

Assessing the impact of climate change in African cities

Methodological aspects

Adaptation to Climate Change



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Covenant of Mayors
in Sub-Saharan Africa

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About ADEME

The French Environment and Energy Management Agency (ADEME) is active in the implementation of public policy in the areas of the environment, energy and sustainable development. The Agency provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work ADEME helps finance projects, from research to implementation, in the areas of waste management, soil conservation, energy efficiency and renewable energy, raw materials savings, air quality, noise abatement, circular economy transition and food wastage abatement.

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About CoM SSA

The Covenant of Mayors in Sub-Saharan Africa (CoM SSA) is an initiative launched by the European Union (EU) to support local governments in Sub-Saharan Africa in their fight against climate change and in their efforts in ensuring access to clean energy. Launched in 2015, this initiative is shaped by local governments so they can debate on local contexts and characteristics.

Through CoM SSA, local governments are invited to make a voluntary political commitment to implement climate and energy actions in their communities and agree on a long-term vision to tackle 3 pillars: access to energy, climate mitigation and climate adaptation.

In order to translate political commitment into practical measures, CoM SSA signatories commit to produce and implement a Sustainable Energy Access and Climate Action Plan (SEACAP).

Technical assistance to signatory cities is provided by a consortium composed of: ADEME, ADENE, AIMF, CEMR, UCLG Africa, Climate Alliance, ENDA Energie, Energy Cities, ICLEI Africa, ICLEI World Secretariat and SEA.

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This document is the result an analysis by working parties established in the signatory cities of the Covenant of Mayors for Sub-Saharan Africa, in the course of a capacity-building workshop, held in Saly, Senegal, from 3 to 6 September 2018, while also drawing on interviews held with representatives of the signatory cities. This document describes the methodological aspects used to study the impact of climate change on a territory. These methodological aspects are illustrated by feedback from African towns.

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Climate and climate change.

Why is there a need for adaptation?

What is climate?

The term “climate” relates to the mean values, measured over long periods, and for large and well-defined geographical areas (called “climate zones”), for meteorological parameters (rainfall, temperature, cloud cover, etc.). Observations over 30 years are needed to establish the characteristics of climate. The climate thus differs from “weather”, which corresponds to the conditions at a given time. Weather forecasts are valid only locally and for a short period (no more than a few days). An unusually violent storm is therefore not evidence of climate change. To be certain of climate change, you need to be able to show that the frequency of certain weather conditions has increased significantly in a given region, over a long period.



Climate is thus the average weather conditions (temperature, rainfall, wind, etc.) experienced:

- in a given location,
- and observed over the long term (30 years).

What is climate change?

Climate change refers to the development of changed

- Average climatic conditions over long periods
e.g. increase in average temperatures, changes in precipitation patterns, sea-level rise, etc.
- Climate change can also involve an increased frequency and intensity of extreme weather events
e.g. increased frequency of droughts, heavy rain, etc.

The sharp and sustained rise in the Earth’s average temperature over almost a century, and acidification of the oceans, cannot be explained by natural phenomena. The current change in composition of the atmosphere, increasing the greenhouse effect, is the only plausible

explanation. The total emissions of greenhouse gases produced today have risen by 80% since 1970, and 30% since 1990. From 2000 to 2010, they were the greatest they have ever been in human history.



What is the greenhouse effect?

The greenhouse effect is a natural phenomenon. Certain gases present in the atmosphere retain part of the solar energy that is normally reflected back into space by the Earth in the form of infrared radiation. These gases thus keep the temperature on Earth at an average of about 15°C. Without them, the average would go down to -18°C, making the development of life impossible. The concentration of these “greenhouse gases” in the atmosphere is steadily increasing. Emissions of greenhouse gases due to human activities have grown considerably since 1850, and the planet is unable to compensate for them in a carbon cycle. The greenhouse gases are therefore building up in the atmosphere.

Human activities give rise to a variety of greenhouse gases:

- carbon dioxide (CO₂), produced by the burning of fossil fuels (crude oil and its derivatives, coal, etc.) and by deforestation and turning over the soil;
- methane, produced by using nitrogenous fertilisers in agriculture; the processing, storage and spreading of animal manure; gastrointestinal fermentation by ruminants;
- nitrous oxide, released by some fertilisers and by certain chemical processes;
- fluorine-containing gases used as propellants, in the manufacture of foams or electronic components, and in air-conditioning equipment, etc.

Why do we need to adapt to climate change?

Climate change exposes economies, societies and ecosystems to a great variety of serious dangers. These dangers include damage to coastal infrastructure, developments in infectious diseases and deterioration in food security. In order to reduce the risk of these harmful effects, it is necessary to take steps to strengthen territories' resilience in the face of climate change. This means increasing their ability to convert the changes, and in particular the climate changes, into social and economic opportunities in the long term.

Adaptation is a process of adjustment:

- to the current or expected climate,
- and to its consequences.

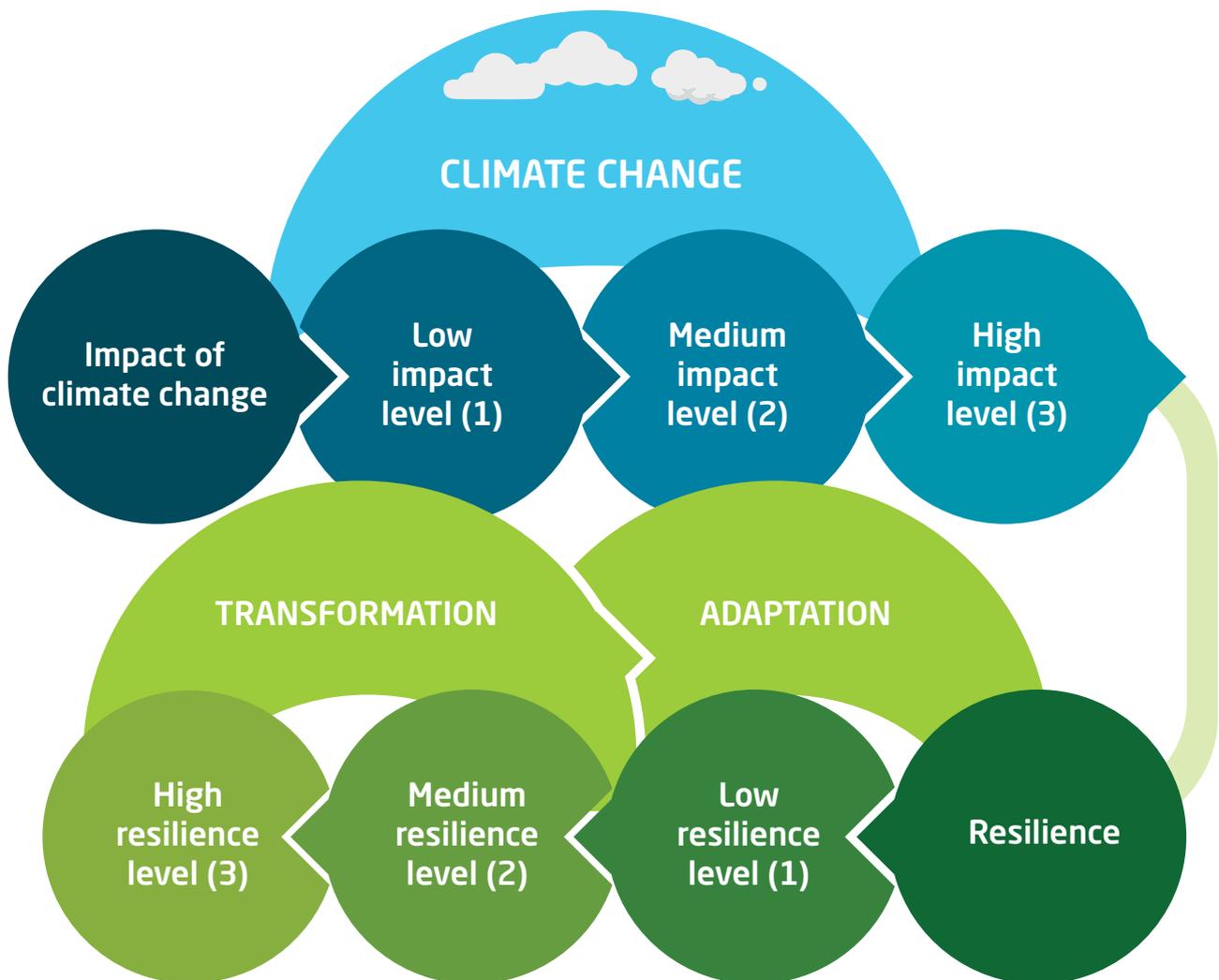


Figure Source: ADEME 2018

In human systems, the aim is to mitigate or avoid adverse effects, and to exploit potentially beneficial effects.

In some natural systems, human intervention can facilitate adaptation to the expected climate and its consequences.

To succeed in reducing emissions of greenhouse gases, and to adapt, we need to introduce changes to our lifestyles, implement new policies and design appropriate practices. Many towns and territories in Africa are now entering voluntary commitments to sustain a territorial development impetus linked to climate adaptation. Studying the effects of climate change is a prerequisite to any adaptation process. This review therefore proposes feedback from African cities on carrying out a study on the effects of climate change.



A Beach in Accra - Encouraging beach communities to take responsibility for environment

How can we identify the effects of climate change in a territory?

The effects of climate change in a particular territory will be determined by its degree of exposure to climatic hazards, and how sensitive it is to those hazards.

Climatic adversity is a natural phenomenon that can cause damage to goods, human beings and/or the environment.

Such hazards are of two types: changes over time in climate-related conditions such as rising temperatures or a rise in sea level, etc. and extreme events, such as tornados or floods.

Exposure to climatic hazards refers to all aspects of a territory that could be damaged by a climatic hazard occurring.

The main problem for the town of Copargo, in Benin, is a poor distribution of rainfall, with abundant and violent rainfall, producing a risk of flooding, together with frequent and long occurrences of drought, and also violent winds and excessive heat. The parts that are exposed to these factors in the town of Copargo are agricultural lands, crops, residential buildings, the population, and the infrastructure.

Sensitivity to climatic hazards refers to the extent to which a part that is exposed to climate change (the municipality or an organisation, etc.) could be affected, either favourably or unfavourably, by the occurrence of such a hazard. A territory that has limited water resources, where the population is fairly elderly, and where there is developed agriculture, will be very sensitive to climate change.

Some districts of Nouakchott, the capital of Mauritania, are especially sensitive to the risk of flooding, which results in areas of stagnant water. The districts of El Mina, Sebkha, south Ksar, Tevragh Zeina and Dar Naim are, to a great extent, below sea level; the water table is thus exposed, resulting in serious health problems in the rainy season.

The level of exposure to climate change effects refers to the extent to which aspects of a system (the population, networks and equipment, heritage, ecology, etc.) are affected by climate change effects.

The impact will be stronger in some areas than in others. It can be assessed by combining the territory's exposure with its sensitivity. If the territory is greatly exposed (with a risk of flooding, or drought, etc.), while also being highly sensitive (with an elderly population, and an economy that depends on the climate, etc.), there will be a great impact on the territory.

Assessing the effects of climate change on a territory involves a study led by the local government, and it provides information on who is vulnerable, and what they are sensitive to; how to measure the effects, and how to choose which adaptation actions to adopt. The diagnosis involves an inter-disciplinary approach and a number of key steps:

- How to organise and who to work with
- How to collect data on past and future exposure to climatic hazards – and also on sensitivity
- How to communicate the effects of climate change on the territory
- How to fund the assessment and adaptation actions rising temperatures or a rise in sea level, etc. and extreme events, such as tornados or floods.

Methodological aspects

1. Organising to launch the process

The members of the project team

To successfully carry out an assessment exercise, it is necessary to designate a team that will have responsibility for the project. Having an elected representative actively involved, and technical directors with adequate responsibilities, is an undeniable advantage. It is very important to closely associate the assessment exercise with either an internal person or someone from outside the municipality, who deals with the management of natural hazards. That person will already be familiar with some of the effects, albeit without linking them to climate change (where that is indeed the case). Given that the assessment exercise is generally directed by someone from the department responsible for sustainable development or for climate change matters, but not necessarily an expert in risk management, it is essential to have a cross-fertilisation of approaches to this issue. Such an exchange of viewpoints will be all the more relevant when specifying an action plan and, if found necessary, in developing a plan to protect against natural hazards.

In Tsévié, a city in Togo, the study of vulnerability and the possible impact of climate change was conducted by a technical group consisting of five experts (in energy, climate changes, the environment, sociology and geographical information systems). These experts, four of whom were from outside Tsévié's project team, were supported by the municipality's technical team responsible for carrying out the SEACAP, the Sustainable Energy Access & Climate Action Plan.



Mobilising the stakeholders from the outset and in the long term



This will involve identifying the organisations that have the skills and technical experts, and which can represent the local government, institutional agencies and organisations from civil society, such as universities, environmental organisations, sectorial associations, the private sector, citizens' associations, etc. The assessment exercise requires a mobilisation of stakeholders from both inside and outside the municipality.

The “insiders” are the various technical departments and the elected representatives, while the “outsiders” are the economic and business representatives, associations, universities and research organisations.

The Nouakchott region recognised three groups of stakeholders: civil society organisations, national government departments and executives with responsibility for a territory. Each group assisted in identifying the effects of climate change, and continued to be mobilised throughout the assessment process, right up to identifying required adaptation actions



Topics dealt with during the assessment

It is recommended for the scope of the assessment to be well defined right from the beginning. In order to do that, it is necessary to identify the project's scope on an administrative level (city, district...) and on a its sectoral or thematic level. The assessment can be based on the municipality's areas of competence (management of waste products, roadways, public transport, water, town & country planning, etc.). It could, alternatively, be widened to include business sectors (such as tourism and agriculture), specific environments or ecosystems (such as forests, or water habitats), and inter-disciplinary concerns (such as public health). We recommend adopting a comprehensive approach, covering all of the territory's areas of competence as well as the business activities and ecosystems. The aim will be to identify the impact of climate change on each of the selected sectors.

The Community of towns of Zou, in Benin, chose to specifically analyse the effects of climate change on water resources, their management being a responsibility of the community of towns. The study made it possible to draw up an overall strategy for the management of water resources and to adapt to climate change in the departement of Zou in Benin.



Calling for support from the regional and national levels

Close links need to be established between the adaptation initiatives made by a municipality and the higher levels of government. The regional, and even national, levels are often able to facilitate and supply methods, and can also provide technical and financial support for implementing practical adaptation measures. In addition, identification of the risks at local level should provide a basis for the diagnosis the country has to undertake in the context of the Paris Agreement, to strengthen its ability to deal with the results of climate change. When National Adaptation Plans (NAPs) are being drawn up, specific financing is very often allocated to the Ministries to support and strengthen cities' capabilities for making local assessments of the effects of climate change. Finance is also often allocated by international funds (e.g. Global Environment Fund, or GEF, and Green Climate Fund), which verify the implementation of these activities involving cities. Cities that are aware of international

finance received by their national government for an NAP can accordingly approach the Environment Ministry to claim support. That happened, for example, in the case of GEF funding to Côte d'Ivoire and Rwanda, to produce their National Adaptation Plans.

The towns of Pikine and Guediawaye, in Senegal, included representatives from their country's Environment Ministry in the technical committees that coordinated their studies. The Ministry is involved in verifying the terms of reference for the study, and complements the technical divisions from each of the towns



Get some tools

The municipality must ensure it has conventional tools for project management and for organising and getting to grips with the various stages in the assessment (e.g. terms of reference, and retroplanning).

The assessment exercise will also require data collection tools, and considerable documentation. This will require filing systems; tools for data processing and analysis, to record the documents available and those to be sought; and participation from the citizens and other stakeholders. There will have to be a plan for maintaining and making use of surveys.

The city of Tsévié, Togo, has trained itself to use the statistics processing tool SPSS 20 to process the data collected from questionnaires on the territory's vulnerability to climate change.



2. Collecting data on exposure

What is this about?

It relates to the territory's exposure to past and future climatic hazards. This analysis involves studying the data in order to ascertain what climatic changes have been observed, either nationally or locally, over the past 10, 20 and up to 100 years. These changes could accelerate, and even become more pronounced, in the years to come. The analysis then involves reflecting on the prospect of various specific climate changes in the territory, so as to gain an understanding of what climate scenarios should be considered, looking forward to 2030, 2050, and 2100 or so, and estimating how the changes could affect phenomena such as flooding, storms and forest fires.

Improving cooperation between parties that are active in shared governance of data

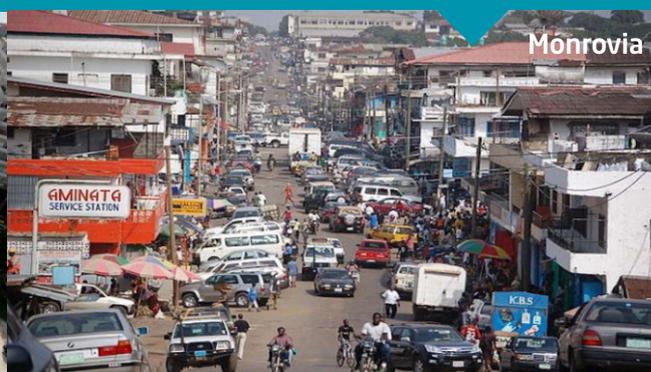
As data relating to climate change is essentially held by national institutions, cities will have to develop cooperative arrangements with those institutions, as well as with universities and research institutions that could assist in data collection. If the existing data has not been computerised, the data collection and management will be expensive for a town, which may not be able to afford the cost. One solution that has been suggested is developing partnerships with various stakeholders and considering together how to handle the data.

Dakar, the capital of Senegal, identified a number of relevant data sources, including the national aviation authority, the Dakar air-quality agency and the country's Environment Department.

International organisations can also collect data at national or local level, as the YMCA does for Monrovia, the capital of Liberia.



Dakar



Monrovia

Analysis of the climate changes already observed

This analysis involves studying scientific data so as to identify what climate changes have actually been observed nationally, inter-regionally or more locally, over the past 10, 20 and up to 100 years. The data collected enables identification of the trends in climate change, that is the relatively slow changes observed over a number of years, and also the extreme events. Analysing the climate observations makes it possible to back up what is felt, by showing the factual basis for those impressions. We recommend a cross-fertilisation between several information sources: weather stations, research laboratories, data from the Intergovernmental Panel on Climate Change (IPCC), etc.

The analysis of climate for the city of Bouaké, Côte d'Ivoire, is based on 30 years of climate data (1980-2010) supplied by Africa Rice for its station in the city (<http://eservices.africarice.org/weatherdata/index.php>). The data is supplemented by communications from Dr Diomandé, a teacher & researcher at the Physical Geography Laboratory of Bouaké's Université Allassane Ouattara (UAO). These reports are based on climate data covering 50 years (1961-2015) arising from SODEXAM (the Société d'Exploitation et de Développement Aéroportuaire, Aéronautique et Météorologique) in Abidjan.



Document analysis

Analysis of the local or regional press, aerial photographs, specialist literature and the municipality's own documents enables the compilation of a record of climate events suffered by a territory over a period of anything from 10 years to about 100 years.



Collective knowledge

It is important to compare the results from the analysis of data and documents with the perceptions and knowledge of various of the territory's "knowledge repositories" (residents, people in charge of the town's various services, and research laboratories, etc.), in order to boost reliability and precision, and to validate conclusions. Surveys can be undertaken with the contact persons, so as to investigate the current situation in a local government department or a production sector faced with climate change, and to analyse to what extent that activity or sector has been affected up to now. This method has the advantage of contributing to raising awareness on climate change issues with these contact persons.

It is useful to begin consulting local experts by bringing together representatives of the various local government departments and production sectors; that enhances each person's thoughts. Face-to-face discussions then make it possible to discuss things and go into greater depth on the points where the municipality's deep vulnerabilities have been identified at the previous meetings. This is why the document analysis stage, which is typically led from above, often proves to be an indispensable preparation, leading directly to the discussion of important issues.



Figure source: Group investigations on the perception of climate risks in the city of Pikine, Senegal, 15 September 2017.

In Tsévié, Togo, the municipality made use of regional data collected by the University. This data was supplemented by interviews conducted by the students with the contact persons, in order to categorise the climate changes that had occurred: in particular, the regularity of rainfall. The interviews were conducted with members of the city council, NGOs and other civil society organisations, decentralised departments of central government, national institutions and direct SEACAP beneficiaries. the Sustainable Energy Access & Climate Action Plan.



Analysis of climate projections

This analysis enables the identification of the climatic hazards that could appear in the future, as well as the territories that appear most threatened by these hazards.



SEACAP workshop held in Nairobi

It will be necessary to determine how likely it is that the climatic hazards experienced in the past will become more frequent and of greater severity, while also considering the probability of events or situations that have never yet occurred, even to a limited extent. The climate projections may be international or national. Many countries in Africa have produced a National Adaptation Plan in accordance with the United Nations Framework Convention on Climate Change (UNFCCC). These documents, just like the national communications, may constitute important sources of data for the assessment exercise on data from the past and on future projections.

Presentation of information on exposure

It is best to keep things simple when choosing how to present the climate projections. Retain only one or two scenarios (a median and an extreme case, for example), or differentiate them in terms of time. Also, keep things simple for the variables used to describe the projections (temperature, rainfall, etc.). Put the first “milestone” at 2030, so that the scenarios do not relate to dates too far in the future, and to encourage adaptation measures to be worked out and policy decisions made. Then extend them to later dates: 2050 or even 2080 and 2100 so as to indicate real progress. The aim is for the people receiving the information to be able to see themselves in the situation depicted and reflect on what is implied.

so as to reach conclusions on the practical effects and end up with recommendations for practical measures to adapt to climate change.

ADAPTATION: SOURCES OF INFORMATION

Climate data and future projections

-  Climate Information Portal (CIP) by CSAG (<http://cip.csag.uct.ac.za>)
- Future Climate Africa (<http://www.futureclimateafrica.org>)
- The African Risk Capacity (ARC) (<http://www.africanriskcapacity.org/>)

Disasters, disasters losses and disaster resilience

-  Global Assessment Report Risk Data Platform (<http://risk.preventionweb.net>)
- DesInventar (<http://www.desinventar.net>)
- EM-DAT: The International Disaster Database (<http://www.emdat.be>)
- PREVIEW Global Risk Data Platform (<http://preview.grid.unep.ch>)
- Disaster Resilience Scorecard for Cities (<https://www.unisdr.org/campaign/resilientcities/home/toolkit>)

JRC, SEACAP starting guide (2019)

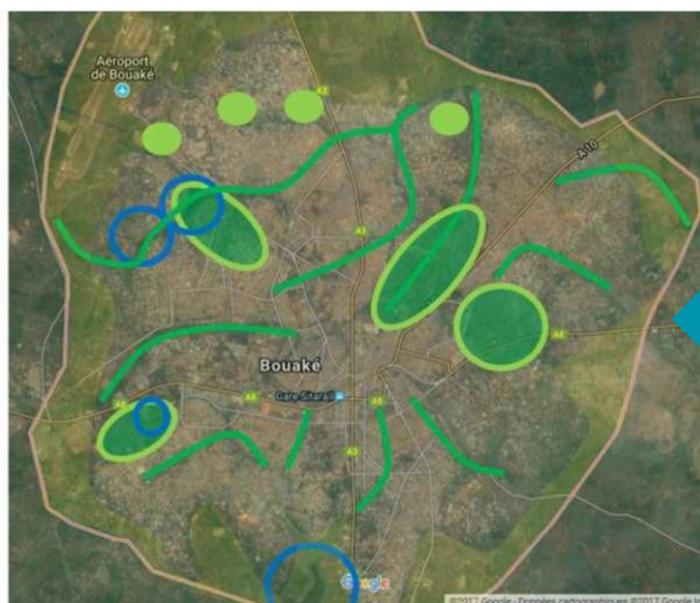
3. Collecting data on sensitivity

What is this about?

This is concerned with identifying the territory's sensitivity to climate change, in other words, how the people, infrastructure and natural elements have been and may in the future be exposed, either positively or negatively, to climatic hazards.

Data on sensitivity

The municipality must draw up a socio-economic and environmental portrait, in order to study the level of damage that the exposure has produced and will produce in a territory, looking at the municipality's departments, the business and other economic sectors, and the natural environments. Various aspects of the territory may be used, such as its geography (Does it have water resources? Its topography), its social structure (Are the people who live there young or elderly?), and its economic nature (Are parts of the economy directly affected by the climate?).



The example of Bouaké, Côte d'Ivoire: "Analysis of natural elements in Bouaké" map, from the study of vulnerability and contribution from the city of Bouaké to climate change, 2018, Bouaké municipality's Study and Advice Centre.

- Retenue d'eau
- Ligne de cours d'eau / ruissellement avec couvert végétal
- Parc / bois / forêt
- Zone urbaine avec couvert végétal
- Zone péri-urbaine avec couvert végétal

Document analysis and consulting collective knowledge

The data may come from a variety of sources. That is, indeed, recommended, just as with the data on exposure we recommended a cross-fertilisation of various scientific knowledge sources (the specialist press, data from national institutes such as INSAE, Benin's National Institute for Statistics and Economic Analysis). It is also necessary to link the knowledge of past exposure with the effects noted in the territory, by using document archives (comprising press articles, municipal and institutional documents, and specialist literature, etc.).

Such an interdisciplinary analysis will enable assessments to be made of the effects that occurred, and of the territory's ability to respond. Carrying out the interviews enables a qualitative approach to be made of the effects, supplementing the analysis of documents on sensitivity in the past. The information obtained may be on additional costs incurred (e.g. to keep roadway services operating day and night for several days following a storm, and for repairs, etc.), on the time needed to get back to normal, or on the effects on the population, etc.

The Community of towns of Zou, in Benin, organised focus groups for the assessment exercise, consulting those who lived there, so that they could express their ideas on water usage in the future.



Creating a hierarchy of impact levels

Looking at the sensitivity makes it possible to create a hierarchy of levels of impact for climate change in the territory. Categorising the levels of impact will serve as a basis for the final diagnosis of impact to be delivered, for presentation to the elected representatives and possibly also to the general public. It will make it possible to stress the most striking risks and end up with a practical result. The classification will also serve as a starting point for drawing up the municipality's adaptation strategy.

In Copargo, Benin, to assess the town's ability to adapt to the threats posed by climate change, a vulnerability matrix was constructed by combining the exposure and the sensitivity, thus making it possible to identify the town's most vulnerable sectors and sub-sectors. The matrix was validated by local representatives in workshops organised at arrondissement level. The sectors most affected were agriculture and animal husbandry, forestry, wetland activities (areas with shallow water resources), health, and human establishments.



4. Communicating the results from the assessment

A positive and comprehensible message

Adapting to the effects of climate change involves questioning lifestyles and the relationships between such factors as energy, water and travel, but it should not be described as alarming, even if not in itself a solution.

Key messages on climate change can be communicated positively examples being where costs are reduced or where there are improvements in living standards, development, attractiveness of the territory, or sustainable resource management. To enable a better appreciation of the diagnosis by the general public and other stakeholders, the effects of climate change should be illustrated by concrete examples from the territory. When a real project is presented, that makes sense and shows that action is possible. A message with a local and immediate resonance can reduce the psychological distance.



Figure 4 Mr Konan Kouakou, Assistant Director General of Bouaké's Regional Council, Côte d'Ivoire inaugurates an operation to raise awareness of forest protection and reforestation (17 July 2018).

Adapting how you communicate with your target audience, to be more persuasive

Adopting differentiated communication (without leaving anybody out) will be more effective. It is therefore necessary to appreciate the level of knowledge held by the public on the matter, in order to adapt one's narrative and messages. The messages to be communicated should not be formulated in the same terms when the municipality is addressing experts, elected representatives and the general public.

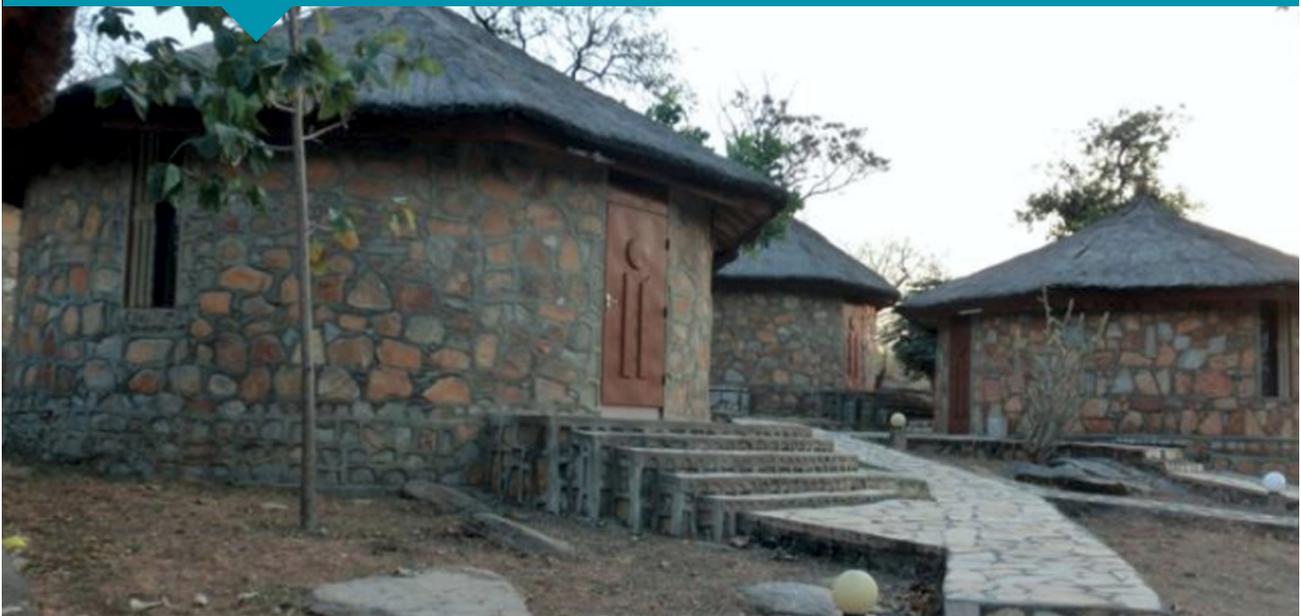
In Bouaké, Côte d'Ivoire, for example, the project team noticed that the general adult population, who are less vulnerable than children and elderly persons, were the most resistant to persuasion. Religious leaders were therefore targeted to pass on messages on the effects of climate change.



Using the most effective practices for communication and participation

Social media and articles appearing in newspapers are channels for raising awareness in cases where the messages are targeted. The towns identify their most effective practices and existing facilities for participation initiatives, such as executives engaging in dialogue on local development.

In Copargo, Benin, the municipality benefited from updating of the Development Plan, relating to the 2018-2022 period, to include the analysis of climate change effects. The participative diagnosis, carried out with the local communities (through interviews and district-level workshops), facilitated an appreciation of the town's priority sectors' exposure and sensitivity. Apart from this assessment exercise, studies were undertaken through Belgian technical cooperation relating to development of the source of Benin's longest river (the Ouémé River); and by the United Nations' equipment fund (UNCDF & UNDP), to implement forms of climate action.



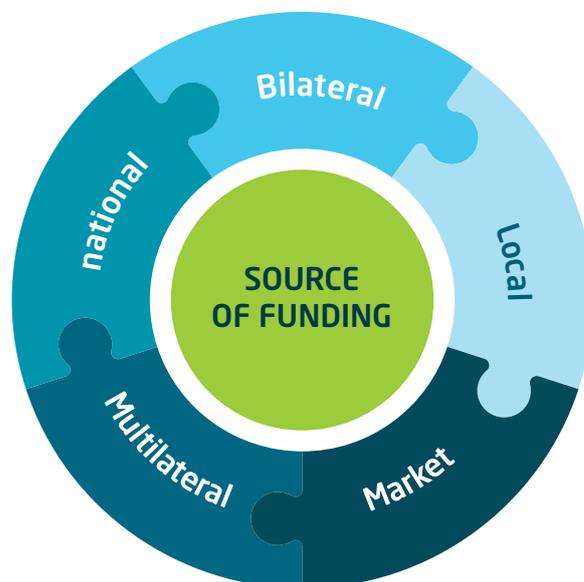
Choosing the right time to communicate

One of the difficulties relates to coordinating the calendar for publicity with the one for putting an action into operation, in order to achieve a good level of awareness in the general public. It can also involve bringing together the key moments for communication with a municipality's project (deciding on a new strategy programming document, such as a Local Development Plan, for example). Extreme events, whether they are forecast or have actually taken place, provide an opportunity to communicate a message on risk reduction possibilities.

5. Obtaining funding

Defining needs

Sources of funding can be of several types: municipal or national, bilateral or multilateral, or market (possibly involving public-private partnerships, carbon-related finance, etc.). Before beginning to establish procedures for mobilising finance, the project team has to decide what it needs in terms of resources (human and financial) to carry out the assessment, while also making provision for financing future forms of action. Additional resources and strengthened competence in relation to financial matters could facilitate moves to the scale of pilot actions, developing into “bankable” projects. In contrast, other measures may be undertaken, without specific financial arrangements. This could relate to future action relating to adaptation, included in the town’s general programming, testifying to the municipality’s commitment.



In Copargo, Benin, the town council, with technical support from the NGO Social Watch, and within the framework of the participative budget, authorised the provision of a communities fund to identify their needs and implement community forms of action such as those for adaptation to climate change.



Making a register of potential financial partners

The municipality must identify financial parties active in the territory and similar international players. At national level, these could be ministries or State agencies. At international level, the partners could be the European Union, development agencies, the African Development Bank, the World Bank, or the Green Climate Fund. Locally, the municipality could have a coordinating role, establishing public-private partnerships with civil society organisations involved in forms of adaptation action, as well as with commercial organisations. The overall situation can be shown by a diagram or a table. The names of parties playing an active role, with their functions and projects, must be communicated to facilitate an understanding of the extent to which they are likely to assist the municipality.



Financing mechanisms

- ✓ **Local Authorities' own financial resources:**
May come from grants (national or external), local taxes (houses, business, income producing sources), borrowing in terms of debt financing and loans.
EXAMPLE: *Kampala Climate Change Action – Energy and Climate Profile* (<https://www.kcca.go.ug/revenue-collection#>)
- ✓ **Grant programs:**
Investment grants or interest rate subsidies are often provided by governments to support the upfront cost of energy efficiency projects that may entail too high investment costs and long amortisation periods.
- ✓ **Soft loans:**
Soft loan schemes which offer below market rates and longer payback periods, and loan guarantees, which provides buffer by first losses of non-payment, are mechanisms whereby public funding facilitates/triggers investments in EPC.
- ✓ **Green Bonds:**
Bond markets can be a source of low-cost capital for cities and municipalities. Green bonds are bonds where revenues are allocated to "green" projects. In particular, these bonds have emerged as a financing tool for climate change mitigation and adaptation actions within cities.
EXAMPLE: *City of Cape Town's Green Bonds*
<https://propertywheel.co.za/2018/04/city-of-cape-towns-first-green-bond-wins-uk-award/>
- ✓ **Public-private partnerships (PPPs):**
The public-private partnership (PPP) is the collaboration between local authority, local investors, and local citizens, based on the awareness that both the public and private sectors can benefit by combining their financial resources, know-how and expertise.
EXAMPLE: *iShack project in South Africa* (<https://www.ishackproject.co.za/>)
EXAMPLE: *Transformative Actions Programme (TAP)*: <http://tap-potential.org/>
- ✓ **Revolving funds:**
Revolving funds are intended to establish sustainable financing for a set of investment projects. The fund may include loans or grants and have the ambition of becoming self-sustainable after its first capitalisation.
- ✓ **Crowdfunding:**
Based on individuals' efforts to support other's initiatives or projects by investing small sums of money. The main channel to gather money is internet: projects seeking funding are displayed in an online accessible portal.
EXAMPLE: *Develatech campaign* (<https://www.kenyacic.org/>)
- ✓ **Third-party financing:**
The third- party financing is a mechanism that allows another party (as ESCOs) to provide the capital and take the financial risk.

Figure Source : JRC, SEACAP Starting Guide (2019)

Developing a collective approach to mobilising finance

The private sector, the various levels of government, and civil society need to pool their knowledge of existing financing strategies, networks, the technical expertise available, and experience of access to finance. The national and international levels could strengthen this ability, identified locally, and consolidate the financing opportunities below the national level. This grouped approach also presupposes that a potential lender will have less risk to underwrite. The national level can thus play a critical role in raising finance, by establishing an appropriate regulatory framework and by strengthening the municipalities' capabilities in mobilising finance. Financing mechanisms and the responsibilities of the various levels of government can also be made clearer in national policies relating to towns.

In Benin, the Ministry of Agriculture established an agricultural support fund for towns that were heavily dependent on agricultural activities. That fund (FADeC Agriculture) made it possible to act as a counterpart to the LoCAL initiative fund of the United Nations (UNCDF/UNDP) to finance equipment intended for adaptation action. Bringing these two funds together has thus enabled the financing of an adaptation project for agricultural activities in the localities of Tchandoga and Tchandégou.



Making needs visible

The municipality's needs must be visible. This must therefore be communicated nationally and internationally by the municipality when describing its activities relating to climate change that require additional finance. The municipalities must accordingly work together and devise strategies for making a strong case when communicating, so that their financing plans are known, and taken into account. This could involve participation in national and international conferences, websites, newsletters, monitoring government ministries' programmes, etc.).

The Covenant of Mayors for Sub-Saharan Africa organises events to ensure visibility, in the context of international events, for the needs of African towns, and helps throw light on the activities of local municipalities, as part of multi-level governance activities involving national representatives (e.g. the Talanoa Dialogue held in a number of towns in 2018).



Multi-level Finance and Governance

Aligning laws and local, national and international policies, in particular those related to nationally-determined contributions (NDC), will make it possible to mobilise certain multilateral funds (such as the Green Climate Fund, or GCF; the Global Environment Facility, or GEF; and the Adaptation Fund) more effectively. Creating a forum for sharing ideas and interaction between national and lower levels of government will simplify the alignment of these objectives. Participating as local government bodies in the development and the implementation of NDCs also strengthens the recognition of the local level in defining national aims.

The potential for common initiatives and networked action

Shared management of the adaptation responsibilities of a number of municipalities that are faced with the same type of climate issues is relevant. The pooling of tasks facilitates learning, by sharing ideas on types of climate change impact experienced by territories, and will also make it easier to mobilise international funding. Some project appeals, for example, relate to decentralised cooperation (either North-South or South-South) on common problems. We can cite as an example the European Commission's call for proposals (such as that on Local governments: Partnerships for Sustainable Cities), and calls launched on a country basis (an example being the French Foreign Affairs Ministry's "Call for Sustainable-Town Projects in Africa").



Local Authorities: Partnership for sustainable cities

In Benin, the Collines Inter-municipal Group established a project covering six towns (Bantè, Savalou, Dassa-Zoumé, Glazoué, Savè and Ouessè) in the Collines département. This grouping was established in 2004, because the elected representatives and the population of the Collines département wished to build a shared vision for the development of their territory. The overall aim of the CEMAATERR project is integration at the territory level of local development policies relating to adaptation and mitigation in the face of climate change. Looking beyond the methodology, the programme aims to contribute directly to local development and to resilience in the relevant territories, by specifically emphasising access to energy and agriculture: sectors with strongly synergistic benefits in countering climate change.

What types of action assist adaptation?

The types of action to undertake will depend on the levels of both vulnerability and impact. Many forms of action can be developed to adapt to climate change!

One could, for example make adjustments in the territory's activities:

- **by optimising the management of water resources, through control of usage;**
- **by choosing bioclimatic architecture for the design of buildings, to benefit from natural cooling when temperatures rise;**
- **by introducing diversity into tourist activity, which is typically concentrated in coastal zones and thus threatened by rising sea levels;**
- **by choosing crops that are adapted to the local climate, and do not need irrigation when there is a drought, etc.**

When such adjustment actions are no longer sufficient to counter the effects of climate change, more-far-reaching transformation will need to be considered.

The action plan for adaptation to climate change must be conducted in harmony with the action plan for mitigation. We recommend that the same people be involved in the two aspects, in order to ensure consistency between them.

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