator in the lead-time in case of predicted heavy rainfall will be determined. For instance, protocols for drainage infrastructure management or flood prevention might include: empty retention basins, reinforce pumping stations and close down roads and streets.

Capacity building to help the ONAS to acquire the skills necessary to take the central role in the rainwater drainage infrastructure will also be financed under this sub-component.

Outputs; Protocols – Training programs

COMPONENT 4 – GOVERNANCE

Transversal governance is a distinctive characteristic of integrated flood management. This component aims at helping the Government of Senegal maintain an in-depth communication between all stakeholders of flood management policy-making and its implementation.

Sub-component 4.1 – Support to integrated flood risk management policy-making. The project will bring support to MRUHCV in its role as lead institution in flood management policy-making and coordination of all the institutions involved in flood management. More precisely, this support to policy making and coordination will include (i) dialogue and cooperation between all institutions involved in the project implementation scheme to ensure maximum efficiency, coordination and consistency, (ii) a high level policy panel that could be led by the Prime Minister's office and (iii) general communication and participative fora with general public, academia and civil society

Outputs; Decisions of the Technical Committee – Decisions of the CNGI – Communication strategy

Sub-component 4.2 – Institutional consolidation and capacity building. The project will include a participative detailed diagnostic of the Senegalese institutional framework for integrated urban flood management. This diagnostic will conclude in recommendation in terms of responsibilities of different institutions, coordination between various institutions and capacity reinforcement that might be needed.

Based on the previously mentioned diagnostic, a specific capacity building program will be implemented in relation to integrated flood management policy-making. The proposed strategy aims at increasing Senegal's resilience to flood disaster risk by combining hard-engineered solutions to reduce vulnerability and non-structural policies and measures to better monitor and respond to flood events.

Outputs: Institutional diagnostic – Training program

Sub-component 4.3 – Project Management Assistance. A project management assistance team will be hired to support implementation of the project by MRUHCV and other institutions (see section C.7 for details on implementation arrangement). It will bring support for precise definition of needs, procurement, follow-up of consultant works and validation.

Outputs: Tender documents – Evaluation reports – Validation of products

C.4. Background Information on Project Sponsor

The Project Sponsor will be the Government of Senegal. The Government of Senegal will support the project through partial financing of Sub-component 1.3, with a contribution of 6 M€ from the State budget. As a consequence, the Ministry of Finance will be involved for channeling the funds.

The Project Sponsor will distribute an delegate the implementation of the project to five executing entities, while overall coordination will also be ensured (cf.infra) :

- MRUHCV: The Ministry of Urban Renewal, Housing and Living Environment (*Ministère du Renouveau Urbain, de l'Habitat et du Cadre de Vie – MRUHCV*) is responsible for the coordination of all stakeholders involved in flood management, and has been leader in the advocacy for a shift in policy towards an integrated approach.
- ONAS: The Senegal National Office for Sanitation (*Office National de l'Assainissement du Sénégal – ONAS*) is the national public institution in charge of urban wastewater and storm water collection and treatment. In late 2013, ONAS has been appointed as the lead entity in charge of drainage infrastructure, from construction works to operation and maintenance.
- ANACIM: The National Agency for Civil Aviation and Meteorology (*Agence Nationale de l'Aviation Civile et de la Météorologie – ANACIM*) is the public agency in charge of producing and processing meteorological data as well as its publication. It is also in charge of civil aviation.
- DGPRE: The Directorate for Water Resource Planning and Management (*Direction de la Gestion et la Planification des Ressources en Eau – DGPRE*) is part of the Ministry of Water and Sanitation (*Ministère de l'Hydraulique et de l'Assainissement – MHA)*. It is in charge of the National Hydrological System and monitors groundwater resources as well as rivers.
- APIX: The Investment Promotion and Large Projects Agency (*Agence de Promotion de l'Investissement et des Grands Travaux – APIX*) is a public company that is in charge of implementing, in the name of the Government of Senegal, major investment project, especially in the framework of public-private partnerships. The involvement of APIX in the project is the consequence of the project's history, as the restructuration of Pikine Irrégulier Sud was originally a mitigation measure from the Dakar-Diamniadio Highway project. At that date, and in response to flood crisis, numerous projects were launched to deal with the emergency investment plan in the suburbs of Dakar, not necessarily though ONAS.

C.5. Market Overview

Not applicable.

C.6. Regulation, Taxation and Insurance

Permits will be obtained, if necessary, by the project sponsors as public entities according to Senegalese regulation. AFD-financed projects are not subject to taxes in Senegal. Foreign exchange induces no risk as exchange rate between euros and CFA franc is fixed. Insurance policies are not standard practice in Senegal for drainage infrastructure.

C.7. Institutional / Implementation Arrangements

Executing entities. Each executing entity will be in charge of the implementation of part of the project according to its prerogatives. The table below illustrates the implication of each executing agency on the sub-components of the project.

Executing Entity	Sub-components	Funding (M€)			Indicative total amount (M€)
		GCF	AFD	GoS	
MRUHCV	1.1 - 1.2 - 2.1 - 2.2 4.1 - 4.2 - 4.3	11,7	-	-	11,7
ONAS	2.3 - 3.2	1,2	11	-	12,2

ANACIM	3.1	1,1	-	-	1,1
DGPRE	3.1	1	-	-	1
APIX	2.3	-	39	6	45

A strong coordination between these five executing entities will be required to ensure an effective project implementation. Each entity will have a leading role on the implementation of activities as per the component breakdown presented above while the overall coordination will be ensured through four mechanisms to maximize interactions between the entities as much as possible:

- Project Management Assistance (PMA - operational level): a dedicated team will be recruited to assist the MRUHCV, Lead Coordinating Institution, in the management of the project and appropriate coordination with the executing entities and other stakeholders. This team will bring a day-to-day support to the five entities, facilitate communication and anticipate potential issues.

- Project Coordinator (oversight): the Project Coordinator, designated within MRUHCV, will act as focal point and work with the Project Management Assistance team to ensure consistency of actions.

- Project Technical Committee (technical level): the Project Technical Committee (PTC), a quarterly meeting gathering the five executing entities headed by a MRUHCV's representant, will represent an opportunity to discuss transversal technical issues and enable a dialogue between the entities involved in the project implementation.

- Steering Committee (strategic level): the Steering Committee will be in charge of the strategic supervision of the project to ensure a global coordination between the project implementation by the executing entities and the guidelines and priorities of the government in terms of integrated flood management.

Further details on both committees are provided below.

Project Technical Committee. The PTC will be composed by the reunion of all executing agencies. It will gather on a quarterly basis to monitor progress of the project and ensure coordination between all executing agencies. MRUHCV, as the Lead Coordinating Institution, will appoint a focal point to represent the Project Technical Committee. The focal point, with the support of the Project Management Assistance, will coordinate the Project Technical Committee and participate in the Steering Committee.

Steering Committee. In the perspective of ensuring national ownership of the project, no specific steering committee shall be set up. Instead, the existing National Committee for Flood Management (*Comité National de Gestion des Inondations – CNGI*) will act as steering committee for the project. The CNGI gathers all institutions involved directly or indirectly to flood management and impacts mitigation. Presently, the CNGI has a focus on crisis management. The project will bring more integrated flood management aspect to its consideration

Link with regional and local level. The CNGI is also linked with Regional Committees for Flood Management (*Comités Régionaux de Gestion des Inondations – CRGI*) and Departmental Committees for Flood Management (*Comités Départementaux de Gestion des Inondations – CDGI*). This connection will ensure that the results of the project will trickle down to the local level on the whole national territory.

Contractual framework. A loan agreement has been signed on December 2nd 2015 by AFD and the Government of Senegal and part of the amount will be on-granted to ONAS for the activities under its responsibility. APIX already has a mandate to lead the drainage works component and resettlement through a decree from the Prime Minister of Senegal.

The financial agreement regarding the GCF grant will also be signed by AFD and the Government of Senegal and on-granted.

Procurement plan. Except for the resettlement plan that will be implemented directly by the Senegalese authorities, the project will be implemented through works, supply and services contracts procured by the

executing agencies. The procurement plan is designed to minimize the number of contracts that have to be procured. The following table provides an overview of the project procurement plan.

Output	Type of Contracts	# of contracts
Output 1. The knowledge of flood risk in Senegal has been enhanced, mapped, and made publicly available	Services	1
Output 2. Risk has been reduced in Pikine Irrégulier Sud and tools are available to reduce the risk at national scale in a cost-effective and efficient manner	Works Services Direct implementation	2 2 N/A
Output 3. Hazard monitoring and response have been developed to enhance existing drainage infrastructure operations	Supply Services	2 1
Output 4. Stakeholders of flood management policy-making work together in an efficient and coordinated manner	Project consultants	1

Organogram. The organogram hereafter describes the implementation arrangement as described in this section.

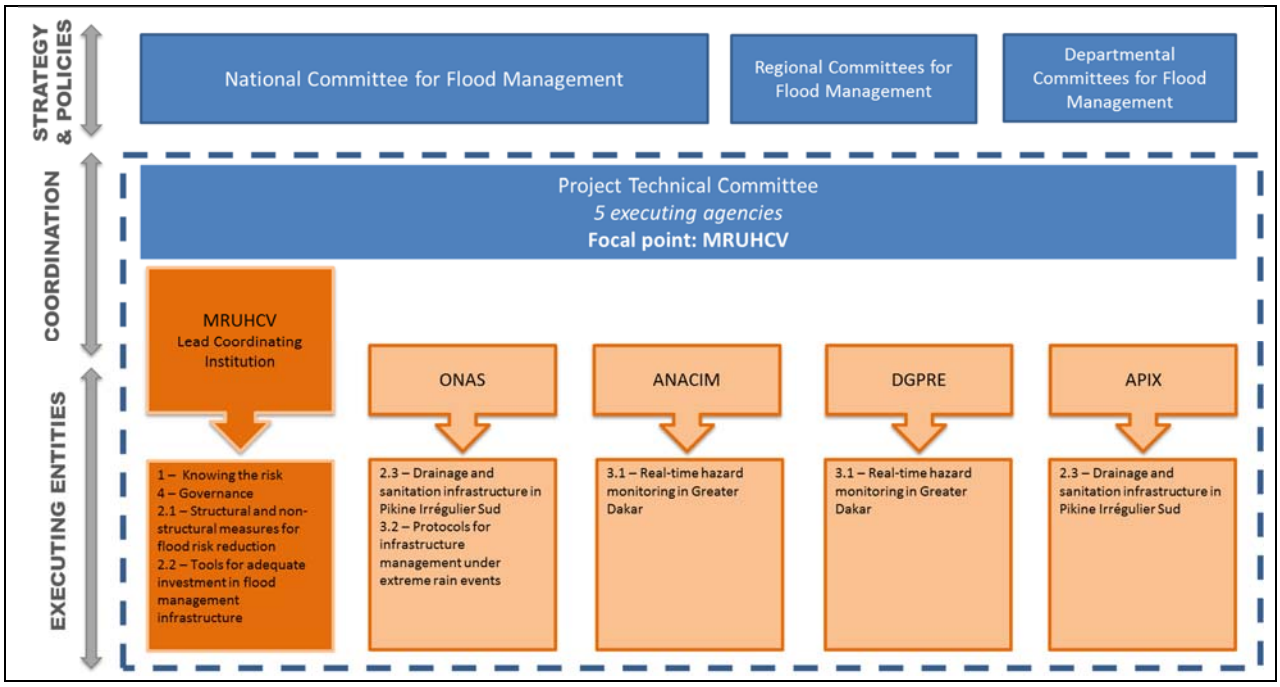
The financial management of the project will rely on a special project account that will be held by the Ministry of Finance. The anticipated disbursement method will be via renewable advances, which is a classic approach for capital management on AFD-financed project with established procedures and mecanisms for both disbursement of advances and payment of invoices.

Disbursement process. MRUHCV, as the lead coordinating institution, will prepare in coordination with the other executing entities a detailed procurement plan that will provide a tentative disbursement schedule with an approximate accuracy at the quarter level. Based on this document, the MRUHCV will be able to transfer a request for funds to the Ministry of Finances when a disbursement is required. After analysis and validation by the Ministry of Finances, this request is transferred to AFD for control and final approval. As a last step, an official letter from AFD is sent to the Ministry of Finances to inform that the disbursement has been processed. The Ministry of Finance will be in charge of the special project account and represent the key entity, in coordination with AFD, to manage the effective disbursement of funds from the GCF grant. A couple of management measures are usually set up to ensure the accuracy of this process: a monthly bank statement should be provided to the MRUHCV by the Ministry of Finances to inform on the available balance on the project account; and the detailed procurement plan will be regularly reviewed and updated by the MRUHCV with the assistance of the PMA to take into account any change on the project schedule.

Payment process. Two payment methods can be considered for payment of invoices: (i) refinancing of expenses paid by the beneficiary and (ii) payment via renewable advances. In the first scenario, the Ministry of Finance will refinance an expense directly paid by an executing entity after reception of the payment certificate and supporting documents. All supporting documents will also be sent to AFD to ensure an appropriate supervision of funds flow. This payment scheme could be used for specific provisions planned in the early stage of the project to ensure implementation readiness.

Under the second scenario: when an invoice is to be paid, the executing entity concerned will transfer this invoice to the Ministry of Finances for treatment and payment, with a copy sent to AFD for supervision. Annual financial audits will be carried out by independent auditing firms and the AFD approval on the auditing reports will be a condition precedent to the next disbursement.

The financial management of the project, including disbursement methods (number of occurrences per year and maximum amount to be requested) and auditing will be detailed in the financing agreement.


STRATEGY & POLICIES
National Committee for Flood Management
Regional Committees for Flood Management
Departmental Committees for Flood Management
COORDINATION
Project Technical Committee
5 executing agencies
Focal point: MRUHCV
EXECUTING ENTITIES
MRUHCV
Lead Coordinating Institution
ONAS
ANACIM
DGPRE
APIX
1 – Knowing the risk
4 – Governance
2.1 – Structural and non-structural measures for flood risk reduction
2.2 – Tools for adequate investment in flood management infrastructure
2.3 – Drainage and sanitation infrastructure in Pikine Irrégulier Sud
3.2 – Protocols for infrastructure management under extreme rain events
3.1 – Real-time hazard monitoring in Greater Dakar
3.1 – Real-time hazard monitoring in Greater Dakar
2.3 – Drainage and sanitation infrastructure in Pikine Irrégulier Sud

C.8. Timetable of Project Implementation

	2017				2018				2019				2020				2021			
Task	**Q01**	**Q02**	**Q03**	**Q04**	**Q05**	**Q06**	**Q07**	**Q08**	**Q09**	**Q10**	**Q11**	**Q12**	**Q13**	**Q14**	**Q15**	**Q16**	**Q17**	**Q18**	**Q19**	**Q20**
Output 1. The knowledge of flood risk in Senegal has been enhanced, mapped, and made publicly available																				
Activity 1.1. *Mapping flood risk at national and local levels*	X	X	X	X	X	X	X	X	X	X										
Activity 1.2. *Population and institutions awareness raising*				X	X	X	X		X		X		X		X		X		X	
Output 2. Risk has been reduced in Pikine Irrégulier Sud and tools are available to reduce the risk at national scale in a cost-effective and efficient manner																				
Activity 2.1. *Recommendations for structural and non-structural measures*								X	X	X	X	X	X	X	X					
Activity 2.2. *Processing flood risk information for infrastructure planning and design*								X	X	X	X	X	X	X	X					
Activity 2.3. *Construction of drainage and sanitation infrastructure in Pikine Irrégulier Sud*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Output 3. Hazard monitoring and response have been developed to enhance existing drainage infrastructure operations																				
Activity 3.1. *Setting-up real time hazard monitoring in Greater Dakar*		X	X	X	X	X	X	X	X	X	X									
Activity 3.2. *Elaboration of operational protocols and guidelines for preventive action on drainage infrastructure*		X	X	X	X	X	X	X	X	X	X									
Output 4. Stakeholders of flood management policy-making work together in an efficient and coordinated manner																				
Activity 4.1. *Support to coordination and policy-making*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Activity 4.2. *Institutional consolidation and capacity building*				X	X	X	X	X	X	X	X	X	X	X						
Activity 4.3. *Supporting executing entities for project implementation*		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

D.1. Value Added for GCF Involvement

The GCF contribution is critical for the project in order to finance the operationalization and strengthening of an integrated flood management policy at national scale. If hard-engineered vulnerability reduction is sometimes easier to implement from a political point of view and social infrastructure investment usually justifies State indebtedness, paradigm shift in policy making is more difficult to achieve.

The grant will provide a strong incentive to go beyond current policy of reduction of vulnerability to flood risk. The GCF grant is expected to drastically speed-up the process and the set-up a comprehensive framework for integrated flood management. The implementation of the GCF grant by MRUHCV will also be instrumental in increasing the institution's legitimacy and comfort its position as the main policy maker on flood management at the national scale.

Though Senegal's indebtedness is deemed sustainable by the IMF since debt relief plans of mid-2000, investment linked to climate change adaptation is evaluated in Senegal's INDC at 14 558 million USD, which includes 12 725 million USD from external indebtedness. The concessionality of GCF funding, in the form of a grant, will permit better efficiency of future investment in flood risk mitigation.

D.2. Exit Strategy

Project outcome's sustainability will be sought through three lines of work: (i) appropriation of integrated flood management principles, (ii) sustainable financial resources and (iii) capacity building.

Country ownership. The project is fully owned by the Government of Senegal and derives from needs that have been assessed by actors of the sector. The project document has been shared with all executing entities, and more broadly with all stakeholders involved in flood management in Senegal. During the implementation of the project, those discussions will continue in the framework of sessions of the CNGI that will serve as steering committee of the project. The sessions of the CNGI will benefit from inputs from sub-component 4.2 of the project.

All those actions aim at ensuring mainstreaming of the concepts of integrated flood management in the policy-making process in Senegal, to ensure sustainable outcomes of the project. Valorization of the project outcomes is also of utmost importance as higher service quality and effective protection against flood disasters will be a strong motivation for the Government of Senegal to provide sufficient funding for the investment and operation in these fields.

Sustainable financial resources. Drainage infrastructures and hydro-meteorological services fall under government's responsibility. Public agencies are usually in charge of service provision. As these services are non-commercial public services, subsidies are (and will remain) the main financing sources, both for investment and operation. The main issue is to clearly identify the recurring financial resources needs to comply with standard in service delivery and ensure that related resources are secured over the years for the service operator.

The first disbursement of the AFD loan will be conditioned to the signing of a performance contract between the Republic of Senegal and ONAS allowing adequate financial resource for maintenance of drainage infrastructure on the 2015-2018-period. Both financial agreements for AFD loan and GCF grant will include a commitment by the Government of Senegal to allocate annually sufficient funds in the State budget to provide for the needs of (i) maintenance of the drainage infrastructure and (ii) the integrated flood management system.

Capacity building. Capacity building is a key aspect to address the issue of sustainability for integrated urban flood management. Most executing agencies of the project will benefit from capacity building actions that will ensure that those entities internalize the processes initiated by the project.

- MRUHCV: MRUHCV will be the main beneficiary of capacity building under the project, as the central entity in charge of policy making for flood management. Sub-components 4.1 and 4.2 will include trainings for MRUHCV personnel to enhance the institution's capability to implement the policy-making process and reinforce the leadership of the ministry in terms of flood risk management. Sub-component 1.1 will ensure that MRUHCV personnel are trained in administration and update of the flood-risk GIS as well as its publicity.

- ONAS: ONAS, as the central operator for drainage infrastructure, will also benefit from capacity building actions. Especially, under sub-component 2.3 financed by AFD, ONAS personnel will be trained in all tasks relative to drainage infrastructure construction and operations: technical training sessions for maintenance of drainage infrastructure, asset management and hydraulic modeling. Support for the first maintenance contract will also be provided. Sub-component 3.2, financed by GCF, will specifically include training for the application of new protocols in terms of drainage infrastructure operations in prevention of major rain events. The capacity building activities financed by GCF and AFD will strengthen ONAS' role and skills in drainage management and operations not only in regular maintenance but also in the context of flood management and prevention.

- ANACIM and DGPRE: Both institutions, respectively in charge of meteorological and hydrological data acquisition and monitoring, will benefit from technical capacity building to ensure operation and maintenance of all new equipment to be set-up in the framework of the project. Specifically, ANACIM will benefit from (i) enhancement of the meteorological model used for forecasting, going to finer detail at local scale, (ii) modernization of measuring and data collection capacities. DGPRE personnel will be trained in terms of hydrological monitoring of the main rivers of Senegal but also potentiometric level measurement in aquifer systems where this element is critical for vulnerability assessment and tidal gauges operation for coastal zones.

- APIX: APIX is the only executing entity that will not benefit from specific capacity building, as its role is confined to the drainage infrastructure construction, and that its implication in the sector is not structural. However, specific support will be brought in terms of social and environmental impact management.

E.1. Impact Potential

Potential of the project to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

The project will deliver significant impacts regarding climate change adaptation, reducing vulnerability to floods caused by expected increase in heavy rainfall events and elevation of sea-level.

Infrastructure for reduced vulnerability in existing cities. Activities in Pikine Irrégulier Sud will ultimately affect the vulnerability of almost 300 000 people living in poor neighborhoods of the suburbs of Dakar, protecting most of them from the effects of heavy rainfalls and resettling others in a safe and equipped site. The project will also have a high impact on infrastructure planning for the rest of urban centers in Senegal. Data production, infrastructure design criteria, weather monitoring and will also be instrumental in sizing and operating future drainage infrastructure, or other climate-sensitive infrastructure.

Flood-resilient urban planning in new developments. Flood risk assessment for the whole territory and specific urban centers will be achieved and translated into the urban development plans, making sure that most vulnerable sites are declared no-build areas, and are dedicated flood-resilient land use. For areas that are exposed to moderate flood risk, the project will also ensure that recommendations and incentives are available to make housing more resilient. The ultimate impact of these measures is to stop the present surge in vulnerability of Senegalese urban territory.

Flood risk awareness-raising. Developing a culture of risk management within public institutions and vulnerable population has a potentially significant impact on vulnerability, reducing casualties, health impacts, decreasing recovery time after flood events.

Climate change adaptation of infrastructure. The effects of climate change in the design of the drainage infrastructure financed under sub-component 2.3 depends on the level of certainty of these effects:

- On the one hand, the effects of climate change on the sea-level rise – based on global data – are rather certain and were taken into account in the design of the infrastructure. Indeed, the outlet was placed to take into account a 50 cm sea-level rise, while the hydraulic design ensures gravitational flow of collected storm water;
- On the other hand, the effects on climate change on rain intensity and frequency – based on local data – is poorly documented. The results of General Circulation Models, described in section C.2., bring little information useful for infrastructure design. One of the outputs of the project will be to build knowledge, especially in Greater Dakar, on the historical evolution of rainfall and so will bring more input for climate models. As a result, the standard 10-year flood design has been chosen.

However, the principles of integrated flood management are based on the assumption that infrastructural response to floods is necessary but not sufficient. From this perspective, the 10-years return period design seems adequate for two reasons:

- It will build resilience in a territory of extremely vulnerability, where tremendous damages are caused by frequent rainfall - 1.5-year return period;
- Whatever the design storm of the drainage infrastructure – and its cost – a major residual risk is still to be considered. The integrated flood management principles consider the risk as a whole and, based on the increased knowledge of flood risk that will be produced, recommendations to deal with rain events that are not covered by the drainage infrastructure will be issued: structural and non-structural measures for flood risk reduction, real-time hazard monitoring and response at the infrastructure management level.

E.1.2. Key impact potential indicator

GCF core indicators	*Expected tons of carbon dioxide equivalent (t CO_2 eq) to be reduced or avoided (Mitigation only)*	*Annual*	**Not applicable.**
		Lifetime	**Not applicable.**
	Expected total number of direct and indirect beneficiaries (reduced vulnerability or increased resilience); number of beneficiaries relative to total population (adaptation only)	*Total*	2 200 000 people at national scale, of which 700 000 people live in Greater Dakar.
		Percentage (%)	16% of the country population, 37% of the Dakar Region population.
Other relevant indicators	• Expected strengthening of institutional and regulatory systems for climate-responsive planning and development (PMF-A 5.0 and related indicator(s)) • Expected increase in generation and use of climate information in decision-making (PMF-A 6.0 and related indicator(s)) • Expected strengthening of adaptive capacity and reduced exposure to climate risks (PMF-A 7.0 and related indicator(s)) • Expected strengthening of awareness of climate threats and risk-reduction processes (PMF-A 8.0 and related indicator(s))		

Methodology. The analysis of the project is made for a 35-years horizon. Since the project focuses on the floods in cities, the geographical perimeter of the economic analysis include twenty-five cities that were pre-identified by the Senegalese Government as the most flood-prone. To integrate the changes over the years, four different periods of nine years each were considered (years 0 to 8, 9 to 17, 18 to 26, 27 to 36). The consequences of the urban population growth were included from year 9. The consequences of climate change were included from year 18.

Potential damages were estimated for four different return periods: 1.5 year (the estimated return period of the 2009 flood), 10 years, 100 years and an infinite return period (for which it was assumed that the project would not avoid any damage).

Flooded surface was derived from available data in Dakar (after the floods in 2005 and 2009) and in Saint Louis – mainly digitalized maps. For other cities, the "flooded surface/urban surface" ratio calculated for Saint-Louis was used. The urban population growth rate was considered equal to 3.9% and constant over time.

The indicators presented above correspond to an estimate of direct beneficiary of the flood risk management policy for a rain event with a return period of 100 years (extreme event).

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

The local-scale knowledge base on flood risk that will be developed for six pilot urban areas in sub-component 1.1 could be scaled-up at least to cover the 25 urban centers that were identifies by the Government of Senegal as flood-prone in the National Program for Development and Restructuring of Flood Zones (*Programme National d'Aménagement et de Restructuration des Zones Inondables – PNARZI*).

In addition, the project is highly replicable at the regional level. Setting up an integrated urban flood management in Senegal will be a milestone in the disaster risk management at the regional level and could be replicated in other countries, especially at the regional scale.

E.2.2. Potential for knowledge and learning

Presently, the knowledge base on risks and vulnerability of the Senegalese territory is insufficient and does not allow a rational risk management and investment planning. It is crucial to build a real database going down to the local scale and based on homogeneous measurement and projection protocols to promote an integrated flood management policy.

Better knowledge of the effects of climate change, as well as the vulnerability of the population to these effects, is a fundamental part of adaptation. One of the objectives of the present project is to produce additional data and assessments at national and local scale. This knowledge will be used for operational decision-making in the framework of the project but will also allow better understanding of the flood risks dynamics linked to climate change in the short, medium and long-term. GCF contribution to the project is thus all the more relevant as the production of climate information is greatly needed at national, but also regional (Senegal River Basin) and global level (IPCC) in order to increase climate change knowledge and climate-sensitive infrastructure planning.

The tools developed in the framework of the project will act as the link between meteorological and hydrological data production – which can be used for other purposes – and flood risk mitigation measures at local scale. For instance, the project will greatly benefit from the implementation of the Hydromet Program designed by the World Bank to support knowledge acquisition on meteorological and hydrological phenomena at national and regional level.

Moreover, an impact evaluation of the project after its completion would certainly be instrumental in diffusing lesson-learnt from the implementation of an integrated flood management policy in West Africa, in the perspective of large scale replication.

E.2.3. Contribution to the creation of an enabling environment

The whole project is directed to the creation of an enabling environment for cost-efficient public expenditure in drainage infrastructure and flood risk management. For existing urban centers, the increase in knowledge about flood-risk, its precise location and potential impact, will have a positive effect on the benefits of investment in the sector as well as management of drainage infrastructure and eventually on protection of human life and economic assets on the territory. However, the main positive impact will be linked to the limitation of increased vulnerability when adequate integration of flood risk in urban planning will limit public and private investment on risk-prone areas.

By setting up clear priorities at the national scale, taking into account projected urban development as well as impacts of climate change, the project will create an enabling environment for more efficient public investment in drainage infrastructure, which constitutes a major expense for the State budget in the coming years.

E.2.4. Contribution to regulatory framework and policies

In terms of drainage infrastructure, the project will help in clarifying the institutional framework and give to ONAS the means and resources to complete the missions it has newly been assigned as the lead institution in this sector. Whereas multiple actors were involved in the construction of drainage infrastructure, the road-map endorsed in 2013 by the Government of Senegal appoints ONAS as the sole institution responsible for drainage works and maintenance. The project will seek complete implication of ONAS in sub-component 2.3 and will bring technical support to ONAS to reinforce the institution's capacity. In addition, the sectorial dialogue initiated by AFD under the instruction of this project will strengthen the overall framework for action in the field of storm water management, which still requires consolidation. The condition precedents and commitments of the Government of Senegal linked to the AFD financial agreement will aim to ensure the financial resources dedicated to these activities.

In terms of integrated flood management, the project will also support MRUHCV's position as lead entity in the sector. The political dialogue that will be initiated in the framework of the project, in the Project Technical Committee or the Steering Committee (CNGI) will help to mainstream integrated flood management policy-making.

Last but not least, in terms of urban planning, the project will also see to the provision of tools for climate-sensitive urban planning, most notably at the local level, through integration *ex-ante* of flood risk as well as tools to enforce no-build areas and reinforcement of resilience in housing in areas exposed to moderate risk.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

Floods have direct impact on human life, health, economic assets and activity, land value and social well-being[4].

Human life and health. Two-thirds of human life losses related to floods are caused by drowning whereas other causes (trauma, electrocution, fire, poisoning) account for one third casualties. Water-borne diseases tend to thrive during flood events, especially where sanitation and solid waste management services are not efficiently provided to the population. Death caused by these diseases can occur after the event, thus are not recorded as directly related to the disaster. Poor people are especially vulnerable to these effects of flood as they do not benefit from proper civil protection, health services and sanitation. For instance, floods over the past few years have contributed to cholera resurgence in Senegal. Between 2005 and 2008, more than 35 000 people have been affected by the disease at national scale and almost 500 people died.

Economic assets. Floods can have a devastating effect on housing and households, as well as industrial assets and public infrastructure. Economic assets vulnerability might be difficult to measure and monitor, especially when the urban fabric is not stabilized. In the Greater Dakar Metropolitan Area alone, exposure and vulnerability of economic assets is estimated to reach 44 billion USD[5]. The 2009 flood has generated the immobilization of 43% of the public transportation vehicle fleet in Dakar. Approximately 50 bus connections have been canceled for large periods of time due to heavy rain events. These public transport interruptions have caused an estimated loss of income of 2 billion FCFA. The project, through its vulnerability assessment will evaluate the potential economic damages caused by floods in Senegalese cities. In addition to the reduction of damages, the project will also generate local jobs creation: for instance, GIS engineers are needed for creating and updating the GIS layers planned in Component 1.1. Component 1.2 may also result in job creation to lead awareness campaign.

Economic activity. In addition to damages to economic assets, floods tend to freeze economic activity by causing interruption in the supply chain due to transportation problems. Damages to stock and reduced customer visits and sales are also common effects.

Land value. Another positive economic impact of flood vulnerability reduction is land value increase. Special attention needs to be paid to the beneficiary of this gain, in particular in poor neighborhoods where land property might not be registered. APIX is currently working on those issues in the framework of the projects it is leading on urban restructuration.

Social well-being. Social benefits are significant, with improved health, safety and living conditions, especially for population in poor settlements, thus contribution to reduction of social inequalities. In particular, women are the first to be affected by social damages caused by disasters as flood events. Reducing this risk shall contribute to bridging the gender gap. Moreover, floods also affect education, which still represents a key sector for the achievement of development challenges in Senegal. In 2009, flood affected more than 250 schools at the national scale. In the Thiaroye locality of Greater Dakar, 57 schools were flooded and 32 were used as shelters for inhabitants of flooded houses.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups

[4] Most of specific data on Senegal are extracted from: *Rapport d'évaluation des besoins post-catastrophe – Inondations urbaines à Dakar 2009,* Government of Senegal and GFDRR, 2010,

[5] Source: Senegal Dashboard Natural Hazards, World Bank
http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=SEN&ThisTab=NaturalHazards

Senegal is still one of the least developed countries according to the United Nations. However, poverty rate has decreased: the share of the population living on less than 1.25 USD a day fell from 66% in 1991 to 34 % in 2011, though according to national standards, 46.7% of the population was still under the poverty line in 2011[6]. Senegal ranks 154 out of 186 in the Human Development Index classification.

Floods affect the poorest residents, those who tend to live in underequipped and low-lying periurban areas. With the projected demographic growth of Senegal (44% of the population is under 15) and the mushrooming urban population, the social problems associated to floods is expected to increase.

Presently, rain events with a 1.5 year return period is causing major damages. As climate change will most likely increase frequency of major rain events, increased impact on poorest population is to be expected. Sea-level elevation will also aggravate the problem in coastal cities like Dakar or Saint Louis.

Feasibility of the project identifies the main gaps that need to be bridged in order to build-up resilience to floods, in a context of climate variability:

1. Knowledge of watershed and groundwater tables ;
2. Knowledge of land use and associated stakes ;
3. Knowledge of rain events and hazards;
4. Integration of flood risk assessment in urban planning;
5. Drainage infrastructure design and planning;
6. Crisis and post-crisis management;
7. Meteorological prevision;
8. Inter-institutional cooperation.

This analysis concurs with the 2011 WB-GFDRR Senegal country profile identified the information and data gaps. First and foremost, many gaps exist in flood prevention and response, including a lack of detailed forecasts and risk zone maps, and suitable flood vulnerability assessment methods and data collection systems. Building such a system could offer guidance on cost-effective solutions for resilience at the national level.

E.4.2. Financial, economic, social and institutional needs

Financial needs. Needs for investment are high – the INDC that was submitted by the Government of Senegal in September 2015 evaluates the amount of climate change adaptation investment in flood risk mitigation at 2.136 billion USD, of which 1.976 billion USD from external financing. For Greater Dakar alone, estimates from the Drainage Masterplan show that at least 200 million USD worth of investment are required. Experience in detailed study for drainage in some areas of the suburbs of Dakar shows that those estimates are greatly underestimated.

Senegal is still nowadays among the list of the Least Developed Countries according the United Nations, but on the middle-income countries according to World Bank criteria. After retaking a promising trajectory in the first half of the 2000s, Senegal's growth has been slowing down since 2006. In the second part of the decade, growth was reduced to an annual average of 3.3 %, a pace barely above that which prevailed between 1980 and 1994 and that is equal to population growth. The multiple shocks (energy, food, financial) that the country has suffered, and the limited number of growth sectors have prevented Senegal’s economy to take-off.

There is therefore a strong financial need to comply with the commitments of the Senegalese Government in terms of investment in infrastructure. One of the objectives of the project is to make sure that each investment is done with maximum efficiency and that every other possible way to build-up resilience to floods have been tried.

Social need. In Dakar and other urban centers, people most vulnerable to flood risk are situated in new and/or informal urban areas where unplanned urban development have not taken into account the hydrological dynamics of the terrain. They are usually poorest people who (i) have come from rural areas or (ii) were progressively pushed from old urban

[6] Source: World Bank Development Indicators

centers to suburbs. With Senegalese cities growing at a rate of 3.9% per year, there is a significant social need to mainstream flood risk policies in urban management.

Institutional need. Floods have been a major issue in Senegal since 2005 and after a phase of emergency response by the Government of Senegal – which involved many institutions in the development of flood management measures, mainly through infrastructure construction – the flood management sector is now at a turning point. Indeed, floods are now a consistent trend of recurring events, especially in urban centers. There is thus a need to consolidate the institutional framework of flood-risk management in Senegal.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

Senegal produced a National Adaptation Program of Action (NAPA) in 2006, which details the country's priority adaptation responses. These include: reforestation, restoration of mangrove swamps, biological stabilization of sand dunes, physical protection against beach erosion and saline intrusion (using ditches, barriers, or other protection means), irrigation projects, restoration of soil fertility, water conservation methods, use of alternative crops, and improved education on adaptation.

In 2010, Senegal submitted its second national communication to the United Nations Framework Convention on Climate Change (UNFCCC). This communication defines an adaptation strategy in order to foster a more comprehensive management of aspects related to climate change. This strategy is focused on three strategic areas: (i) development of knowledge on the effects of climate change and transfer of appropriate technologies, (ii) strengthening prevention and the fight against shocks and (iii) promoting sustainable management of natural resources. The second area explicitly mentions recommendations for intervention in the housing sector: "*Investments to improve living conditions in areas often affected by flooding is important for vulnerable populations. Therefore, strengthening rainwater drainage networks, effective implementation of urban plans and social housing strategies are recommended in order to protect people against the flood risks*." (Second national communication). The project addresses both strategic areas regarding development of knowledge and strengthened prevention. In particular, the recommendation regarding investment is fully addressed, through optimizing cost-effectiveness

Senegal has also submitted in September 2015 its Intended Nationally Determined Contributions (INDC) with the support of Germany (through GIZ), France (through the INDC Facility) and the Global Environment Facility. French support was focused on the economic analysis of adaptation and mitigation measures of the INDC, in order to ensure their integration in the national development plan (*Plan Sénégal Émergent*). Investment to reduce vulnerability to floods is one key feature of adaptation measures considered in the INDC – the amount of investment needed for the 2016-2035 period is 2.136 billion USD, 1.976 billion USD being sought from external financial resources. The project will directly contribute to these objectives (i) directly through sub-component 2.3 which includes investment in drainage infrastructure and (ii) indirectly though long-term measures that will help increase cost-efficiency of investment in infrastructure and lead to long term strategies for vulnerability reduction.

E.5.2. Capacity of accredited entities and executing entities to deliver

Accredited entity. AFD has been active in Senegal for more than 70 years and finances project in various sectors according to the priorities set by the Government of Senegal. In the water, sanitation and drainage sector, AFD currently has a 70 M€ living portfolio, that should grow to 200 M€ before the end of 2016. AFD leads, along with the European Union, the political dialogue between donors and the Government in the urban water and sanitation sector.

Drainage and integrated flood management one of four areas of operation in AFD's sectorial strategy. Across Sub-Saharan Africa, AFD has a portfolio of more than one billion euros in drainage projects. AFD also has a long track record in assisting Trans-boundary Basin Organizations, such as OMVS (Senegal), CICOS (Congo), ABN (Niger), with the aim of strengthening operational hydrological monitoring in a perspective of Integrated Water Resources Management (IWRM) promotion.

At a global level, AFD has been accumulating significant climate finance experience for over 10 years. Since 2005, AFD has allocated more than 17 billion euros (2.9 billion euros in 2014) for climate-smart development projects and activities. In 2011, AFD formally reflected the growing importance of the fight against climate change in its activities by adopting a core operational climate strategy: AFD 2012-16 Climate & Development Action Plan. This strategy is based on three pillars including: (i) an ambitious objective to allocate at least 50% of its annual financial commitments to activities that have positive climate co-benefits on mitigation and/or adaptation, (ii) a systematic portfolio-wide measurement of climate impacts, through carbon footprint and resilience risk assessments, and (iii) project selectivity according to their impacts on climate change.

In Senegal, AFD climate change portfolio since 2007 includes 9 projects for a total amount of 104 million Euros :

- 6 adaptation projects, mainly in the agricultural sector;
- 2 mitigation projects;
- 1 project addressing both adaptation and mitigation objectives.

AFD has a local office in Dakar, which is in charge of ensuring correct communication and coordination with local project sponsors.

Executing entities. The five executing agencies were selected according to (i) the correspondence of their mandate with the activities under their responsibility in the project but also (ii) their capacity to deliver.

- MRUHCV: MRUHCV is composed of various Directorates which have different roles and lead different types of project. In terms of flood risk management, two main Directorates are involved: (ii) the Directorate of Urban Planning and Architecture, for preventive flood-risk reduction actions at urban planning level and (ii) the Directorate of Flood Zones Restructuration, for curative flood-risk reduction actions on existing urban fabric. Both Directorates have led similar projects in the past.
- ONAS: The core activity of ONAS is building and operation of sanitation systems, which will be the main activity under its responsibility in the project, along with some capacity building activity. As an operational structure, ONAS has teams specialized in project management and procurement.
- ANACIM and DGPRE: Both institutions are specifically responsible for the operation of respectively the meteorological and hydrological data production and monitoring system. They employ skilled engineers specialized in those domains. They have led similar projects in the past.
- APIX: APIX is an experienced project sponsor that has successfully led large scale complex projects (for instance the Dakar-Diamniadio highway).

For all of the executing entities, the risk of inefficient implementation is mitigated by sub-component 4.3, which purpose is to provide expert support to project implementation.

E.5.3. Engagement with civil society organizations and other relevant stakeholders

Engagement of the local authorities will also be critical in the implementation of an integrated urban flood management policy framework and will be sought through Project Management Assistance and communication to CRDI and CDGI[7].

[7] See section C.7 for more details on those committees.

Civil society was also engaged in the elaboration of the Environmental and Social Management Plan as well as the Resettlement Action Plan for drainage infrastructure in Pikine Irrégulier Sud. The NGO ENDA is in charge of implementing the resettlement actions directly with the population.

Also, sub-component 2.3 will include Information, Education and Communication (IEC) services aimed at Pikine Irrégulier Sud populations – with a special focus on women and their needs – and will involve other stakeholders, including municipalities and civil society. It has the ambition to deal with two subjects:

- On the one hand the acceptance and protection of drainage infrastructure – the service will include communication efforts with the public to (i) present and explain the project and its objectives (ii) ensure the protection of infrastructure drainage, among others against the infiltration of wastewater and solid waste. Regarding wastewater, beyond promoting public network connection, the provision will also aim to highlight the on-site sanitation solutions implemented by the Structuring Fecal Sludge Market Program, funded by the Bill and Melinda Gates Foundation.
- On the other hand, the service will lead consultations with local population on the development of retention ponds. A consultation will be conducted with residents living nearby projected retention ponds to define the development of the surroundings of these basins that best fits the aspirations of the inhabitants of these neighborhoods. These adjustments can then be made as part of the works of Sub-component 2.3 of this project.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project

E.6.1. Cost-effectiveness and efficiency

The whole project has been designed to increase cost-efficiency and effectiveness of future investment in flood risk mitigation in Senegal. Moreover, procurement procedures, based on international open competitive bidding, aim at cost-effectiveness. Through project implementation, and especially the regular meeting of the CNGI, duplicates will be avoided.

Infrastructure. Infrastructure under sub-component 2.3 has been engineered to ensure maximum cost-efficiency of the investment in terms of population protection against flood events. Indeed, retention ponds are designed to reduce flow capacity of evacuation channels down-stream, by cutting peak flows – thus drastically reducing civil works costs. This approach has been subject to a global validation through the Drainage Master Plan for Dakar Region and to detailed design during project preparation. Moreover, the whole system has been designed to let water flow gravitationally, thus avoiding pumping and associated energy costs.

Mapping. Flood risk mapping, as proposed in sub-component 1.1, requires the elaboration of a DTM that might be costly. The proposed technique is based on satellite imaging, which is usually cheaper than other techniques, including airborne laser telemetry.

Radar. The real-time monitoring system of meteorological events in Greater Dakar, based on X-band radar and loose network of rain gauges is more efficient and less costly than most traditional systems that require greater quantity of rain gauges or larger radars.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

The ratio between GCF grant and total amount of the project is 21%.

E.6.3. Financial viability

Flood risk management is a non-merchant public service that does not generate cash-flow for public authorities. As such, there is no financial viability to be expected from the project.

E.6.4. Application of best practices
The project was designed according to good practices in the fields of disaster risk management. It follows the recommendations of the Sendai Framework for Action, and the World Bank "Guide to Integrated Urban Flood Risk Management for the 21st century". In terms of technical best practices, the project will ensure to provide the best quality-investment ratio in a perspective of long term sustainability through: - Best available GIS software; - Appropriate and up-to-date technologies for hydrological and meteorological data production, processing and transmission.

E.6.5. Key efficiency and effectiveness indicators		
GCF core indicators	Estimated cost per t CO_2 eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	
	Not applicable.	
	Expected volume of finance to be leveraged by the proposed project and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)	
	Not applicable.	
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project)		**Not applicable.**

F.1. Economic and Financial Analysis

Economic Analysis. An economic analysis of the project has been made to evaluate costs and benefits generated by the implementation of the project, compared to a situation without the project. According to standard methodology, the benefits are evaluated as avoided damages (now and in the future).

The economic analysis is made for a 35 years horizon time. Since the project focuses on the floods in cities, the geographical perimeter of the economic analysis include 25 urban centers that were pre-identified by the Senegalese Government as the most flood-prone areas. Damages caused by floods were estimated for four different return periods: 1.5 year (the estimated return period of the 2009 flood event), 10 years, 100 years and an infinite return period (for which it was assumed that the project would not avoid any damage).

According to the economic analysis, the project's breakeven point is reached nine year after the project starting date. This economic efficiency of the project can be explained by:

- Significant damages reduction for very frequent floods in Pikine Irrégulier Sud, thanks to the construction of drainage infrastructures;
- Significant reduction of damages for most of the floods in Senegal thanks to a better urban planning. Indeed, the urban population growth in Senegal is very important, resulting in a demographic pressure in cities. Without the project, the urban population increase would lead to an increase in population living in flood prone areas, and consequently, to an important increase in damages.

The internal economic profitability rate is estimated to reach 28%.

Financial Analysis. Flood risk management is a non-merchant public service that does not generate direct cash-flow for the public authorities. As such, there is no financial return on investment to be expected from the project.

F.2. Technical Evaluation

Technical solutions for hard-engineered drainage infrastructure in Pikine Irégulier Sud have been designed to fit the guidelines that are laid in the Drainage Master Plan for Greater Dakar. Those guidelines are based on the principle of systems composed of retention basins that cut the peak flows and drainage canals to evacuate storm water to the outlet (see section E.6.1 for cost-efficiency of this solution). The infrastructure's detailed design has been validated by the Project Sponsor's executing agency's technical team (APIX). It has been revised and approved by the Engineer that has been recruited for works supervision, including revision of the hydraulic model.

The design storm that has been used to elaborate detailed design of the infrastructure is based on the data available since 1896 from the Yoff meteorological station (placed next to Dakar's airport). From this perspective, the infrastructure was designed for a 10-years return period. This return period is standard in Senegal and is sufficient to protect most of the population from most flood events, even in the context of climate change that is expected to increase the frequency of intense rain events. It should be reminded at this point that the rain event that caused the disastrous flood events that occurred in 2009 has been evaluated to have a very short return period: 1.5 year.

The outlets have been places 50 centimeters higher than presently necessary to take into account the elevation of sea level due to climate change. Even with this constraint, the infrastructure will let storm water flows gravitationally through the channels.

F.3. Environmental, Social Assessment, including Gender Considerations

The GCF-funded sub-components of the project will not have any negative impact on environmental, social and gender aspects, as it consists mainly of capacity building and institutional work. The main impacts to be expected are related to component 2.3, financed by AFD and the Government of Senegal.

Environmental and Social Impact Assessment. An Environmental and Social Impact Assessment (ESIA) has been made in 2013 for the drainage infrastructure which is the project activity with major impacts, and that will be financed under sub-component 2.3. The ESIA was carried out as part of the Pikine Irregulier Sud restructuration project, which comprises the drainage project under consideration as well as street rehabilitation and social equipment components being currently implemented under a separate World Bank and AFD financing. The ESIA is included as an annex to the present Funding Proposal. It includes an effective consultation process, an ESMP that ensures proper monitoring of E&S issues and mitigation measures throughout the process.

Impact analysis showed significant positive impacts during the life-cycle of the drainage infrastructure and some negative impacts during the construction phase, which can be mitigated with the implementation of the proposed mitigation measures. The measures were detailed in the ESMP for their implementation and monitoring. The ESMP also contains a book of Environmental and Social Clauses that will be included in the tendering documents. The application of all the environmental and social measures that will be retained in the tendering documents should be systematic for full respect of the principles of preservation and protection of the environment.

The impacts during construction phase are addressed in the ESMP which recommends different mitigation measures to minimize impacts on the physical environment (soils, air, water, flora, fauna and wastes) and social-economic environment (health, safety, job creation, transport, business, housing and livelihood), both during construction and operational phases. The ESMP includes training and awareness program on health (including STDs such HIV) and safety (security, accident prevention) working conditions for workers, contractors and project owner. Adequate safety gear and equipment will be provided to all workers employed by the project. The ESMP also proposes solutions to promote sound resources management, especially energy and water.

For the wastewater collection infrastructure under the sub-component 2.3, studies will be carried out in the coming months that will also include an E&S impact assessment. The validation by AFD of the ESIA regarding that part of sub-component 2.3. is a condition precedent to the disbursement of the funds relative to the construction of the wastewater collection infrastructure as per AFD-Government of Senegal financing agreement. According to AFD's procedures the ESIA must meet World Bank's standards.

Wastewater management impact. Currently, people living in Pikine Irrégulier Sud are mainly equipped with latrines or septic tanks, which operation is greatly disturbed by the presence of the water table close to the surface. This can cause the pits to overflow. The consequences in terms of pollution of the water table and unhealthy conditions of the area are significant. The evacuation of rain water and lowering of the water table provided under Sub-component 2.3 should greatly improve the situation.

However, previous experience in storm water drainage in Dakar show that a significant risk of intrusion of wastewater into storm drains networks must be taken into account especially as the majority of outlets of Pikine Irrégulier Sud drainage system bring the water to Hann bay, which is a very fragile ecosystem that the Government of Senegal is trying to decontaminate.

Sub-component 2.3 includes wastewater collection infrastructure that will essentially protect drainage infrastructure against illegal connections. It is not intended to finance individual connections, which is usually not a problem in Greater Dakar. However, the possibility of arranging for local residents to access the sewer networks for dumping gray water will be assessed. The wastewater collection infrastructure will be connected the Hann bay treatment system that is planned to begin operation in 2018.

Social impact. The Resettlement Action Plan (RAP) for sub-component 2.3 was developed in the framework of the overall urban restructuration project in Pikine Irrégulier Sud (Cf. above). It was developed according to national

standards and in accordance with the principles of the World Bank[8]. The RAP has also been the subject of consultations with the people concerned. In the context of drainage works in Pikine Irrégulier Sud, people who need to be resettled are mostly people living in the areas to be developed as retention ponds. These basins are located on low topographic area, and are the first site to be flooded. They are therefore the most vulnerable population. The first estimate of the number of Project Affected People adds up to 700. This number was determined through extensive field survey by local authorities during the elaboration of the RAP but might be slightly modified during implementation. The most probable evolution in the number is a decrease, as people tend to leave their houses. The execution of the Pikine Irregulier Sud project RAP is currently on-going and is being subject to implementation reports elaborated by APIX.

Any person affected by the project is entitled to a compensation payment of damages incurred on the basis of a compensation matrix by type of loss, according to the Senegalese and international standards. The compensation process is monitored by the Operational Group of Dakar, whose tasks are information and sensitization of the populations affected by the project, identification, assessment and payment of compensation, and resettlement of the population. A resettlement zone covering an area of 165 ha has been built in Tivaouane Peulh, in the municipality of Rufisque. This zone of Greater Dakar is currently undergoing major urbanization, with housing being established and several resettlement projects. The plots have connection to the electricity grid, access to clean water, wastewater collection infrastructure as well as social facilities (places of worship, schools, health centers). The resettlement process is being monitored by APIX.

The RAP's budget is estimated at 6 million euros for the drainage infrastructure and will be fully financed by the Government of Senegal. Registration in the State budget of the necessary funds has been set up as a condition precedent to the disbursement of AFD fund as per the AFD-Government of Senegal financing agreement.

Gender issues. Gender equality has been integrated in the appraisal documents, the Environmental and Social Impact Assessment (ESIA) and especially in the Resettlement Action Plan (RAP).

The RAP found out that there is an important gender disparity with respect to property and land ownership. The identified assets to be lost under the project are mainly owned by men while women represent a small share of the people directly affected. Woman headed households represent 20% of the households affected and have been identified as vulnerable. According to World Bank Operating Procedure OP 4.12, an elaborate vulnerability scheme has been set up to identify vulnerable PAPs (women, children, elderly, people with disabilities, etc.) who are entitled to more comprehensive compensations and assistance throughout the resettlement process whether it is for dwellings or commercial activities that are impacted. For example, single women headed households are being given priority access to housing as well as commercial concessions.

The ESIA takes into account how the project, during its construction phase, will affect men and women in a differentiated manner, mostly because of their respective economic activity. For example, small shops and especially restaurants employ more women, while small industries and craftsmanship mostly employ men. The ESIA also recognizes gender as a factor contributing to vulnerability and the fact that flooding problems affect more vulnerable people. Flood events and lack of appropriate sanitation services have significantly more impacts on women, as they bear most of the burden of health problems caused by stagnating unhealthy water.

The Environmental and Social Management Plan contains measures such as strengthening working skills of women, aimed at increasing the project positive impacts towards women, including their access to jobs created by the projects.

More importantly, gender aspects will be dealt with specifically during project implementation. Indeed, gender issues will be included in three of the project's sub-components:

- Sub-component 1.2: Flood risk awareness campaigns will have a special focus on gender issues, to prevent specific risks on women and children. The diagnosis in terms of gender in relation to flood risk will be realized

[8] Please refer to the World Bank's Operational Policy OP 4.12 *Involuntary Resettlement* for further details on RAP methodology.

as part of the services of flood-risk awareness campaign, based on extensive field surveys, and the strategic program of the campaign will be designed accordingly.

- Sub-component 2.1: The role of women will be taken into account in the non-structural measure recommendation that will be issued in the framework of the project. Gender-specific measures will thus be issued.
- Sub-component 2.3: The Information, education and communication (IEC) services that will be financed as part of sub-component 2.3 in Pikine Irrégulier Sud will also specifically target women as they have a pivotal role in health risk prevention, waste and wastewater disposal. As described in detail in section E.5.3., the IEC services will address acceptance of the drainage and sanitation infrastructure as the options for developments around retention ponds (parks, sport facilities) that best fits the aspirations of the inhabitants of these neighborhoods.

F.4. Financial Management and Procurement

The complete financial resources of the project will be passed on to the Senegalese executing entities, as described in section C.7. The financial management and procurement on the project, including financial accounting, disbursement methods and auditing will be detailed in the financing agreement that will be finalized after the Board's approval. It will be consistent with AFD's internal procedures that have been approved through GCF's accreditation.

Procurement. All procurement related to the project's components financed or co-financed by GCF's funds will be undertaken in accordance with AFD's Procurement Guidelines[9]. The bidding process is conducted in compliance with local regulations and international good practices under the sole responsibility of the project owner. AFD is particularly vigilant about compliance with the principles of transparency and opening to competition. It requires all project stakeholders to have the highest standards in terms of ethics and social and environmental responsibility. The publication of general procurement notices by each of the public executing entity involved in the Project, as per the requirements of the Public Procurement Code, will be monitored by AFD. The publication of these notices is under the responsibility of the executing entities in application of the national legislation.

AFD consequently provides project owners with model templates and conducts controls, under the principle of subsidiarity, to ensure that the procurement process runs smoothly. In particular, according to AFD procedures, a no-objection is given by AFD at each step of the procurement procedure: procurement process, draft tender documents, technical and financial evaluations, draft contracts. International competitive bidding procedures will be used for any significant contract (for more details see accreditation application).

All financing allocated by AFD has been untied since 1st January 2002. AFD consequently finances all goods and services regardless of the country of origin of the supplier or service provider, or of the amount of the contract.

Disbursement methods. Two main disbursement methods are used in AFD-financed project: (i) direct payments made by AFD to third party contractors as well as refinancing of expenses paid by the beneficiary and (ii) payment by renewable advances.

Audits. Mid-term and final technical and financial audits will be carried out by a reputable and independent auditing firm, paid on the funds of the project. The auditing firm shall verify that all amounts drawn on the project funding have been used in accordance with the terms of the financial agreements. Renewable advances will be disbursed on a special project account held by the Ministry of Finance. Annual financial audits will have to be carried out, and the audit reports will be a condition precedent to each drawdown.

[9] The Procurement Guidelines are available online at the following address:
http://www.afd.fr/webdav/site/afd/shared/L_AFD/Opportunites_d_affaires/Directives-Passation-Marches-Etats-Etrangers-va.pdf

G.1. Risk Assessment Summary

Five risk factors have been identified for the project, graded medium to low. Appropriate mitigation measures are brought through the project.

- Risk Factor 1: operational risk on the effective change in the institutional framework of flood management.
- Risk Factor 2: financial risk on the effective availability of credits from the Government of Senegal for the resettlement sub-component.
- Risk Factor 3: financial risk on the reimbursement of the AFD loan for sub-component 2.3.
- Risk Factor 4: environmental risk on potential degradation of Hann bay, where outlets of the drainage infrastructure will be set up.
- Risk Factor 5: social risk on the implementation of the Resettlement Action Plan.

G.2. Risk Factors and Mitigation Measures

Selected Risk Factor 1

Description	Risk category	Level of risk	Probability of risk occurring
An institutional risk was identified in the implementation of the project. Indeed, most of the project is based on institutions that have been newly appointed as the lead in their field: MRUHCV for integrated flood management policy and ONAS for infrastructure construction and maintenance. Their legitimacy is crucial to the implementation of the project and coordination with other stakeholders is critical.	Technical and operational	High (>20% of project value)	Medium

Mitigation Measure(s)

The project was designed to fit the institutional strategy of the Government of Senegal in terms of flood management. The central role of ONAS in infrastructure building and maintenance was validated in the PROGEP Steering Committee that is presided by the Prime Minister's office.

Adequate coordination with all competent authorities will also be sought through the activities financed under component 4.

Selected Risk Factor 2

Description	Risk category	Level of risk	Probability of risk occurring
The resettlement of most vulnerable populations of Pikine Irrégulier Sud is critical to reach the expect outcomes of the project and constitutes a socially sensitive activity. The availability of adequate funding is of the essence.	Financial	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The entry in the State budget of the amount needed to proceed to compensation of resettled population is a condition precedent to the disbursement of the funds available under the loan facility.

Selected Risk Factor 3

Description	Risk category	Level of risk	Probability of risk occurring
Sub-component 2.3 will be in part financed by AFD by the means of a loan to the Government of Senegal. The financial risk associated to the sustainability of this debt is to be considered.	Financial	High (>20% of project value)	Low

Mitigation Measure(s)

Despite an upward trend in external debt in recent years, Senegal over-indebtedness risk remains low ("green" country) according to the latest debt viability analysis of the IMF and the World Bank updated in January 2015.The rating agency Standard & Poor's (S&P) confirmed in December 2014 the sovereign rating of Senegal to B+/B with a stable outlook, saying that Senegal suffers from low levels of income and a reduced monetary flexibility, and that the reduction of public deficits and the current account will only happen gradually. It considers, however, that the country's institutions are relatively strong compared to other countries in West Africa. Meanwhile, Moody's assesses the same rating to B1, with a stable outlook. As a lender to the Republic of Senegal, AFD will monitor continually its risk rating.

Selected Risk Factor 4

Description	Risk category	Level of risk	Probability of risk occurring
Sub-component 2.3 has potential negative environmental impact, as the outflow of the drainage infrastructure is bound to be delivered on Hann bay, which is a fragile ecosystem that the Government of Senegal is struggling to decontaminate – with the technical and financial support of AFD. Intrusion of wastewater or solid waste in the outflow would be harmful to the ecological state of the bay.	Social and environmental	High (>20% of project value)	Medium

Mitigation Measure(s)

The Hann bay is situated in Dakar and presently is in a disastrous ecological state due to disposal of untreated domestic and industrial wastewater. The Government of Senegal has been working on decontaminating this bay for years and is about start with the technical and financial support of AFD, works to set up wastewater collection and treatment in Hann bay.

The wastewater activity of sub-component 2.3 aims at giving access to the wastewater collection infrastructure to the population of Pikine Irrégulier Sud in the most strategic areas to ensure protection of the rainwater drainage infrastructure. Moreover, solid waste intrusion in the drain channels is deemed to be low, because channels are buried and entrances are closed with grates.

Selected Risk Factor 5

Description	Risk category	Level of risk	Probability of risk occurring

A risk is identified for Sub-component 2.3 in the field of social safeguards as many poor people have built their houses or conduct their economic activity in the highly vulnerable low-lying areas and they will have to be relocated. The estimate at this stage of the project is 700 Project Affected Persons.	Social and environmental	High (>20% of project value)	Medium
Mitigation Measure(s)			
The Resettlement Action Plan (RAP) of the drainage infrastructure in Pikine is a part of the project in its own right, to protect the inhabitants of the most vulnerable areas. The RAP was elaborated according to the guidelines of the Operational Policy OP 4.12 *Involuntary Resettlement* of the World Bank. It will be financed by the Government of Senegal. The executing agencies APIX is experienced in implementation of such RAP and a close monitoring of the advances of the resettlement will be done by AFD. Resettlement action on the field will be led by a NGO, along with *Fondation droit à la ville,* which is the main operator of curative urban intervention in Senegal. A resettlement zone has been developed in the outskirts of Dakar to offer a possible alternative for displaced populations.			

H.1. Logic Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level

Paradigm shift objectives	
Increased climate-resilient sustainable development	The project aims at reducing the vulnerability of the population of Senegal to flood risks that are expected to rise with the effects of climate change and increasing urbanization. While financing most urgent investment in infrastructure, it will help the Government of Senegal in flood management policy-making by (i) building knowledge on the actual and projected risk, (ii) recommending alternative solutions to costly hard-engineered solutions and integrating flood risk to urban planning, (iii) optimizing management of existing and future infrastructure and (iv) ensuring mainstreaming of integrated flood management in the governance of the sector.

Expected Result	**Indicator**	**Means of Verification (MoV)**	**Baseline**	**Target**		**Assumptions**
				Mid-term (if applicable)	Final	
Fund-level impacts						
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	Change in expected losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters	CNGI annual reports	0		apprx 8 000 000 $ per year	Recommendations as to structural and non-structural measures and protocols are implemented
A3.0 Increased resilience of intrastructure and the built environment to climate change	Number and value of physical assets made more resilient to climate variability and change, considering human benefits	CNGI annual reports	0		apprx 8 000 000 $ per year	Recommendations as to structural and non-structural measures and protocols are implemented

H.1.2. Outcomes, Outputs, Activities and Inputs at Project level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project outcomes	**Outcomes that contribute to Fund-level impacts**					
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation	Urban planning documents taking into account flood risk	0		6	Adequate enforcement of the urban planning documents
A6.0 Increased generation and use of climate information in decision-making	Use of climate information products/services in decision-making in climate-sensitive sectors	CNGI annual reports	0		4/year or 20 total (CNGI meetings)	Adequate communication and availability of flood risk information and data
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	Total geographic coverage of climate-related early warning systems and other risk reduction measures established/strengthened	ANACIM reports	0		550km^2	Coordination between ANACIM and ONAS
A8.0 Strengthened awareness of climate threats and risk-reduction processes	Number of males and females made aware of climate threats and related appropriate responses	Awareness campaign reports	0		500000	N/A

	Including female ratio				50%	
Project outputs	**Outputs that contribute to outcomes**					
1. The knowledge of flood risk in Senegal has been enhanced, mapped, and made publicly available.	Number of urban centers with publicly accessible detailed GIS on flood risk Number of people that has been made aware of flood risk Including female ratio	PMA report Awareness campaign reports	0 0		6 500000 50%	Adequate communication and availability of flood risk information and data N/A
2. Risk has been reduced in Pikine Irrégulier Sud and tools are available to reduce the risk at national scale in a cost-effective and efficient manner.	Number of people who benefit from risk reduction measures Female ratio of people that has been consulted through IEC services Number of flood risk assessment developed and used Meters of drainage system installed in Pikine Irrégulier Sud	CNGI annual reports ONAS evaluation reports APIX evaluation reports PMA reports	0		200000 50% 1.000.000Total 20000	The infrastructure is respected and duly maintained

3. Hazard monitoring and response have been developed to enhance existing drainage infrastructure operations.	Surface covered by real-time hazard monitoring Number of preventive actions led by ONAS based on meteorological alert.	ANACIM reports ONAS reports	0		550km^2 25	The equipment is duly installed and maintained Communication between monitoring and operator is operational
4. Stakeholders of flood management policy-making work together in an efficient and coordinated manner	Coordination meetings with all stakeholders that take into consideration policy-making decisions on flood management	CNGI annual reports	0		4/year (CNGI meetings)	Political support to decision taken in the CNGI

Activities	**Description**	**Outputs**	**Assumptions**
1.1 Mapping flood risk at national and local levels	See section C.3	Flood risk GIS	Existing studies and data are made available Funds are sufficient to operate, maintain and make publicly available GIS data
1.2. Population and institutions awareness raising	See section C.3	Awareness-raising campaign	Action is taken on the information provided
2.1 Recommendations for structural and non-structural measures	See section C.3	Regulatory recommendations – Guidebooks – Proposition of incentives	Recommendations are followed and incentives are efficiently implemented
2.2 Processing flood risk information for infrastructure planning and design	See section C.3	Investment plans – Models – Protocols – Training programs – Communication program	Tools are made available and used by stakeholders for planning and designing infrastructure

2.3 Construction of drainage and sanitation infrastructure in Pikine Irrégulier Sud	See section C.3	Drainage infrastructure – Sanitation infrastructure – Training programs – IEC campaign	Delivery of necessary permits People accept to be resettled The infrastructure is respected and duly maintained
3.1 Setting-up real time hazard monitoring in Greater Dakar	See section C.3	Monitoring equipment and software – Forecasting models – Training programs	Information on existing equipment and protocols is provided Sufficient resource to operate and maintain the equipment
3.2 Elaboration of operational protocols and guidelines for preventive action on drainage infrastructure	See section C.3	Protocols – Training programs	Information on existing protocols is provided Protocols are followed by the drainage infrastructure operator
4.1 Support to coordination and policy-making	See section C.3	Decisions of the Technical Committee – Decisions of the CNGI – Communication strategy	Outputs of the project are presented to CNGI
4.2 Institutional consolidation and capacity building	See section C.3	Institutional diagnostic – Training program	Existing studies and data are made available Recommendations are implemented
4.3 Supporting executing entities for project implementation	See section C.3	Tender documents – Evaluation reports – Validation of products	Conformity of procurement process

H.2. Arrangements for Monitoring, Reporting and Evaluation

This section reflects the monitoring and accountability framework that was approved by the Board in the decision B11/10. It is subject to the Accreditation Master Agreement (AMA) that is still on negotiation and to the Funded Activity Agreement (FAA) that will be signed by AFD and the GCF.

1. DURING THE PROJECT IMPLEMENTATION PERIOD

Continuous monitoring. To monitor the progress of the Project in achieving the planned outcome and outputs, the Project Management Assistance (PMA) will establish and maintain a project performance management framework, which will be designed to permit adequate flexibility to adopt remedial action regarding project design, schedules, activities, and development impacts.

PMA will refine the monitoring framework, confirm achievable targets, firm up monitoring and recording arrangements, and establish systems and procedures no later than six months after project implementation begins. Baseline and progress data will be reported at the requisite time intervals by the executing entities to PMA. PMA will be responsible for analyzing and consolidating the reported data, and for reporting the outcome to AFD through the quarterly progress reports. Moreover, progress reports will be presented to the CNDI, which gathers all pertinent authorities on flood risk management in Senegal. Based on this information, the PMA will elaborate on a yearly basis an annual performance report (APR) which will include indicators progress reports, implementation issues, financial management data that include dates and amounts disbursed for each funded activity and compliance with financial covenants and updates procurement plan.

During the whole implementation period, AFD will lead a continuous monitoring of project activities led by the executing agencies. The project will be supervised on day to day basis by the local AFD Office that is in continuous and close dialogue with the implementing entities. The project manager, based at AFD's Headquarters, will lead supervision missions at least on a half-yearly basis to monitor progress in the implementation of the project, compliance with project agreements and financial covenants and make necessary adjustments in its organization, budget or implementing arrangement.

Mid-term review. A midterm review will be conducted within two and half years of project being effective and shall include a review on institutional, technical, environmental, social, economic and financial issues, assessment on the performance of the funded activity against the GCF investment criteria and assess, as the case may be, the need to restructure the project. The outcome of the midterm review will be incorporated as recommendations for improving the implementation during the second half of the project's duration.

Final review. Within 6 months of the closing of the project, the Technical Committee will submit a project completion report to AFD that includes evaluation of outcome an impact indicators and assessment based on the 6 GCF investment criteria.

2. DURING THE POST IMPLEMENTATION PERIOD

Two or three years after the closing of the project, an independent evaluation is made by a consultancy firm. If the AFD Evaluation Department selects the project an impact assessment would be conducted by a consultancy firm with the support of the local agency.

3. COMMUNICATION STRATEGY

Within the communication strategy of the project (related to both institutional and awareness campaigns issues), AFD shall ensure that the visibility of the GCF contribution is guaranteed.

I. Supporting Documents for Funding Proposal

☐	NDA No-objection Letter (expected)
☒	Feasibility Study
☐	Integrated Financial Model that provides sensitivity analysis of critical elements (xls format)
☒	Confirmation letter or letter of commitment for co-financing commitment
☐	Term Sheet
☒	Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan
☒	Appraisal Report or Due Diligence Report with recommendations
☐	Evaluation Report of the baseline project
☒	Map indicating the location of the project
☒	Timetable of project implementation
☐	Project confirmation (see the template in Annex I to the Accreditation Master Agreement)

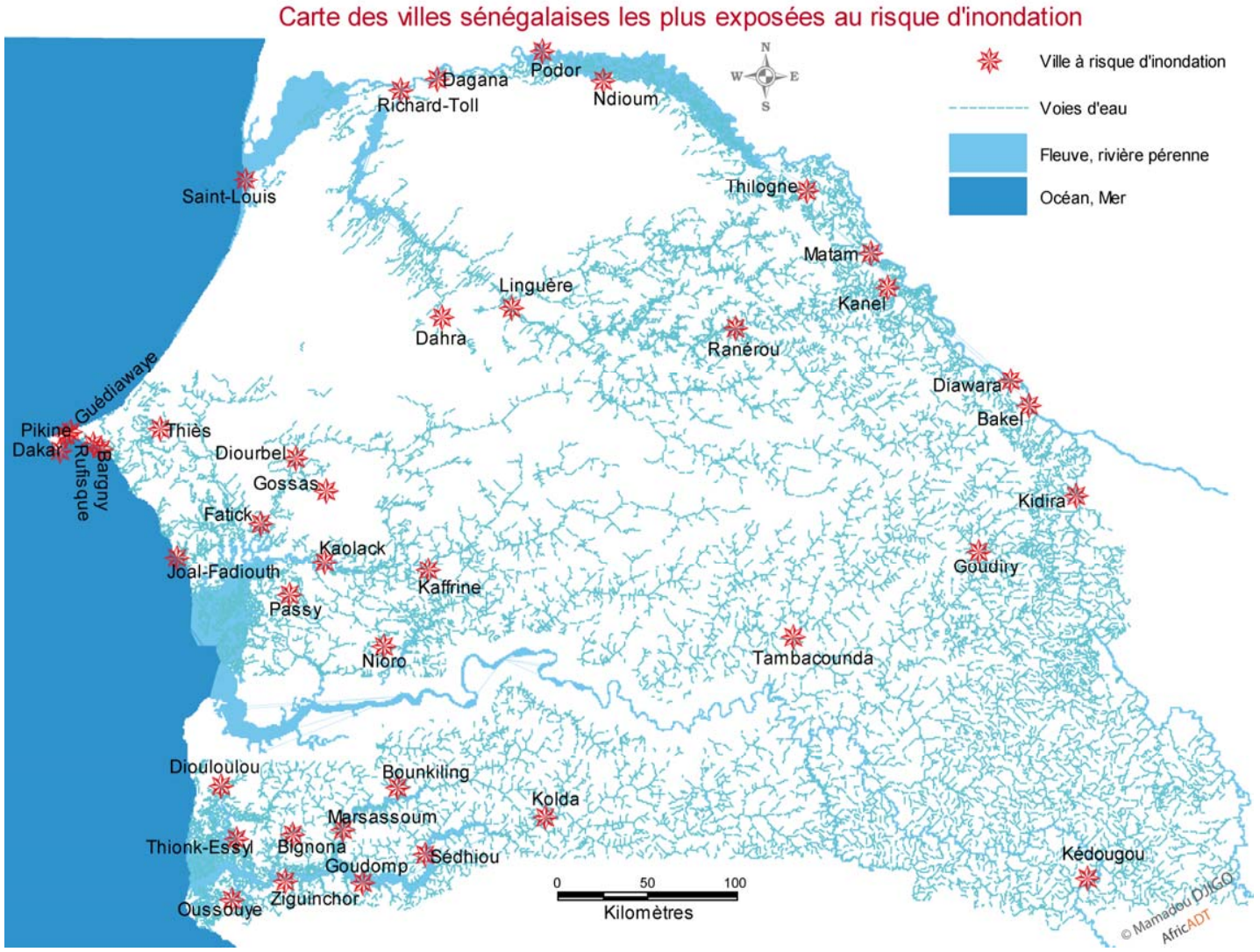


Figure 2 - Map of flood-prone urban centers in Senegal

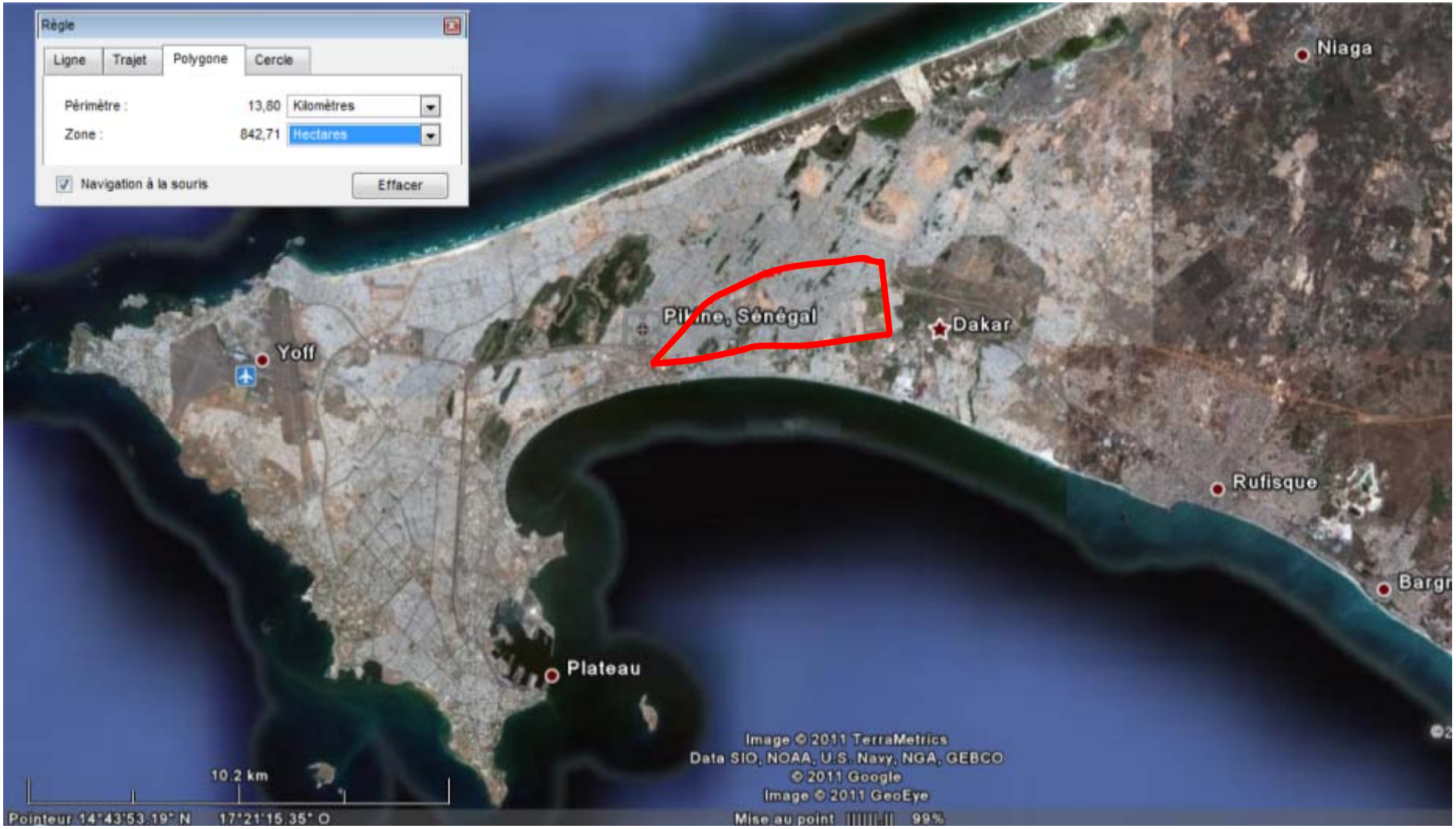


Figure 3 - Situation of Pikine Irrégulier Sud

République du Sénégal
Un Peuple – Un But – Une Foi

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MINISTERE DE L'ENVIRONNEMENT
DEVELOPPEMENT DURABLE

.....

DIRECTION DE L'ENVIRONNEMENT

ET DES ETABLISSEMENT CLASSES

To: The Green Climate Fund ("GCF")

Dakar, le 15 Janvier 2016

Re: Funding proposal for the GCF by "Agence Francaise de Développement" regarding "Senegal Integrated Urban Flood Management Project"

Dear Madam, Sir,

We refer to the project "**Senegal Integrated Urban Flood Management** " in **Senegal** as included in the funding proposal submitted by Agence Francaise de Développement Entity to us on 27 November 2015.

The undersigned is the duly authorized representative of NDA of Senegal.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the project "Senegal Integrated Urban Flood Management" as included in the funding proposal.

By communicating our no-objection, it is implied that:

The government of Senegal has no-objection to the project "Senegal Integrated Urban Flood Management" .

(a) as included in the funding proposal;
(b) The project "Senegal Integrated Urban Flood Management " as included in the funding proposal is in conformity with Senegal's national priorities, strategies and plans;
(c) In accordance with the GCF's environmental and social safeguards, the project" Senegal Integrated Urban Flood Management " as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the project "Senegal Integrated Urban Flood Management" as included in the funding proposal has been duly followed.

We also confirm that our no-objection applies to all projects or activities to be implemented within the scope of the programme.

We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,

Name: **Madeleine Diouf SARR**

Title: **Green Climate Fund DNA/Senegal**

Environmental and social report(s) disclosure

Basic project/programme information	
Project/programme title	SENEGAL INTEGRATED URBAN FLOOD MANAGEMENT PROGRAM
Accredited entity	AFD
Environmental and social safeguards (ESS) category	Category A
Environmental and Social Impact Assessment (ESIA) (if applicable)	
Date of disclosure on accredited entity's website	2016-04-07
Language(s) of disclosure	FRENCH (2016-01-26) and ENGLISH (2016-04-07)
Link to disclosure	http://www.afd.fr/base-projets/downloadDocument.action?idDocument=2241
Other link(English)	http://www.afd.fr/base-projets/downloadDocument.action?idDocument=2311
Page link	http://www.afd.fr/base-projets/consulterProjet.action?idProjet=CSN1405
Environmental and Social Impact Assessment (ESMP) (if applicable)	
Date of disclosure on accredited entity's website	2016-04-07
Language(s) of disclosure	FRENCH (2016-01-26) and ENGLISH (2016-04-07)
Link to disclosure	http://www.afd.fr/base-projets/downloadDocument.action?idDocument=2241
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Page link	http://www.afd.fr/base-projets/consulterProjet.action?idProjet=CSN1405
Resettlement Action Plan (RAP) (if applicable)	
Date of disclosure on accredited entity's website	2016-04-07
Language(s) of disclosure	FRENCH (2016-01-26) and ENGLISH (2016-04-07)
Link to disclosure	http://www.afd.fr/base-projets/downloadDocument.action?idDocument=2240
Other link(English)	http://www.afd.fr/base-projets/downloadDocument.action?idDocument=2312
Page link	http://www.afd.fr/base-projets/consulterProjet.action?idProjet=CSN1405
Any other relevant ESS reports and/or disclosures (if applicable)	
Description of report/disclosure	The same documents as above were also published by APIX (Senegal, one of the executing entities) at the following links
Date of disclosure	2016-02-03
Language(s) of disclosure	FRENCH (2016-02-03) and ENGLISH (2016-06-16)

French	http://autoroutedakardiamniadio.net/sites/default/files/download/PAR%20Restructuration%20de%20PIS_Studi%200313%201-2mini.pdf http://autoroutedakardiamniadio.net/sites/default/files/download/PAR%20Restructuration%20de%20PIS_Studi%200313%202-2mini.pdf http://autoroutedakardiamniadio.net/sites/default/files/download/EIES%20PIS%20partie%201.pdf http://autoroutedakardiamniadio.net/sites/default/files/download/EIES%20PIS%20partie%202.pdf
English	http://autoroutedakardiamniadio.net/sites/default/files/download/20160406_CSN1405_esia_pikine_irregulier_sud_en_final_anglais_opt.pdf http://autoroutedakardiamniadio.net/sites/default/files/download/20160406_CSN1405_rap_pikine_irregulier_sud_en_final_anglais_opt.pdf