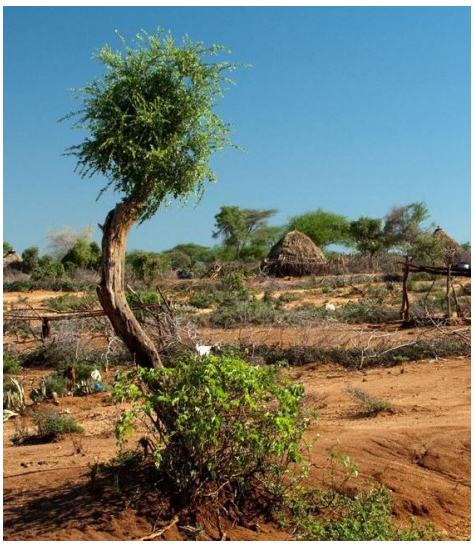
PROSPECTIVE STUDY OF THE IMPACTS OF CLIMATE CHANGE ON THE URBAN AREA OF CONAKRY WITH A VIEW TO CLIMATE-COMPATIBLE PLANNING



MARCH 2017

CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Contents

Foreword

This project note has been prepared with the technical assistance of the CTCN, at the request of the Ministry of the Environment, Water and Forests of the Republic of Guinea.

Apart from national economic development policies (Poverty Reduction Strategy Paper, Five-Year Development Plan, etc.), the Republic of Guinea Conakry has put together a series of policies to improve people's resilience in the face of the harmful effects of climate change. These include the National Adaptation Plan of Action (NAPA), the Initial National Communication and, more recently, the Intended Nationally Determined Contribution (INDC). This contribution provided an opportunity for Guinea to highlight the fundamental importance of taking account of climate change adaptation in the country's development process. The INDC stresses that adaptation is essential to anticipate the impacts of climate change and thereby reduce the costs and damage they cause. It also pointed out to the international community the huge efforts that Guinea needs to make to cope with the negative effects of climate change, as well as to shoulder its responsibilities in relation to the vulnerability of the West African sub-region. Implementation of the project ideas and strategies is, however, still very limited due to lack of the expertise needed to put together “bankable” projects that can be financed by climate donors.

It was in this context that the Republic of Guinea, through the National Environment Department, requested the technical assistance of the CTCN (Climate Technology Centre and Network) in order to overcome this barrier to accessing finance for adaptation projects.

This assistance has thus enabled support for a community of “champions” to come up with consolidated project ideas. This project, on **Implementing and Disseminating a prospective study of the impacts of climate change on the urban area of Conakry with a view to climate-compatible planning,** is one of five projects/programmes with strong climate change adaptation potential chosen by the national authorities.

This concept note aims to present the broad outlines of the project and enable potential funders to assess the project’s relevance in terms of the expected impacts and their own strategic directions. It will then be a question of defining the methods by which to establish a complete project dossier, bearing in mind the specific access requirements of each international donor.

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The **Climate Centre Technology and Network (CTCN)** promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries. The CTCN is the operational arm of the UNFCCC Technology Mechanism, hosted by the UN Environment Programme (UNEP) and the UN Industrial Development Organization (UNIDO) and is supported by more than 260 partners worldwide.

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Summary presentation of project

Project name	**PROSPECTIVE STUDY OF THE IMPACTS OF CLIMATE CHANGE ON THE URBAN AREA OF CONAKRY WITH A VIEW TO CLIMATE-COMPATIBLE PLANNING**
Place of intervention	The programme is based in the Greater Conakry area.
Main project stakeholders	**Ministry of Environment, Water and Forests**: defining priorities, implementation and monitoring/evaluation; **Centre for Environmental Study and Research (CERE) of Conakry University**: (i) collection and analysis of socioeconomic and biophysical data, (ii) remote detection, mapping and analysis of land occupation dynamics, coastal retreat and ecosystems (dynamics, paths and future horizons), (iv) definition and characterisation of a future scenario and production of a forward plan for climate-compatible regional and environmental sustainability for the urban area of Conakry, (v) definition of priorities, and (vi) implementation and monitoring/evaluation. **Ministry of Urban and Land Planning**: defining priorities, implementation and monitoring/evaluation. **Local authorities:** defining priorities, implementation and monitoring/evaluation
Summary	This project aims to develop risk probability, vulnerability and climate change adaptation models for the urban area of Conakry, bearing in mind the complexity of climate change, exacerbated by local human factors and associated uncertainties. It is an interdisciplinary project with multiple stakeholders. It aims to develop forward strategies to aid decision-making on climate risk management, with the aim of improving resilience and developing long-term risk adaptation capacities (flood, drought, water shortage, heatwave, coastal erosion, rising sea levels, etc.) applicable to the urban area of Conakry and its direct area of influence, in line with a “territorial” (regional) approach. The project thus aims to raise awareness and support local actors to design and implement adaptation strategies bearing in mind the interactions between the different catchment areas in the region. It will be a question of establishing a structured approach through the piloting of demonstration adaptation initiatives. These approaches require a real transfer of skills and financial resources to the local authorities for environment and climate actions. Raising the awareness of local CSOs and citizens will be a parallel priority with the aim of influencing political decision-makers.

Goal:

To improve, firm up, spatialise and share knowledge on the impacts of climate change in the urban area of Conakry to 2040, in order to encourage informed decision-making with a view to resilient regional planning. This region will cover five communes of Conakry City: the prefectures of Coyah, Dubréka, Boffa, Forécariah and Kindia.

Specific objectives:

SO1 - To characterise and spatialise the climate risks to which people, infrastructure and ecosystems are exposed in the urban area of Conakry to 2040.

SO2 - To develop a coherent and shared vision of the main climate risks being run in the urban area of Conakry to 2040.

SO3 - To produce and implement awareness raising actions for local actors on the impacts of climate change in the urban area of Conakry.

SO4 - To jointly identify and implement pilot adaptation actions.

SPECIFIC OBJECTIVE 1:

Outcome 1: The climate risks to which people, infrastructure and ecosystems in the urban area of Conakry and its direct area of influence are exposed have been characterised to 2040 with a view to enabling all stakeholders to understand the impacts of climate change.

Main activities planned:

O1A1 – Ascertaining the baseline situation with regard to land occupation and use: acquisition and processing of satellite images, ground truth control, physiognomic surveys on the ground and definition of land occupation and use types.

O1A2 - Ascertaining the baseline situation on climate risks (coastal erosion, coastal dynamics, flooding, water shortage, heat islands and mangrove degradation).

O1A3 - Climate risk characterisation to 2040, production of regional-scale sensitivity maps and prioritisation of critical zones.

O1A4 - Evaluation of the impact of projected climate risks (human, social, economic, environmental, infrastructural) and joint identification of priority zones or sectors.

SPECIFIC OBJECTIVE 2:

Outcome 2: Individual and collective awareness of the need for adaptation has emerged from the planning exercises, including jointly-constructed climate risk scenarios, and is enabling these challenges to be incorporated into the regional planning documents.

Main activities planned:

O2A1 - Production, simulation and validation of strategic scenarios for the different climate risks.

O2A2 - Organisation of workshops to develop a full and shared prospective vision of the main climate risks among the different regional planning actors in the urban area of Conakry.

SPECIFIC OBJECTIVE 3:

Outcome 3: Training and awareness raising actions have been implemented for the public authorities responsible for land planning in the Conakry area.

Main activities planned:

O3A1 - Production of a capacity-building programme on including climate change adaptation issues into regional plans for the public authorities responsible for regional land planning in Greater Conakry. Capacity-building of local commune-level councillors to promote inter-communal actions on climate change adaptation and regional coherence.
O3A2 – Capacity-building of ministerial officials directly involved in climate change adaptation, of the commune-level council, of the neighbourhood and district councils and local population in order to establish joint partnerships and gain access to national and international climate change adaptation funds.

Outcome 4: Civil society awareness-raising actions have been implemented through an environmental education and eco-citizenship programme that prioritises information, awareness-raising and training seminars and conferences.

Main activities planned:
O4A1 - Support for the local voluntary sector to ensure their more effective involvement in and contribution to climate change adaptation
O4A2 – Capacity-building of local actors, particularly women and youth, on climate change adaptation strategies

SPECIFIC OBJECTIVE 4:

Outcome 5: Pilot adaptation actions, focused particularly on reducing the risks of flooding, water shortages and heat islands, are being implemented by all actors concerned with a view to significantly improving the environment and quality of life for people living in the urban area of Conakry and its direct area of influence.

Main activities planned:
O5A1 - Pilot adaptation actions identified jointly with the local actors
O5A2 - Pilot actions implemented by local actors (public authorities or civil society)

O5A3: An integrated water quality monitoring system established in the priority critical areas.

Total project length	**3 years**
Indicative budget	**3,782,000 €**

1. Project description

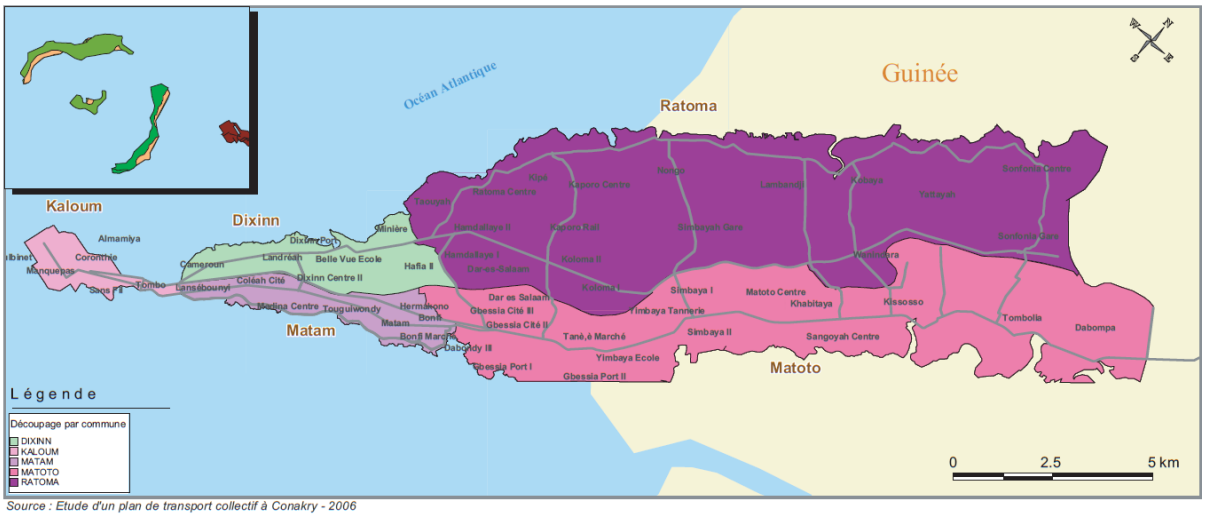
1.1. Geographic features of the Greater Conakry area of intervention

The project area corresponds to the boundaries of Greater Conakry, as defined in the 2040 development vision for the Conakry region. It comprises the capital, Conakry, and numerous small and medium-sized towns located within a radius of 150 km.

1.1.1. Conakry City

Under the authority of a Governor, the capital Conakry is made up of five communes: Kaloum, Dixinn, Matam, Matoto and Ratoma, each with its own municipal council and elected mayor:

- Kaloum commune, situated at the far end of the peninsula, is the city's administrative centre. It is home to the country's mining and commercial port and stretches over an area of 258 ha, with a density of 243 inhabitants/ha.
- With a population of 143,255 inhabitants, Matam commune covers an area of 587 ha (with a density of 346.9 inhabitants/ha). This commune is home to the country's largest business centre (Madina market) and accounts for more than 60% of the city's commercial transactions.
- Dixinn commune has a population of 135,788 inhabitants spread across 724 ha, i.e. a density of 253.4 inhabitants/ha. This commune is home to many of the city's major facilities (28 September Stadium, Donka University Hospital, Gamal Abdel Nasser University, Conakry Great Mosque and Cameroon Cemetery).
- Ratoma is the biggest commune in Conakry by area (6,188 ha). It has a population of 652,783 inhabitants spread across 20 neighbourhoods with an average density of 54 inhabitants/ha. Primarily residential, this commune is marked by its rapidly increasing densification.
- Matoto has an area of 3,512 ha with a population of around 666,640 inhabitants (189 inhabitants/ha), spread across 31 neighbourhoods. This commune is home to the Gbessia international airport.



Source : Etude d'un plan de transport collectif à Conakry - 2006

Figure 1: The five communes of Conakry City

Conakry forms a linear agglomeration covering an area of around 308 km^2 and stretching administratively over 36 km. The city is built on a peninsula jutting out into the Atlantic Ocean on a north-east - south-west axis. The volcanic Loos islands situated offshore in the Atlantic Ocean are administratively attached to it. From west to north-east, its relief presents first a flat topography of more or less low altitude (around the communes of Kaloum, Dixinn and Matam), continued by a ridge that marks out two slopes (north and south), at first with a gradual and then later a steeper incline that increases as you travel inland. These slopes descend to the ocean and then lead onto swamps and mangroves. Relatively deep riverbeds, perpendicular to the central ridge, occur around every 2 km, dividing up the urban area of the city. The peninsula rises to 130 m and extends into a landscape of hills rising rapidly to reach 1,007 m at Mount Kakoulima (Dubréka), 50 km from Kaloum commune.

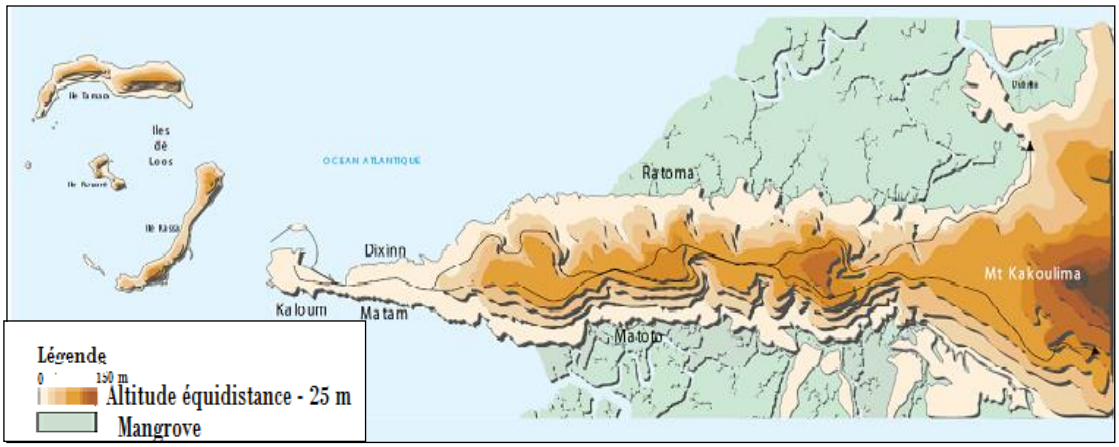


Figure 2: Topographical map of Conakry Town - Source: STUDI, IDEACONSULT and INGEROP, 2007.

The city is characterised by numerous water courses that rapidly drain the surface and ground waters into the sea and marshes. These courses are more numerous north of the main ridge which, offset to the south, results in catchment areas of unequal size. The presence of these catchment areas leading into the sea or marshlands has advantages for urban planning: they are an asset when organising rainwater collection through the creation of small independent feeders.

The substructure of Conakry peninsula comprises two water-bearing levels:

- A surface water table generally less than 5 m deep. This is quite shallow and refills rapidly. This level supplies the traditional wells found almost everywhere across the city. It has been badly contaminated from individual wastewater and sewage drainage facilities and is therefore unable to provide a source of clean drinking water.
- The second level is already being drawn upon by boreholes in order to supply the city, as well as by private individuals (with very deep wells). It is also under threat and needs serious protection as excavations could result in its contamination, given the already polluted groundwater. The growing number of badly designed pits and soakaways is an increasingly serious source of potential pollution of the groundwater tables. These tables, composed of seven large basins, are interlinked and thus form a single reservoir of drinking water.

As regards the marine environment, the continental plate slopes very slightly. It is covered by a layer, several metres thick, of solids deposited by the rivers: clay, sludge, fine sand, shell debris. The bottom is completely flat to the north of the peninsula, with a depth of 6 m not being reached until 8 km from the coast. In contrast, to the south of the peninsula there are depths of 10 m at just 4 km

from the coast, and this reduces to only 1 km in the strait between the islands of Loos and the peninsula. Tides along the Conakry coast are twice daily with a magnitude ranging from around 0.9 m to 3.6 m. The coastline consists of a 14 km stretch of rugged and rocky coast with 16 km of flat, swampy areas covered with mangroves and periodically subject to tidal invasion. These mangroves are prone to expand during sudden river flooding, which washes down a great many alluvial deposits (July, August, September) and to reduce in periods of swell. The Conakry coast is very busy with different activities. It is home to ports, multiple landing stages, the electricity plant, a military camp, and housing. It has vulnerable areas such as the mangrove mudflats, oyster and shrimp beds, rice paddies, etc.

1.1.2. The Greater Conakry region

In addition to Conakry City, Greater Conakry comprises several urban and rural communes. From north to south these are: Farmoréyah (1,650 ha), Forécariah (361 ha), Kindia urban area (3,875 ha), Maférinyah (372 ha), Kouriyah (4,000 ha), Tanénè (375 ha), Fria (656 ha), and Moussayah (1,550 ha).

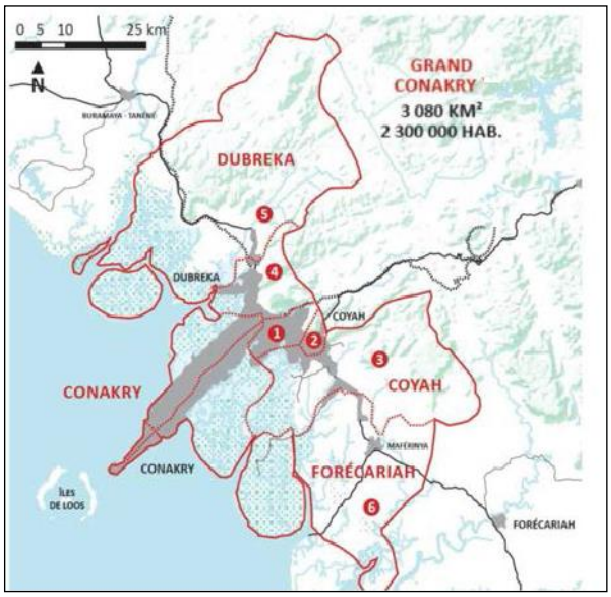


Figure 3: Map of Greater Conakry - Source: Louis Berger and Arte Charpentier Architects

These towns form part of Guinea-Maritime, which extends along the coast for between 100 and 150 km, comprising mangrove formations, a set of continental plains and, in the direction of Fouta Djallon to the east, plateaux and foothills. The region is crossed by numerous water courses and receives more than 1,500 mm of rain per year, increasing to a maximum of 4 m in Conakry itself. It enjoys a sub-Guinean tropical climate characterised by a sometimes markedly dry season from October to May and a rainy season with abundant precipitation from May to October.

1.2. Project background and challenges

1.2.1. An urban region facing strong demographic and economic challenges

Greater Conakry and its metropolitan region form an area attractive to the Guinean population and international private sector. There is a very significant population concentration due to the area's economic opportunities: (i) the commercial dynamism caused by the monetarisation of the market for certain products (fish, salt); (ii) the importance of small-scale fisheries; (iii) the development of large commercial and mining ports (Conakry and Kamsar), in addition to numerous landing stages along the coast; (iv) the high farming potential of the agricultural region, particularly rice cultivation on the vast plains and coastal islands etc. This area of Guinea is also conducive to the production of fruit: banana, pineapple, mango, orange, coconut, avocado and dwarf palm. Off the coast of Conakry, the islands form a clear tourist attraction, with beaches of fine sand.

A no less important reason for the attractiveness of the area is the strong concentration of infrastructure and essential services, in comparison with other regions of Guinea.

Conakry has experienced very rapid population growth, from 1,092,936 inhabitants in 1996 (Ministry of Planning, 1996) to 1,660,973 according to the last general census of the population (2014), i.e. an increase of more than 50% in less than 20 years. In 1900, the city limits extended no further than Tombo island: 4 km long covering an area of 3.5 km^2. After several phases of expansion (see figure 4), the city has become a huge agglomeration characterised by its urban sprawl as far as the foot of Mt Kakoulima to the east, where the city joins the prefectures of Dubréka and Coyah. This latter town, located some 50 km from Conakry, has also experienced rapid and uncontrolled expansion towards the prefecture of Forécariah.

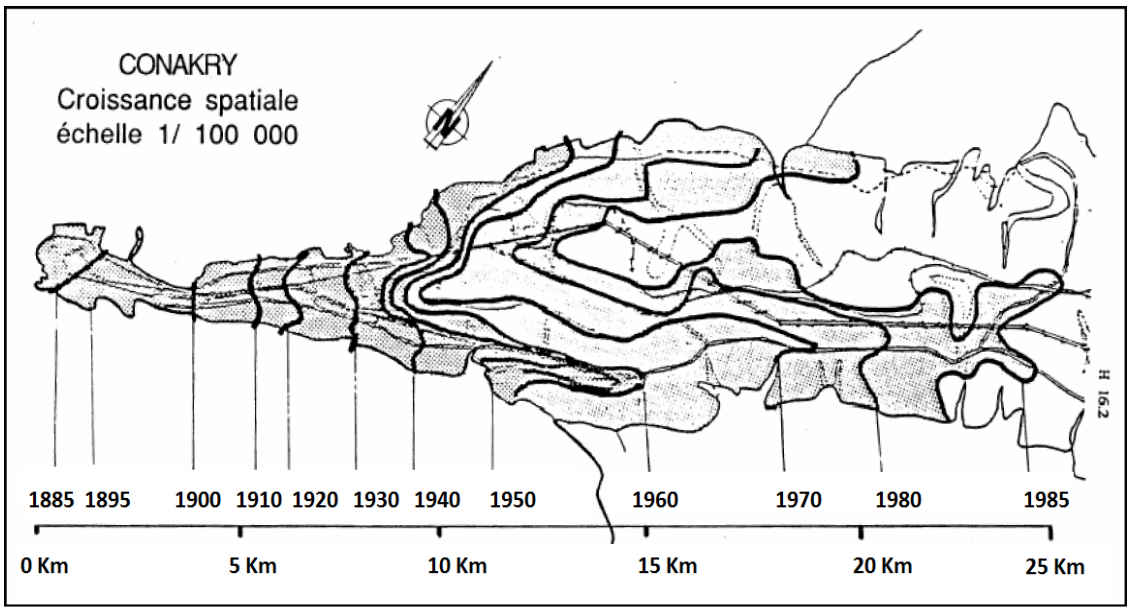


Figure 4: Map of the spatial growth of Conakry City from 1885 to 1985 - Source: STUDI, IDEACONSULT and INGÉROP, 2007

This growth has not been limited to Conakry City but extends over the whole of Greater Conakry: by 2040, the population of the seven areas forming Greater Conakry is likely to have nearly doubled in relation to its current figure (from 471,625 to 744,332 inhabitants).[1]

Place	Population in 2014	Annual rate of growth	Projected population 2040
Kindia (sub-prefecture of the centre)	170,557	2.04%	288,337
Forécariah (sub-prefecture of the centre)	20,275	4.11%	57,778
Maférinyah	43,730	3.62%	110,233
Fria	61,582	1.07%	81,215

[1] Greater Conakry Studies – final report, 2016

Ténènè	48,051	3.05%	104,942
Moussaya	38,005	1.53%	56,402
Farmoreah	33,057	1.23%	45,425

1.2.2. An exposed urban area sensitive to current and future climate variability

The programme report "*Strengthening resilience and adaptation to the negative impacts of climate change along vulnerable Guinean coasts - RAZC*" indicates that the increase in temperature, the increased frequency and intensity of extreme events, such as raised sea level, intense rains, hurricanes, flooding and heatwaves, are threatening the coastal area, particularly Conakry and its environs.

This zone (Conakry, Coyah, Dubréka, Forécariah, Kindia and Bofa) is home to nearly 25% of the Guinean population and around 80% of its industry and other business sectors, making it highly vulnerable to the impacts of climate change.

The assessment conducted of the cities of Conakry and Coyah (RAZC, 2014) shows that, by 2035,[2] these cities could experience:

- an average increase in temperature of +1.4°C (in relation to the 1961-1990 reference period – see figure 5);

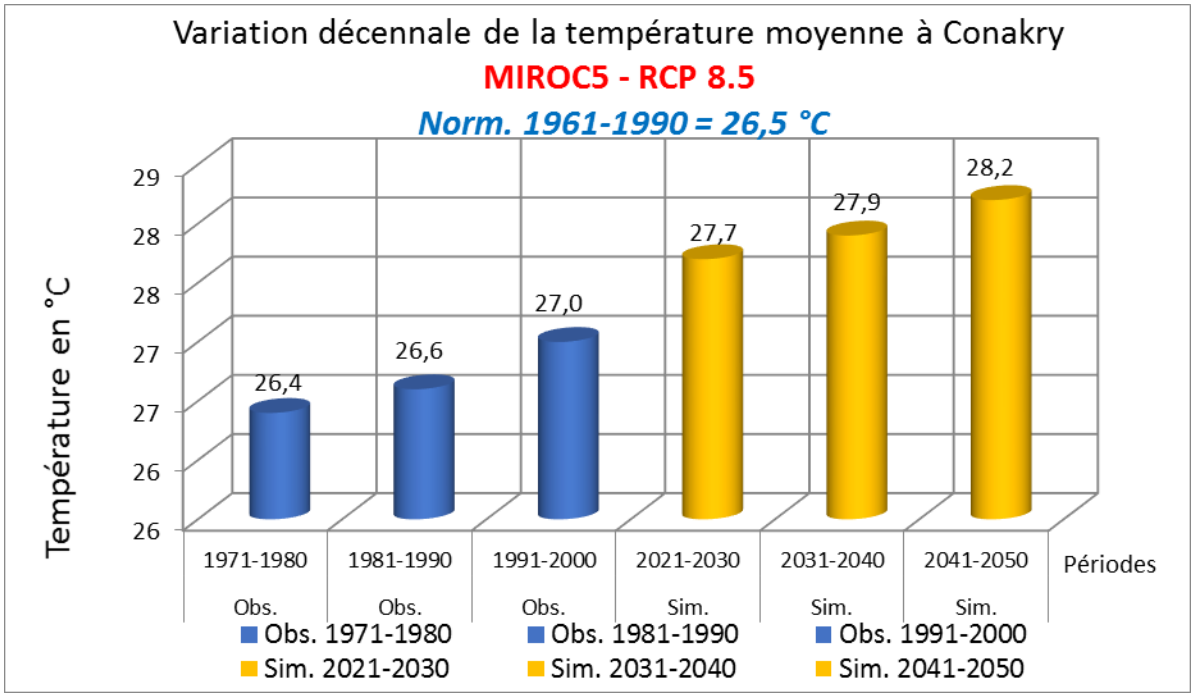


Figure 5: Projected change in average temperatures in Conakry

- a decline in average rainfall of around 24% in Coyah and 9% in Conakry (2026-2035 period, in relation to the 1971-2000 reference period average), with very marked falls during the periods May-June and September-October;
- an increase in violent phenomena such as storms cannot be excluded.

[2] A climate projection to 2035 has been done for Conakry and Coyah using the MIROC 5 climate model based on representative concentration pathways (RCP) taken from the 5th report of the IPCC (AR5).

- a rise in sea level of between 80 cm and 2 metres by the end of the century (according to different studies), adding to the magnitude of the twice-daily tides, and which will strongly affect the areas (primarily mangrove) framing the urban area of Conakry (see figure 6).

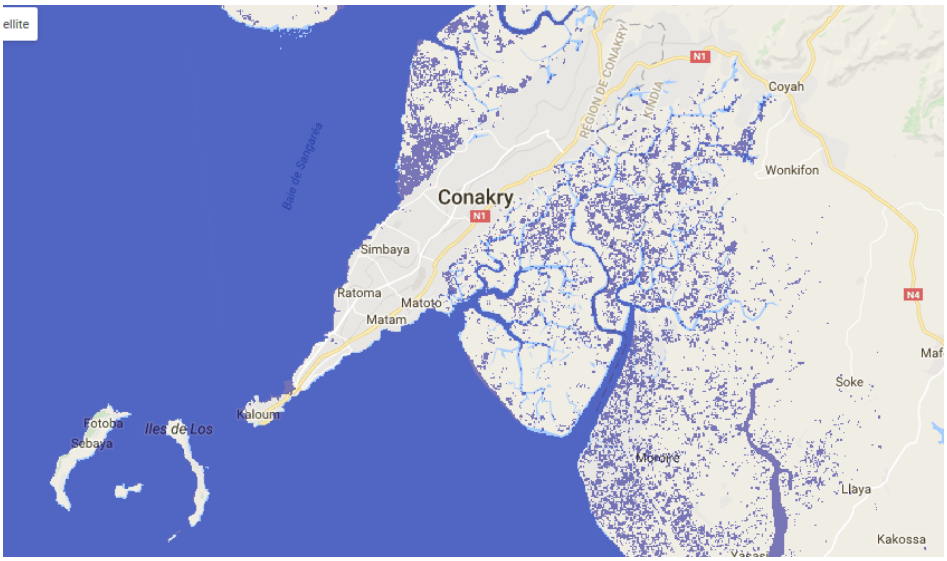


Figure 6: Simulation of a two-metre rise in sea level – sea water intrusions do not directly affect the peninsula but do affect all surrounding areas

In addition to the future climate risks to which the region will be exposed, major underlying vulnerabilities, particularly with regard to the region's urban and rural planning, will most likely result in very high adaptation costs. For example, despite the achievements of the second urban project (UDP 2), more than two-thirds of households in Conakry still do not have access to road drains.

Figure 7: Flooding in Conakry

As a result, Conakry is at considerable risk of flooding given the inadequate management of storm water due to, among other things: (i) the topography of the area (steep slopes), the strong and stormy nature of the rains and the tidal level, which influences the volume of flow at the outlet point; (ii) the poor coverage of drainage networks, often undersized and malfunctioning; and (iv) the lack of regulation of built settlements, characterised by high population densities and the precarious nature of the buildings.

1.2.3. Gaps in our knowledge of the medium-term impacts of climate change

➲ ***Limited scientific knowledge***

Coastal African towns are among the most vulnerable to climate change and climate variability in the world. Despite this evidence, there have thus far been very few studies conducted into climate change in the urban area of Conakry. Consequently, the interaction between several factors such as poverty, rapid urbanisation and unregulated land settlement, particularly along the coast and in

forest ecosystems, etc. is exacerbating the effects of climate change on a region that has a very poor capacity for adaptation.

Summary descriptive studies have been conducted in the context of implementing the "*Strengthening resilience and adaptation to the negative impacts of climate change along vulnerable Guinean coasts - RAZC*" project. These studies are grouped together under the heading "*Climate change and urban planning tools in Conakry and Coyah".* They have enabled the identification of a number of general vulnerabilities: weak urban planning and management capacities; the exposure of both cities to marine submersion, erosion and land movements; flooding and water scarcity, the degradation of ecosystems (the hydrographic network and flora) due to unregulated urban expansion and the poor application of the regulations governing spatial planning and land-use. Moreover, these cities are extremely vulnerable to extreme heat. This assessment, conducted in 2014, was not, however, distributed to institutions with decision-making power on land planning issues.

To these studies must be added some further research works carried out and/or under way within the Centre for Environmental Research and Studies (CERE) and Conakry University, to a greater or lesser extent related to the challenges of climate change. Some of these studies are shown in the following table.

Study title	**Status**	**Study objectives**	**Links to this project**
Spatio-temporal analysis of the effects of climate change and urban pressure on the Conakry coast	Ongoing	To understand the concomitant effects of climate change and urban sprawl on the coast	Produce databases
Influence of port developments on the historical evolution of the Kaloum coast	Ongoing	To determine the influence of port developments on coastal occupation	Produce databases
Challenges linked to the use of the coastal area in Conakry City	Ongoing	To understand the different challenges of living and working on the maritime coast in Conakry City and to analyse the legal issues	Produce databases
Effects of urban sprawl on the plant biodiversity of Ratoma commune	Completed	To analyse the land occupation dynamic and its effects on plant biodiversity in Ratoma commune	To provide data on the land occupation dynamic and its effects on biodiversity
Effects of urbanisation on forest ecosystems in the urban commune of Dubréka	Completed	To analyse the impact of urbanisation on forest ecosystems in the urban commune of Dubréka	To provide data on the land occupation dynamic and its effects on ecosystems and other forest environments
Evaluation of the effect of human actions on urban and peri-urban forest ecosystems: its application to the classified forest of Kakimbo, Conakry	Ongoing	▪ To characterise the current dynamic of the classified forest of Kakimbo ▪ To identify the anthropogenic determinants of this dynamic ▪ To propose ideal measures for the sustainable conservation of this forest	To provide data on the degradation of forest ecosystems

Challenges associated with the incorporation of green landscapes into the urban fabric of Conakry	Ongoing	▪ To contribute to ascertaining the challenges of incorporating green landscapes into the urban fabric of Conakry with a view to proposing a planning, management and monitoring strategy for sites intended as green spaces ▪ To list and map the sites intended as the green landscape ▪ To characterise the green space sites in Conakry City ▪ To identify actors involved in managing green spaces ▪ To propose a green landscape management strategy	
Analysis of the risk of flooding related to the dynamic of uncontrolled settlement in the slums of Kobaya, Ratoma commune, Conakry	Completed	▪ To establish the link between the risks of flooding and the uncontrolled settlement of land in the Kobaya neighbourhood ▪ To characterise the main factors that cause flooding in Kobaya ▪ To establish the link between the characteristic variables of flooding and the main factors of flooding ▪ To propose a flood prevention strategy	To provide indicative data on the impacts of climate change in Conakry
Influence of coastline dynamics on the mangrove settlements between Tabonsou and Soumbouya estuaries	Completed	To understand coastline dynamics and their implications for the mangrove ecosystems	To provide indicative data on the impacts of climate change in Conakry

➲ ***Too little distribution and dissemination of studies with which to guide public decision-makers***

A certain compartmentalisation can be seen between the studies conducted and their use in the context of the challenges around which the public authorities need to mobilise. This is true both for studies conducted in the context of development projects/programmes and for scientific publications. For example, studies conducted by CERE are disseminated through the university by making copies available in CERE's library, and scientific publications are disseminated through peer-reviewed journals and scientific conferences. There is, however, generally no work done to disseminate and distribute these studies to different target groups (elected representatives, public authorities, civil society).

One particular challenge at the moment is therefore to develop the tools and create the appropriate spaces for each audience in order to ensure dissemination of the results of these studies in relation to society's short- and medium-term issues.

1.2.4. Urban planning takes insufficient account of the challenges of climate change adaptation

A study undertaken in 2011 within the context of the RAZ-C programme was aimed at examining the spatial planning tools (town and country planning) with a view to incorporating adaptation measures appropriate to coastal towns. It noted the following with regard to certain planning tools:

Planning tool	Level of integration of adaptation issues
National Land Planning Scheme (1992)	It does propose measures likely to contribute to adaptation; however, these are general and insufficient because they are not the result of an in-depth analysis of the region's vulnerabilities and the recommendations do not therefore include measures targeted at adapting to the impacts of climate change. For example, the criteria and formation of programme regions does not highlight the factors of vulnerability due to climate disturbance. It needed to include this aspect in the criteria and define, for example, a programme region as comprising towns directly located on the coast or along water courses in order to take into account the problem of sea erosion and coastal immersion, along with the violent phenomena that could arise, and flooding.
Lower Guinea Regional Development Plan	This document does not explicitly explain the problem or offer targeted measures related to climate change. The spirit of the plan is more or less social and the strategies and actions proposed for its implementation are based primarily on the revitalisation of economic activity and improvements in the population's living conditions with a view to their stabilisation in order to stem the rural exodus.
Conakry Urban Development Plan	It proposes interesting urban development options for climate change adaptation. In fact, if implemented, they would enable reduced congestion around the port centre in Kaloum and a better distribution of urban settlements, thus minimising the impacts of phenomena such as flooding, heatwaves and, possibly, extreme events. These options would also be likely to tackle the uncontrolled use of space and the urban sprawl that is resulting in increased energy consumption, flooding, over-consumption of natural resources, and so on. However, they are wholly insufficient given the critical vulnerability of Conakry City, which is a peninsula exposed to all the negative effects of climate change and other natural hazards.
Urban and Rural Development Plan for Boké and Kamsar	It does include environmental protection measures but the aspect of climate change has not been examined in such a way as to make recommendations of scale with the aim of protecting people and their belongings from the climate variations under way and/or which may arise.
Code on Private and State-owned Land and the Urban Planning Code	These texts cover all technical areas of the sector but they need to be supplemented by implementing regulations and, above all, to incorporate provisions that particularly target the impact of climate disturbance on the urban space, infrastructure and housing.

In fact, through lack of sufficient information and training of the local public authorities aimed at better incorporating this dimension of vulnerabilities to climate change, these observations are still relevant today. It should, however, be noted that work to incorporate climate issues into the local

development plans of eight rural communes has been undertaken by the National Department for Local Development.

1.3. Project content

1.3.1. Strategic vision

This project aims to develop risk probability, vulnerability and climate change adaptation models for the urban area of Conakry, bearing in mind the complexity of climate change, exacerbated by local human factors and associated uncertainties.
Unlike previous experiences, this is an interdisciplinary project with multiple stakeholders. It aims to develop forward strategies to aid decision-making on climate risk management, with the aim of improving resilience and developing long-term risk adaptation capacities (flood, drought, water shortage, heatwave, coastal erosion, rising sea levels, etc.) applicable to the urban area of Conakry and its direct area of influence, in line with a "territorial" (regional) approach. The project therefore proposes working at "territorial" level. "*The territory bears witness to an economic, ideological and political appropriation of space by human groups who have a particular perception of themselves, their history, their singularity. [...] It is where they are rooted, it is at the heart of identity*."[3] This notion of territory goes beyond administrative boundaries and "natural" geographic borders.
The project thus aims to raise awareness and support local actors to design and implement adaptation strategies taking into account the interactions between the different catchment areas in the region. It will be a question of establishing a structured approach through the piloting of demonstration adaptation initiatives. These approaches require a real transfer of skills and financial resources to the local authorities for environment and climate actions. Awareness-raising of local CSOs and citizens must form a parallel priority, in order to influence political decision-makers.

1.3.2. Goal and specific objectives

The goal of the project is to improve, firm up, spatialise and share knowledge on the impacts of climate change in the urban area of Conakry to 2040, in order to encourage informed decision-making with a view to resilient regional planning. This region will cover five communes of Conakry City: the prefectures of Coyah, Dubréka, Boffa, Forécariah and Kindia.

Specific objectives
Specifically, the programme aims:
SO1 - To characterise and spatialise the climate risks to which people, infrastructure and ecosystems are exposed in the urban area of Conakry to 2040.
SO2 - To develop a coherent and shared vision of the main climate risks being run in the urban area of Conakry to 2040.
SO3 - To produce and implement awareness-raising actions for local actors on the impacts of climate change in the urban area of Conakry.
SO4 - To jointly identify and implement pilot adaptation actions.

[3] *G. Kourtessi-Philippakis, R. Treuil (ed.), Archéologie du territoire, de l'Egée au Sahara, Paris, 2011, Publications de la Sorbonne*

Expected outcomes

O1 - The climate risks to which people, infrastructure and ecosystems in the urban area of Conakry and its direct area of influence are exposed have been characterised to 2040 with a view to enabling all stakeholders to understand the impacts of climate change.

O2 - Individual and collective awareness of the need for adaptation has emerged from the planning exercises, including jointly-constructed climate risk scenarios, and is enabling these challenges to be incorporated into the regional planning documents.

O3 - Training and awareness-raising actions have been implemented for the public authorities responsible for land planning in the Conakry area.

O4 - Civil society awareness-raising actions have been implemented through an environmental education and eco-citizenship programme that prioritises information, awareness-raising and training seminars and conferences.

O5 - Pilot adaptation actions, focused particularly on reducing the risks of flooding, water shortages and heat islands, are being implemented by all actors concerned with a view to significantly improving the environment and quality of life for people living in the urban area of Conakry and its direct area of influence.

1.3.3. Activities

Depending on the outcomes expected, the activities to be implemented are as follows:

O1A1 – Ascertaining the baseline situation with regard to land occupation and use: acquisition and processing of satellite images, ground truth control, physiognomic surveys on the ground and definition of land occupation and use types.

This baseline will be conducted at the start of the programme by the project management unit under the scientific coordination of CERE, with the technical assistance of one or several European research institutions to be hired following an international call for tenders.

O1A2 - Ascertaining the baseline situation with regard to climate risks (coastal erosion, coastal dynamics, flooding, water shortage, heat islands and mangrove degradation).

This baseline study will be conducted at the start of the programme by the project management unit under the scientific coordination of CERE, with the technical assistance of one or several European research institutions to be hired following an international call for tenders.

O1A3 - Climate risk characterisation to 2040, production of regional-scale sensitivity maps and prioritisation of critical zones.

This assessment will be conducted at the start of the programme by the National Meteorology Department, in cooperation with CERE and under the supervision of the project management unit.

O1A4 - Evaluation of the impact of projected climate risks (human, social, economic, environmental, infrastructural) and joint identification of priority zones or sectors.

This evaluation will be conducted at the end of year 1 jointly by the project management unit and CERE. Ad hoc local and international experts will be called upon to support the project team in conducting this evaluation as necessary. This activity will result in a report specifying the expected impacts, including costs, and will endeavour to spatialise the information produced through a cartographic atlas of the vulnerabilities of the Greater Conakry region.

O2A1 - Production, simulation and validation of strategic scenarios for the different climate risks.

This activity will be conducted in years 2 and 3, on the basis of the initial assessments in O1. The production and testing of these scenarios will be done by a multidisciplinary team led by CERE, with

the technical assistance of an international research institute. These scenarios will enable several possible future scenarios to be envisaged to 2040 for Greater Conakry, bearing in mind the expected impacts of climate change. Coordination with the activities of O2A2 will be ensured in order to validate the basic hypotheses of the different scenarios envisaged.

O2A2 - Organisation of workshops to develop a full and shared prospective vision of the main climate risks among the different regional planning actors in the urban area of Conakry.
At least 10 workshops will be organised in years 2 and 3 to present, debate and validate the selection of the sustainability scenario that will, in the end, be incorporated into the Greater Conakry Regional Development Plan. These workshops will bring together scientists, managers, local elected representatives and civil society. They will enable, firstly, the initial assessment and methods of scenario modelling to be validated. They will, secondly, be an opportunity for consultation around which to establish the desirable future scenario and collectively validate a sustainability scenario for Greater Conakry in the face of climate change to 2040. The methods and tools used to successfully bring this consultation about will form the object of careful reflection in order to ensure they are appropriate to the different stakeholders involved; of these possible tools the following can be mentioned: urban walkabouts, educational films, participatory workshops, public debates, etc. The issue of the languages used in the workshops will also be crucial to ensure the wide participation of local actors.

O3A1 - Production of a capacity-building programme on including climate change adaptation issues in regional plans aimed at the public authorities responsible for regional land planning in Greater Conakry. Capacity-building of local commune-level councillors to promote inter-communal actions on climate change adaptation and regional coherence.
At least 5 training sessions, of at least 9 days each (in blocks of 3 days per quarter), will be organised in years 2 and 3 for 80 local elected representatives and managers of the public space in Greater Conakry on integrating the challenges of climate change adaptation into local planning.

O3A2 – Capacity-building of ministerial officials directly involved in climate change adaptation, of the commune-level council, of the neighbourhood and district councils and local population in order to establish joint partnerships and gain access to national and international climate change adaptation funds.
At least 5 training sessions of at least 3 days each will be organised in years 2 and 3 for 150 actors from the region in question.

O4A1 - Support for the local voluntary sector to ensure their more effective involvement in and contribution to climate change adaptation
This activity will consist primarily of providing better information to the local voluntary networks with regard to when local public consultations are being held on climate change, through the media and social networks, particularly related to O5 of this project.
O4A2 – Capacity-building of local actors, particularly women and youth, on climate change adaptation strategies.
At least 10 awareness-raising and training sessions, of one day each, will be organised in years 2 and 3 for 500 members of local associations; particular attention will be paid to gender and generational equality in the participating panels.

O5A1 - Pilot adaptation actions identified jointly with the local actors.
This activity will be implemented at the start of year 3 and will enable, through the organisation of targeted and localised focus groups and calls for projects, so-called "no regret" pilot adaptation

projects to be defined, aimed at improving resilience to current climate variations. A dedicated fund, with an overall budget of one million euros, will be established and managed by the project management unit.

O5A2 - Pilot actions implemented by local actors (public authorities or civil society).
Once the feasibility and scoping studies have been carried out for the pilot actions, implementation will be undertaken by the public authorities and/or civil society itself when possible.
O5A3 - An integrated water quality monitoring system established in the priority critical areas.
This activity requires analysis of the quality of surface and ground waters and will be conducted in CERE's laboratories.

It should, finally, be noted that a capitalisation process will be mainstreamed into the project and will result in communications at scientific conferences and the publication of project results in peer-reviewed scientific journals, with the aim of promoting a transfer of experience to other vulnerable urban areas.

1.4. Direct and indirect beneficiaries

The stakeholders involved in project implementation are:

Public actors	Local population	Financial actors
National authorities (Ministries) Elected representatives Staff from the environment and nature protection services Health workers Urban planners and developers Civil defence officers	Owners Tenants / inhabitants Small-scale fishers Salt harvesters Farmers (rice growers, vegetable farmers, planters, etc.) Livestock farmers (cattle, sheep, goat, pigs, poultry, etc.) Bee-keepers Hunters Local community associations and civil society.	Manufacturers established in the areas at risk Hauliers Shopkeepers Building and civil engineering firms internal and external to the vulnerable areas Farmers internal and external to the vulnerable areas Industrial and semi-industrial fishers National and international NGOs located or working in the areas at risk.

1.5. The project's internal and external coherence

1.5.1. National public policies

The project is in line with several national priorities that form the object of sectoral policy documents and legal and regulatory instruments. These relate in particular to:

- The 2007 National Action Plan for Climate Change Adaptation (PANA-CC), which notes the coastal zone as being particularly vulnerable to climate change.
- The 2006 National Action Plan to Combat Desertification (PAN/LCD), the aim of which is to identify the factors that contribute to desertification and the concrete measures to be taken to combat this and mitigate the effects of drought. It should be noted that Conakry regularly experiences episodes of drought, which have a considerable impact on the quantity and quality of drinking water available to the population, a population that is, moreover, constantly increasing.

- The private and state-owned land policy, which emphasises the management of land and buildings by the state, local authorities and private individuals. The activities relate primarily to (i) land management through implementation of the Code on Private and State-owned Land; and (ii) the establishment of an inter-ministerial committee for monitoring and overseeing the application of this code. A more specific and spatialised knowledge of the impacts of climate change to 2040 in the urban region of Conakry will contribute to better informed decision-making within this inter-ministerial committee.

1.5.2. Greater Conakry Vision 2040

A study was financed by the European Union in 2015 aimed at helping the Guinean authorities promote a coherent national and regional planning and development policy.

This culminated in the production of a summary document, the content of which focuses on the challenges and problems of urban planning, mobility, transport, environment, economic and social development, etc. It has enabled the Guinean government to adopt a development vision for the Conakry region based on a balanced scenario built around three strategies: (i) strengthening different urban links and hubs in order to limit the demographic pressure on the peninsula; (ii) gaining control over and structuring the urban sprawl in order to avoid continued urban expansion and the intensification of urban areas on the peninsula.

Even though the vision explicitly includes resource preservation and a limiting of environmental effects through "directed, controlled and optimised" urbanisation, an analysis of the problem of climate change and proposals for targeted adaptation measures were not included.

As the vision was a prelude to producing the Territorial Coherence Plan, this prospective study project will enable the strategies and measures necessary for general and, particularly urban, resilience to be included in this plan.

1.6. Project management

The precise management methods will be determined during the consolidation phase for the project note. Nonetheless, a preliminary outline would be as follows:
The project will be managed by the Ministry of the Environment, Water and Forests, with the scientific and technical assistance of:

- the Centre for Environmental Studies and Research (CERE);
- the Ministry of Urban and Spatial Planning;
- the Ministry for Regional Administration and Decentralisation.

A cross-cutting technical team devoted to project implementation will be mobilised and established within the Ministry of the Environment, Water and Forests to provide: technical steering and coordination of the project; technical and financial reporting; and monitoring and evaluation actions. The implementation of programme activities will be preceded by the production of a detailed work plan on a quarterly/annual basis. Once validated, this plan will be sent to the programme steering committee.

The steering committee will comprise the General Secretaries of the Ministries involved, project donors, local elected representatives from Greater Conakry, representatives of the technical and financial partners and representatives of the national departments concerned. The steering

committee will meet a minimum of once every six months to provide strategic decisions and, where necessary, arbitration throughout the programme.

2. Expected project impacts

2.1. Social and economic impacts

In the short-term, this project will contribute to:

- A better integration of adaptation issues into public policies, regional and urban planning tools, and legal and regulatory texts on regional development, including initiatives under way;
- Capacity-building of Guinean research structures to enable them to evaluate the impact of climate change;
- Better awareness among local populations of the impacts of climate change and the challenge of adaptation;
- Improvements in the living conditions of local people through the implementation of small pilot actions.

In the medium term, the project will contribute more widely to:

- A reduction in poverty caused by the economic losses resulting from flood damage and the resulting repairs;
- Reduced degradation, alteration and/or loss of infrastructure and facilities caused by climate variability;
- The maintenance of services linked to infrastructure/facilities and their quality;
- Reduced illness and death caused by the effects of climate variability;
- The prevention of a slowdown and/or temporary halt in commercial activity due to climate variability (destruction of business infrastructure, submersion of markets and access roads) and subsequent economic losses;
- Reduced accidents, economic losses and deaths caused by the destruction of industrial and transport infrastructure, and reduced slowdown and/or blockage of road traffic due to flooding;
- Reduced heat islands and their resulting consequences (sweating, dehydration, insatiable thirst, thermal stress, trouble sleeping, skin cancer, exhaustion and debilitation of individuals, particularly children, the elderly and pregnant women, neurological and cardiological problems).

2.2. Risks and project sustainability

Risks involved in achieving the project objectives	**Risk mitigation strategy**
Political instability in the country	Strengthen democracy and the rule of law
Political instability in a neighbouring country could create an influx of refugees into Conakry	Control and confine refugees coming from unstable neighbouring countries outside the area of influence of the project
Social unrest in the country	Awareness-raising
Lack of political will among leaders	Advocacy
Population's rejection of the project	Awareness-raising

3. Human and financial resources needed by the project

The following gives a summary of the main anticipated needs. A more accurate estimate will be produced at a later stage.

3.1. Human needs

➲ **Project management**

A dedicated project management unit will be established within the Ministry of the Environment, Water and Forests. It will comprise:

A coordinator	An administrative and financial officer
A programme officer	An accountant
A monitoring/evaluation officer	A secretary

➲ **Technical expertise**

Additional needs will be necessary in terms of national and international technical expertise in the following areas:

- Database management on land use and occupation and urban dynamics;
- Study of heat islands;
- Characterisation of climate risks and assessment of the impacts of these risks;
- Production, simulation and validation of strategic scenarios for complex systems.

3.2. Project team operating resources

The project management unit (PMU) must have the power to take decisions regarding project management. It will play a crucial role in project monitoring and evaluation and in using those evaluations to improve performance. The PMU must include a representative from the Ministry of the Environment, Water and Forests, a representative from the Centre for Environmental Research and Study (CERE) and a representative from the National Urban and Spatial Planning Department(DATU). In order to operate, it will need financial resources to enable its members to participate in implementing activities in the field, facilitate their travel to consultation meetings and cover their international travel costs in relation to events or training.

3.3. Establishment of a fund dedicated to pilot actions

The fund dedicated to pilot actions will enable so-called “no regret” adaptation activities to be defined and implemented on the basis of the results of the prospective studies and also the activities suggested through the focus groups. This fund will have an overall budget of €1,000,000 (cf. sub-total outcome 5) and will be managed by the PMU.

3.4. Indicative budget

Expected outcome	Activity	Amount in Euros (€)
Outcome 1: The climate risks to which people, infrastructure and ecosystems in the urban area of Conakry and its direct area of influence are exposed have been characterised to 2040 with a view to enabling all stakeholders to understand the impacts of climate change.	Ascertaining the baseline situation with regard to land occupation and use: acquisition and processing of satellite images, ground truth control, physiognomic surveys on the ground and definition of land occupation and use types.	200,000
	Ascertaining the baseline situation on climate risks (coastal erosion, coastal retreat dynamics, flooding, water shortage, heat islands and mangrove degradation).	150,000
	Climate risk characterisation to 2040, production of regional-scale sensitivity maps and prioritisation of critical zones.	95,000
	Evaluation of the impact of projected climate risks (human, social, economic, environmental, infrastructural) and joint identification of priority zones or sectors.	107,000
Sub-total expected outcome 1		**552,000**
Outcome 2: Individual and collective awareness of the need for adaptation has emerged from the planning exercises, including jointly-constructed climate risk scenarios, and is enabling these challenges to be incorporated into the regional planning documents.	Production, simulation and validation of strategic scenarios for the different climate risks.	80,000
	Organisation of workshops to develop a full and shared prospective vision of the main climate risks among the different regional planning actors in the urban area of Conakry.	250,000
Sub-total expected outcome 2		**330,000**
Outcome 3: Training and awareness-raising actions have been implemented for the public authorities responsible for land planning in the Conakry area.	Production of a capacity-building programme on including climate change adaptation issues in regional plans aimed at the public authorities responsible for regional land planning in Greater Conakry. Capacity-building of local commune-level councillors to promote inter-communal actions on climate change adaptation and regional coherence.	300,000
	Capacity-building of ministerial officials directly involved in climate change adaptation, of the commune-level council, of the neighbourhood and district councils and local population in order to establish joint partnerships and gain access to national and international climate change adaptation funds.	500,000
Sub-total expected outcome 3		**800,000**

Outcome 4: Civil society awareness-raising actions have been implemented through an environmental education and eco-citizenship programme that prioritises information, awareness raising and training seminars and conferences.	Support for the local voluntary sector to ensure their more effective involvement in and contribution to climate change adaptation.	300,000
	Capacity-building of local actors, particularly women and youth, on climate change adaptation strategies.	300,000
Sub-total expected outcome 4		**600,000**
Outcome 5: Pilot adaptation actions, focused particularly on reducing the risks of flooding, water shortages and heat islands, are being implemented by all actors concerned with a view to significantly improving the environment and quality of life for people living in the urban area of Conakry and its direct area of influence.	Pilot adaptation actions identified jointly with the local actors.	100,000
	Pilot actions implemented by local actors (public authorities or civil society).	700,000
	An integrated water quality monitoring system established in the priority critical areas.	200,000
Sub-total expected outcome 5		**1,000,000**
Sub-total expected outcomes		**3,282,000**
Project team operating resources		500,000
TOTAL PROJECT COST		**3,782,000**

Annexes

Logical framework

	Intervention logic	Indicators, objectively verifiable and quantified if possible	Sources and means of verification
Goal	**OO - To improve, firm up, spatialise and share knowledge on the impacts of climate change in the urban area of Conakry to 2040, in order to encourage informed decision-making with a view to resilient regional planning**		
Specific objectives	**SO1** - To characterise and spatialise the climate risks to which people, infrastructure and ecosystems are exposed in the urban area of Conakry to 2040 **SO2** - To develop a coherent and shared vision of the main climate risks being run in the urban area of Conakry to 2040 **SO3** - To produce and implement awareness-raising actions for local actors on the impacts of climate change in the urban area of Conakry **SO4** - To jointly identify and implement pilot adaptation actions		
Expected outcomes	**O1** - The climate risks to which people, infrastructure and ecosystems in the urban area of Conakry and its direct area of influence are exposed have been characterised to 2040 with a view to enabling all stakeholders to understand the impacts of climate change **O2** - Individual and collective awareness of the need for adaptation has emerged from the planning exercises, including jointly-constructed climate risk scenarios, and is	**O1:** - Availability of detailed and easily understandable thematic maps at all levels (from ministries to sectors) - A report providing quantified assessments of the impacts of climate change to 2040 **O2**: a sustainability scenario validated and shared during 10 consultation workshops; incorporation of the prospective exercise in	**O1:** studies and activity reports disseminated **O2:** reports from

	enabling these challenges to be incorporated into the regional planning documents **O3 -** Training and awareness-raising actions have been implemented for the public authorities responsible for land planning in Greater Conakry **O4 -** Civil society awareness-raising actions have been implemented through an environmental education and eco-citizenship programme that prioritises information, awareness-raising and training seminars and conferences **O5** - Pilot adaptation actions, focused particularly on reducing the risks of flooding, water shortages and heat islands, are being implemented by all actors concerned with a view to significantly improving the environment and quality of life for people living in the urban area of Conakry and its direct area of influence	the Greater Conakry Regional Development Plan **O3:** 300 elected representatives and actors from land planning informed and trained **O4:** 500 members of local associations informed and trained, of which % women **O5:** 1,500,000 beneficiaries of adaptation pilot actions	dialogue workshops; regional development plan **O3:** reports from training sessions and activity reports **O4:** reports from training sessions and activity reports **O5:** activity reports and field surveys
Activities to be implemented	**O1A1** – Ascertaining the baseline situation with regard to land occupation and use **O1A2** - Ascertaining the baseline situation on climate risks (coastal erosion, flooding, water shortage and heat islands) **O1A3** - Climate risk characterisation to 2040, production of regional-scale sensitivity maps **O1A4** - Evaluation of the impact of projected climate risks (human, social, economic, environmental, infrastructural) and joint identification of priority zones or sectors **O2A1** - Production, simulation and validation of strategic	**<u>Necessary resources</u>** **Staff:** ▪ Project coordination ▪ Management and coordination of pilot initiatives ▪ Technical expertise: climatology, urban planning, geomatics and remote detection, communication/graphic design, facilitating consultations **Equipment:** ▪ Vehicles ▪ Physical resources (particularly to strengthen the CERE's capacities)	

	scenarios for the different climate risks **O2A2** - Organisation of workshops to develop a full and shared prospective vision of the main climate risks among the different regional planning actors in the urban area of Conakry **O3A1** - Production of a capacity-building programme on including climate change adaptation issues in regional plans aimed at the public authorities responsible for regional land planning in the urban area of Conakry **O3A2** – Capacity-building of ministerial officials directly involved in climate change adaptation, of the commune-level council, of the neighbourhood and district councils and local population in order to establish joint partnerships and gain access to national and international climate change adaptation funds **O3A3** – Capacity-building of local commune-level councillors to promote inter-communal actions on climate change adaptation **O4A1** - Support for the local voluntary sector to ensure their more effective involvement in and contribution to climate change adaptation **O4A2** – Capacity-building of local actors, particularly women and youth, on climate change adaptation strategies **O5A1** - Pilot adaptation actions identified jointly with the local actors **O5A2** - Pilot actions implemented by local actors (public authorities or civil society)	▪ Training materials ▪ Communication and awareness-raising materials ▪ Resources for implementing pilot adaptation projects **Training:** ▪ Strengthening of CERE's geomatics laboratory ▪ Capacity-building in facilitating regional consultations **Operational facilities:** ▪ Integrated system of hydroclimatic monitoring in vulnerable areas	

	O5A3 - An integrated hydroclimatic monitoring system established in the priority critical areas (climatology, hydrology, piezometry and water quality)		