



# PROMOTING NECESSARY REFORMS TO ENSURE THE SUSTAINABLE OPERATION AND MAINTENANCE OF DRAINAGE SYSTEMS

The proper functioning of the drainage system carried out as part of the Stormwater Management and Climate Change Adaptation Project (PROGEP) depends on regular maintenance. The project therefore included reflections on the institutional and financial reforms of the urban stormwater drainage sector, necessary to ensure the sustainability of the facilities built in the cities of Pikine and Guédiawaye.

## ■ BACKGROUND

In Senegal, the institutional framework for stormwater management is characterized by the existence of several actors involved in the planning, implementation, operation and maintenance of sanitation infrastructure. The main sectoral ministries concerned with stormwater management include the ministries responsible for urban planning, interior, decentralization, housing, water, urban sanitation and the environment. Municipalities and some agencies are also involved in this sector.

At the start of the Stormwater Management and Adaptation to Climate Change Project (PROGEP), the roles and responsibilities of each of the institutional actors mentioned above were not clearly defined. Likewise, no lead agency was designated to ensure harmonization and coordination of interventions. Only a National Flood Protection Committee, established in 2010, existed to guide and coordinate the implementation of activities. The works were often carried out without clearly defining the methods of their operation, the choice of structure and the financial resources necessary for their proper functioning.

Within the framework of PROGEP, the various works carried out mainly consisted of (i) primary large section channels, both open and covered, in reinforced concrete and masonry perimeter walls, (ii) secondary collectors in PVC, (iii) fenced, and lit rain overflow basins equipped with guard boxes and wall-walks, (iv) special structures for evacuating water to the sea, (v) primary and secondary pumping stations, (vi) sanitized and lit interlocking paved roads, and (vii) landscaping around the ponds, through Community Investment Projects (PICs), etc. This important infrastructure has contributed significantly to the flood control of the cities of Pikine and Guédiawaye.

However, it is important to stress that the sustainability and proper functioning of these drainage and flood protection works depend, in large part, on the arrangements put in place to ensure their operation and maintenance, particularly after the project is completed. It is therefore necessary and urgent to design and establish an efficient management strategy and viable mechanisms to finance the corresponding expenditure.



*Before PROGEP's intervention, the roles and responsibilities of urban stormwater drainage stakeholders were not clearly defined. This situation reduced the effectiveness of interventions in climate risk management. The photo illustrates the severity of the flooding in Dalifort-Foirail, prior to the project's intervention.*

## DESCRIPTION OF THE INTERVENTION

In order to guarantee the sustainability and proper functioning of the drainage and flood protection facilities built under PROGEP, the Municipal Development Agency (ADM) had, from the beginning of the project's implementation in 2013, launched a diagnostic study on *"the institutional and financial aspects of stormwater management in urban environments, institutional and financial viability"*.

This diagnosis led to the following proposals: (i) the creation of a management and operational mechanism and (ii) the establishment of viable mechanisms to finance the maintenance of drainage systems in peri-urban Dakar. These proposals resulted in two complementary studies to clarify the roles and responsibilities of stakeholders in the urban stormwater drainage sector, on the one hand, and to set up a rainwater sanitation fund, on the other hand. The validation of the results of these studies by all stakeholders in the sector made it possible to establish an action plan defining the methods and process to be adopted to ensure the sustainability and durability, among other things, of the works carried out within the framework of PROGEP.

As the National Office for Sanitation of Senegal (ONAS) is the main entity mandated by the Government with regard to sanitation, ADM has, through PROGEP, signed a partnership agreement with this office in order to contribute to the reinforcement of its human, material and financial capacities for the proper performance of its missions.

In the same vein, ADM has established, through city contracts, a partnership with the cities of Pikine and Guédiawaye, with the aim, among others, of promoting their involvement in the maintenance and management of the facilities.

Thus, taking into account the insufficient resources available to these territorial authorities and ONAS, PROGEP has covered the costs inherent in the maintenance of the drainage system since PROGEP's inception. At the same time, it financed a program to strengthen ONAS' technical and logistical capacities and also supported it in the implementation of the action plan resulting from the above-mentioned institutional studies. Accordingly, as provided for in the relevant legal agreements, the required conditions should be met so that ONAS can integrate the facilities into its assets and be in a position, at the end of the project, to ensure their technical and financial maintenance.

## ACHIEVEMENTS



### STRATEGIC STUDIES AND KNOWLEDGE PRODUCTION



Study of the institutional and financial aspects of urban stormwater management



Study for the establishment of a rainwater sanitation fund



Study to clarify the roles and responsibilities of stakeholders in the urban stormwater sector



Update of the ONAS asset inventory for the determination of management costs (operation and maintenance) of drainage systems



### MAINTENANCE OF THE STRUCTURES



Maintenance, since the start of PROGEP, of a 22 km linear drainage network by a specialized company hired for this purpose



### CAPACITY BUILDING OF ONAS



Implementation of a 7-module program that trained 71 ONAS staff in the management of drainage systems



Acquisition of logistical resources (pickup vehicles, etc.)

Promoting necessary reforms to ensure the sustainable operation and maintenance of drainage systems

## ■ RESULTING CHANGES

### Structural reform of the urban drainage system

Before the introduction of PROGEP, a multitude of actors were often involved in the management of stormwater drainage, without consultation or coordination. These are mainly the Government and the municipalities through their own budgets or through projects and programs financed with the assistance of technical and financial partners. In addition to these institutional actors, there are also populations generally organized in non-governmental organizations (NGOs) and community based organizations (CBOs), such as neighborhood committees, sports and cultural associations (CSAs), and so on.

The strategic studies carried out within the framework of PROGEP have made it possible to build a consensus around ONAS' position as the main operational entity of the stormwater drainage system at the national level; this is intended to facilitate the coordination of interventions, to have less confusion between the mandates of the actors and to clearly define their responsibilities. This clarification of roles and responsibilities has enabled the communities to identify the different stakeholders in the management of the facilities, thus helping to strengthen their monitoring and involvement capacities.

### Clear proposal to finance stormwater drainage

PROGEP made it possible to carry out an in-depth study and relevant proposals for the establishment of an in-

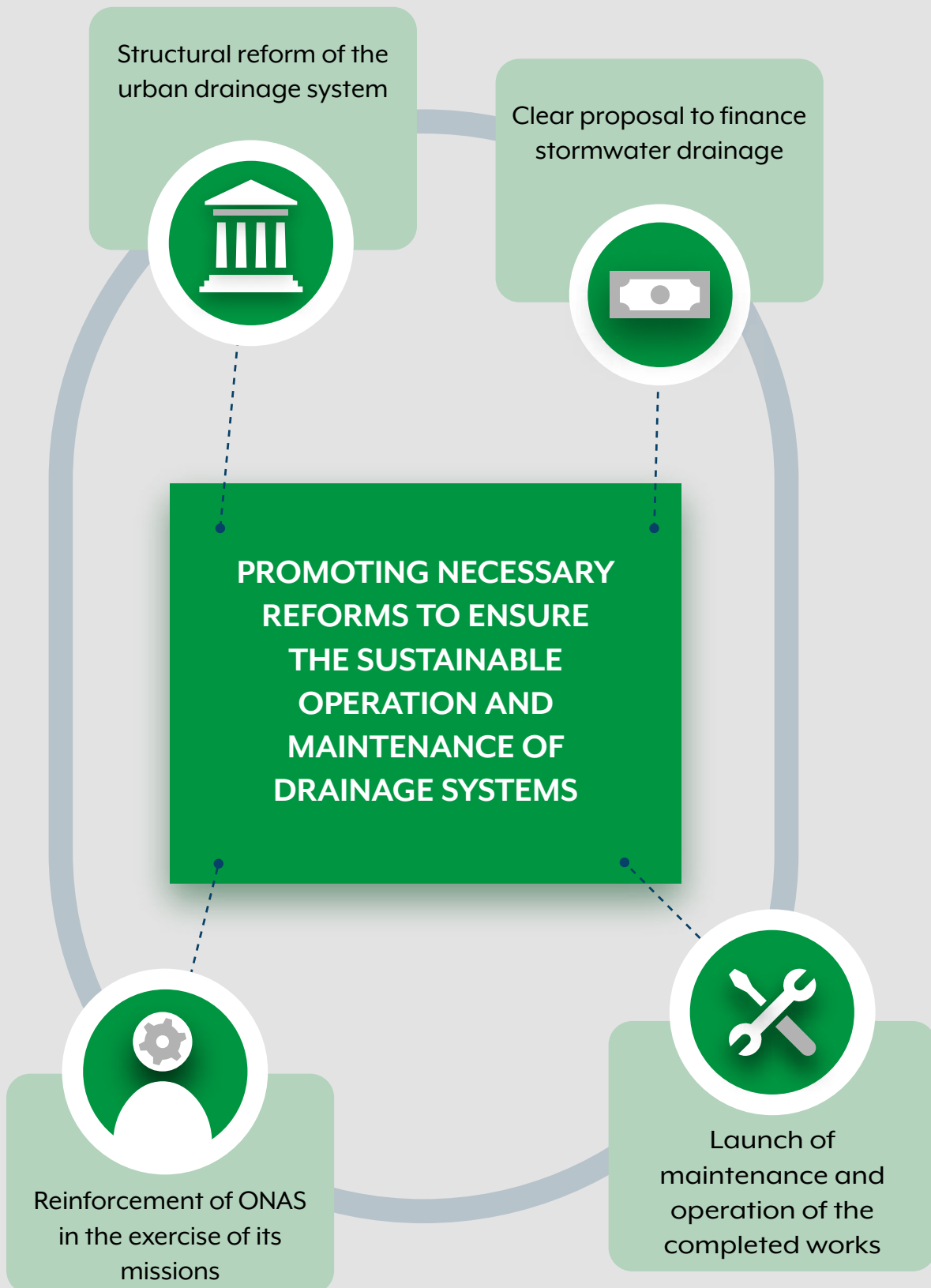
stitutional and financial mechanism guaranteeing the management and maintenance of drainage systems. This system should also ensure the viability and sustainability of the infrastructures built as part of the project. Thus, in the report, the elements to address this concern were indicated. It was therefore up to the ministry in charge of sanitation to then carry out the necessary reforms to this end.

### Reinforcement of ONAS in the exercise of its missions

PROGEP has contributed to strengthening ONAS' role and capacities through: (i) the consensus created around its central position in stormwater drainage management; (ii) the strengthening of the technical and logistical skills of its teams, with a view to the creation, within its framework, of a department specialized in stormwater management; and (iii) the updating of the inventory of its fixed assets in the Dakar region, to better assess the operating and maintenance requirements of sanitation systems.

### Launch of maintenance and operation of the completed works

Pending the final incorporation of the works completed into ONAS' assets and the effective establishment of a rainwater sanitation fund, PROGEP has regularly covered the costs of maintaining the facilities completed since their final reception.





# REINFORCE THE EFFECTIVENESS OF STORMWATER DRAINAGE INTERVENTIONS

## Study to clarify the roles and responsibilities of stakeholders in the urban stormwater sector

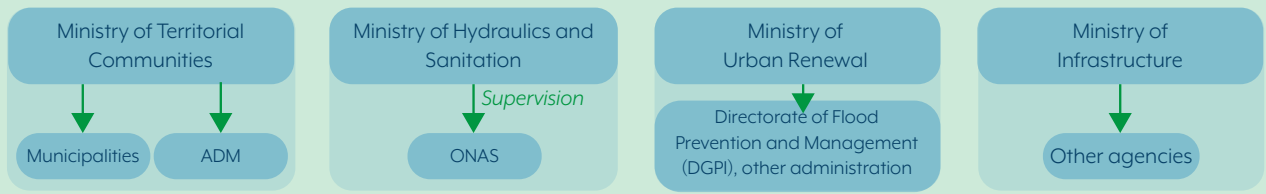
To better guarantee the sustainability and proper functioning of drainage and flood protection facilities, it was deemed necessary to set up an effective management and operating system. To this end, in 2014, ADM carried out a study to clarify the roles and responsibilities of the actors involved in the field and proposed the operating procedures of the system.

This study made it possible to recall that stormwater transport and storage facilities are part of the Government's property. It is therefore responsible for their care, maintenance and renewal. In this context, the Government, after a detailed inventory of all drainage infrastructures, must proceed, through a concession or any other type of legal arrangement of its choice, to transfer their management to a specialized operational entity, which

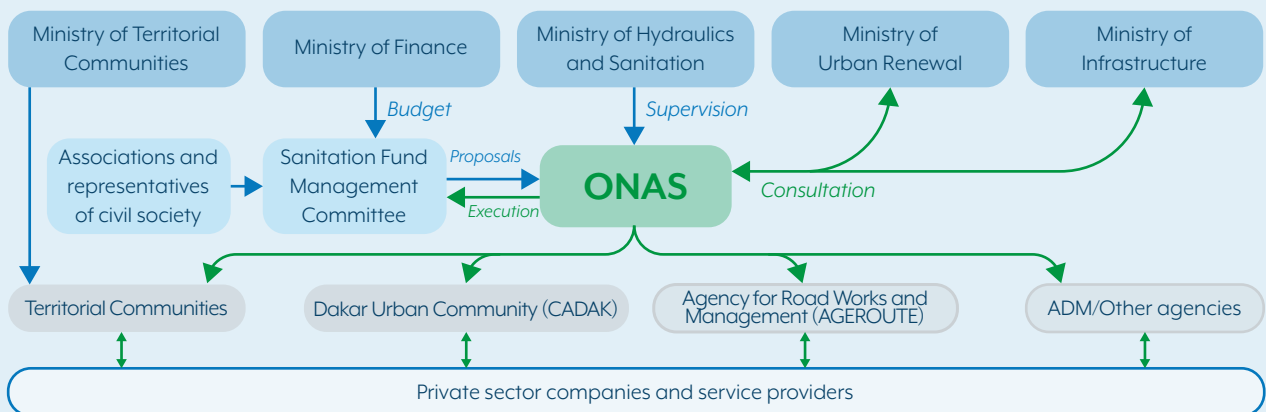
it must provide with the necessary financial resources for this purpose.

After proposing different institutional options, this study recommended that ONAS, through a new department specializing in stormwater management, should be the main body designated for this purpose. As such, ONAS should be responsible both for the design and implementation as the contracting authority of the study and construction contracts, as well as for the operation and maintenance carried out on a direct labor or sub-contracted basis. The other major recommendation of this study is that ONAS should be able to coordinate the stormwater drainage sector, through a management committee of the rainwater sanitation fund, which should include all the institutions involved in drainage.

### MULTI-ACTOR SECTORAL MANAGEMENT SYSTEM



### SYSTEM ORIENTED AROUND A STRONG CENTRAL ACTOR



*Schematic diagram<sup>1</sup> of the transition from the current multi-stakeholder drainage management system to a system oriented around a strong central actor (ONAS) recommended in 2014, by the study to clarify the roles and responsibilities of stakeholders in the stormwater drainage sector in an urban environment*

<sup>1</sup> The diagram is extracted from "Study to clarify the roles and responsibilities of stakeholders in the urban stormwater sector", ADM, 2014 (In French). The reference situation is 2014.



## A TARGETED TRAINING PROGRAM TO STRENGTHEN THE CAPACITY OF THE ONAS TO OPERATE AND MAINTAIN STORMWATER DRAINAGE AND STORAGE FACILITIES

The operation and maintenance of the works carried out under PROGEP require certain specific skills, some of which were not available within ONAS. The capacity building needs were therefore identified by the office and resulted in an ad hoc training program to address this weakness. This program consisted of the following seven (7) training modules:

1. Integrated stormwater management
2. Diagnosis, scaling and modelling of stormwater networks and facilities
3. Diagnosis of sanitation networks and master plan
4. Operation of sanitation networks

5. Rehabilitation of sanitation networks that cannot be visited
6. Contractual relationships in stormwater infrastructure management
7. Digital communication

At the end of the execution of this program, 71 ONAS agents were trained on the different modules, organized, in large part, by the International Office for Water, via the National Training Center for Water Professions at its two sites in Limoges and La Souterraine.

This training program was carried out at a total cost of one hundred and seventeen million seven hundred thousand (117,700,000) FCFA.



### Moussa NDIAYE

Head of the Support and Technical Control Department of the National Office for Sanitation of Senegal (ONAS)



*ONAS has been designated as the lead agency for the management of activities related to the operation and maintenance of infrastructure.*

*If ADM, as an implementing agency, has completed the PROGEP's works, it is then up to ONAS, in accordance with its missions and the related institutional arrangements, to incorporate them into its assets and ensure their management. We have proven technical skills that have been further strengthened under PROGEP.*

*But to ensure this work, ONAS must have additional material, human and financial resources at its disposal. A rainwater sanitation fund would ensure this regular care. However, it should be noted that the process to establish this fund has not yet been completed, as the decree authorizing its creation has not yet been signed. Thus, it will be necessary to find other solutions to mobilize the necessary resources for the maintenance of the facilities, otherwise the maintenance will be partial or, quite simply, not carried out."*

## ■ LESSONS LEARNT

### Need proven skills for the maintenance of the drainage system

The proper management of the drainage network set up by PROGEP requires proven experience of the staff assigned to this task. Their skills are mobilized, for example, for operations relating to specific operations of certain mechanisms (gates, valves, etc.), the management of special facilities for discharging into the sea, the monitoring of groundwater fluctuations, coordination with meteorological services to better anticipate extreme events (rain or sea), etc.

### Beyond the consensus, a strong will is needed to implement the institutional and financial management of the drainage system

The creation of an important financial tool such as a rainwater sanitation fund can only be envisaged around a strong consensus on the part of all institutional and technical actors. Thus, the commitment of the ministries responsible for water and sanitation management is essential to finalize the process of setting up a fund to guarantee the sustainability of the investments made.



*The proper functioning of the facilities built under the PROGEP requires specialized, coordinated and regular maintenance. Technical, human and financial resources must be available to avoid negative social, economic and environmental consequences. In the photo, members of the PROGEP team evaluate the condition of the check valves on one of the 3 completed ocean disposal structures.*





*A drainage channel, at Dalifort-Foirail, allowing rainwater to flow towards the sea.*



## **GUARANTEE THE PROPER FUNCTIONING OF THE STRUCTURES THROUGH REGULAR MAINTENANCE**

The drainage systems built through PROGEP are exposed to a large number of phenomena that can reduce their drainage capacity, cause water overflows, hinder their optimal functioning and degrade the health of neighboring inhabited areas. These phenomena could result from the obstruction of collectors by solid waste, silting, the accumulation of sediments that can favor the proliferation of aquatic plants, the degradation of erosion protection slopes, etc. The maintenance and upkeep of the drainage system necessary to avoid these major problems can be broken down into five main areas: (i) monitoring the management and regulation of the entire system; (ii) maintenance of ditches, open or closed channels, as well as underground collectors; (iii) maintenance of natural or artificial storage ponds; (iv) pumping stations; (v) and sea disposal facilities, with their specific equipment. Currently, to carry out these maintenance tasks and ensure the proper functioning of the system, ONAS is working on a contract of one hundred and forty-one million six hundred (141,600,000) FCFA for 22 km of network, financed with funds from PROGEP.



## Momou Fall

Municipal Counselor and Vice-President of the Commission for Living and Environment of the municipality of Wakhinane Nimzatt



*The work of PROGEP has made it possible to solve the problem of flooding in the neighborhoods of our municipality. But the end of PROGEP is approaching and we are concerned. We are aware that, without regular maintenance, these facilities will inevitably deteriorate. If the facilities do not work properly, our communities will again be at risk of flooding.*

*In our municipality, we have set up Local Committees for Stormwater Management and Climate Change Adaptation Initiatives (COLIGEPs<sup>2</sup>). We provide grassroots organizations with small logistical resources to ensure the cleaning*

*of the ponds and canals and motivate them to ensure the proper functioning of the drainage system. But we have to admit that this mobilization is insufficient and we do not have the necessary technical and financial skills and resources to effectively manage network maintenance.*

*Within the framework of PROGEP, ONAS has been designated as the body responsible for carrying out the maintenance of the facilities. We hope that it will be equipped with sufficient means and capacities to ensure the sustainability and proper functioning of the drainage system."*

<sup>1</sup> See Capitalization Brief " Promoting community engagement to support the resilience of local populations and the preservation of drainage systems"



*The awareness-raising activities of COLIGEP members and the clean-up activities around the ponds and canals they coordinate will not be sufficient to avoid the degradation of these achievements in the long term.*

## ■ FUTURE PROSPECTS

### A pilot action with a national vision

The stormwater drainage sector is of interest to all localities in Senegal affected by the floods. The operational and financial approach adopted by PROGEP will serve as a pilot experiment to effectively combat these floods in Senegal. The institutional aspects addressed have a scope that goes beyond the intervention area and can be replicated and adapted at the national and sectoral level.

### Towards the establishment of a rainwater sanitation fund and a fund management committee

The recognition of ONAS as the main entity in the sector of drainage helps the management and decision-making process. However, it is necessary for this body to have sufficient technical and financial resources to be able to carry out its tasks properly. The establishment of a rainwater sanitation fund or other similar mech-

anism should ensure that ONAS has the necessary resources available for this purpose. As proposed in the study, the creation and management, at the same time, of a committee to manage the fund could enable the sector's stakeholders to benefit from a more appropriate consultation framework.

### Without an institutional and financial mechanism to ensure their maintenance, the works are in danger

The activities carried out within the framework of PROGEP have made it possible to build a consensus on the methods required to ensure the maintenance of the works carried out, after the project has been completed. The delay in the implementation of this system jeopardizes the proper functioning of the drainage network in the medium and long term. All of the necessary measures must be taken to mitigate this risk, which has considerable social, economic and environmental consequences.



*Without maintenance and care, the works carried out are exposed to the risk of rapid deterioration. In the photo, waste accumulation at the entrance to the Dalifort-Foirail retention pond.*



## REFERENCES

- Study of the institutional and financial aspects of urban stormwater management, ADM, 2013 (In French)
- Study to clarify the roles and responsibilities of stakeholders in the urban stormwater sector, ADM, 2014 (In French)
- Study for the establishment of a rainwater sanitation fund, ADM, 2014 (In French)
- Fact sheet "Clarification of the roles and responsibilities of stakeholders in the stormwater drainage sector", ADM, 2019 (In French)
- Fact sheet "Training session - Operation, management, maintenance and servicing of PROGEP equipment and works", ADM, 2019 (In French)

### Stormwater Management and Climate Change Adaptation Project (PROGEP)

The Stormwater Management and Climate Change Adaptation Project, PROGEP, implemented by the Municipal Development Agency (ADM), is a component of the Ten-year Flood Control Plan (PDLI). It is funded by the Government of Senegal, with technical and financial support from the World Bank, the Global Environment Fund (GEF) and the Nordic Development Fund for a total of USD 121.3 million (FCFA 60.65 billion).

This urban development project implemented over seven years (2012-2019) was aimed at reducing flood risks in Dakar's peri-urban area (Pikine and Guediawaye) and at promoting sustainable city management practices in selected urban areas (Saint-Louis and Diamniadio). It sought to find sustainable solutions using an integrated approach based on a combination of infrastructural and non-infrastructural interventions.

### The Municipal Development Agency (ADM)

ADM, the agency responsible for coordinating the implementation of the Stormwater Management and Climate Change Adaptation Project (PROGEP), was established in 1997 thanks to combined efforts of the Government and the Mayors Association of Senegal, AMS. The agency was established in the context of 1996 reforms, referred to as the "regionalization" reforms, aimed at reinforcing decentralization and local development in Senegal. As a key partner to local

authorities, and in accordance with its Strategic Plan, ADM works to make local regions more attractive and competitive and to strengthen their governance. To this end, the agency contributes to building strategic, financial, administrative and technical capacities of local authorities. ADM helps authorities manage territorial information, facilitates cooperation between local authorities, and promotes inter-communality.

*This publication is part of a series of briefs that capitalize the achievements of and lessons learned from the implementation of the PROGEP project. This capitalization brief, as well as the publications cited, can be accessed at: [www.adm.sn/progep](http://www.adm.sn/progep)*