BMZ

Federal Ministry
for Economic Cooperation
and Development

Future-makers.
Building the future.
Let's join forces.

Incorporating the concept of climate change adaption into municipal planning

Initial experiences in Mali

Published by:

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

This publication presents the approaches, results and recommendations of a pilot project undertaken by the Environmental Policy Support Project (PAPE), the Local Government Support Programme (PACT) and the Sector Project to Combat Desertification (SV-CCD/GIZ-Bonn) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), in collaboration with the Agency for Environment and Sustainable Development (AEDD) acting on behalf of the Malian Ministry of Environment and Sanitation (MEA).

Authors:
Klaus Ackermann (Bonn), Sidi Konaté (Bamako)
With contributions from:
Anne Hahn, Mafing Koné, Godihald Mushinzimana, Levke Sörensen, Djiriba Traoré, Anneke Trux

Cartographic material
The cartographic representations in this document are purely illustrative and do not imply recognition of borders or territories under international law. GIZ cannot guarantee that this material is up to date, accurate or exhaustive, or accept responsibility for any direct or indirect damage caused by its use. The authors' contributions do not necessarily reflect the opinions of the editor.

CONTENTS

BOXES, FIGURES AND TABLES

BOXES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AEDD	Agence de l'environnement et du developpement durable (agency for environment and sustainable development)
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CC	Climate change
CCOCSAD	Communal Steering Committee responsible for coordinating and monitoring development actions
CFCT	Centre de formation des collectivités territoriales (local government training centre)
CNRST	National Centre for Scientific and Technological Research
CP	Climate proofing for development
DNCT	Direction nationale des collectivités territoriales (national directorate for local governments)
DNEF	Direction nationale des eaux et forêts (national directorate for water and forests)
DNPD	Direction nationale du plan et du développement (national directorate for planning and development)
DREF	Direction régionale des eaux et forêts (regional directorate for water and forests)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
MEA	Ministry of Environment and Sanitation
NRM	Natural resource management
OECD	Organisation for Economic Cooperation and Development
PACT	Programme d'appui aux collectivités territoriales (local government support programme)
PAPE	Projet d'appui à la politique environnementale (environmental policy support project)
PDESC	Plan de développement économique, social et culturel (economic, social and cultural development plan)
REDL	Réseau de réflexion et d'échanges sur le développement local (network of development actors working in the field of decentralisation and local government in West Africa)
SLM	Sustainable land management
STP/CIGQE	Secrétariat technique permanent du Cadre institutionnel de gestion des questions environnementales (permanent technical secretariat for the institutional framework of environmental issues management)
SV-CCD/ GIZ-BONN	Sector Project to Combat Desertification

FOREWORD

The impacts of climate change are undermining many of the socio-economic activities undertaken by local governments in Mali. These authorities urgently need tools that will enable them to incorporate climate adaptation measures into their plans so that they can anticipate and reduce the risks associated with climate change.

Bilateral and multilateral cooperation organisations have developed various approaches and instruments to promote efforts to combat the negative effects of climate change and encourage the adoption of adaptation measures. One of these tools, which has been developed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, is climate proofing for development.

In Mali, the Ministry of Environment and Sanitation (MEA), the Permanent Technical Secretariat for the Institutional Framework of Environmental Issues Management (STP/CIGQE) and its successor, the Agency for Environment and Sustainable Development (AEDD), have expressed a keen interest in adapting and using this tool for municipal planning processes.

Climate proofing for development was initially piloted in the framework of the project 'Strengthening national climate policy and strategies for adapting to climate change', which was supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

This initiative was followed up with a pilot project designed by the Environmental Policy Support Project (PAPE), the Local Government Support Programme (PACT) and the Sector Project to Combat Desertification (SV-CCD/GIZ-Bonn), which was led by GIZ and STP/CIGQE (now AEDD) within the MEA, and funded by the German Federal Ministry for Economic Cooperation and Development (BMZ). The objective of this project was to adapt the climate-proofing tool to procedures for formulating economic, social and cultural development plans (PDESCs), which are intended to encourage sustainable land management (SLM) by local governments in Mali.

Inspired by the promising outcomes of this approach – which are described in this publication – the Malian authorities then designed a more complex programme that was launched in January 2012 with funding from the BMU.

The actors involved in the pilot project would like to extend their warm thanks to the communes for their commitment to this initiative. They are also most grateful for the support provided by partners in various government departments, and to the German Federal Ministry for Economic Cooperation and Development (BMZ) for backing the project.

SUMMARY

Natural resources are one of the mainstays of the Malian economy. But demographic growth, repeated droughts and other climatic constraints have led to the over-exploitation and degradation of these resources, especially at the local level. This worrying situation is exacerbated by the fact that Mali is one of the countries most vulnerable to climate change, the effects of which are accelerating this type of degradation.

A good deal of time and effort have been devoted to considering how development projects and programmes can take account of climate change at the national level. Less attention is paid to its effects at the local level, even though this is where they hit hardest, since the Malian people are highly dependent on the agricultural sector and natural resources for their survival. The repercussions of climate change on subsistence activities and local economies make adaptation to climate change at the local and municipal level absolutely crucial. Incorporating climate issues and adaptation measures into local planning processes can not only help reduce people's vulnerability to climate change, but also contribute to sustainable development.

It is therefore imperative that socio-economic planning and development processes take account of the problems associated with climate change, to ensure that they include adequate adaptation measures and help strengthen resilience to climate change and its effects.

In order to tackle this issue, the Ministry of Environment and Sanitation (MEA) and the German Cooperation in Mali initiated a joint pilot project entitled 'Incorporating climate change adaptation into municipal planning', which started in April 2010 and ended in December 2010.

This project helped develop an approach that uses a mainstreaming tool developed by GIZ – climate proofing for development – and adapted it to municipal planning procedures in Mali to ensure that climate change is taken into account when economic, social and cultural development plans (PDESCs) are prepared.[1] The objective of this pilot project was to support communes in their efforts to identify, plan and implement climate adaptation measures that will help increase their resilience to climate change.

The approach was tested in six pilot communes, and the initial encouraging results presented to actors who are involved in municipal planning processes in Mali.

Key words: municipal planning – adaptation to climate change – climate proofing – PDESC – climate change adaptation measures.

1 Climate proofing for development is a methodological approach that is designed to incorporate climate change-related themes into national, sectoral and local development plans and projects, to ensure that greater account is taken of the challenges and opportunities associated with climate change.

1. CONTEXT

1

The Malian economy is heavily reliant on the exploitation of natural resources, which have become severely degraded as a result of demographic pressure and unsustainable use. The Ministry of Environment and Sanitation (MEA) estimates that about 100,000 hectares of forest are lost each year, and that land degradation is a major economic and ecological problem for the nation, costing between 20.9 and 26.5 per cent of GDP each year (MEA, undated).

Climatic constraints can have a critical impact on socio-economic development in Sahelian countries such as Mali, especially in rural areas. Marked spatial and temporal variations in the climate across the country often result in low rainfall and recurrent droughts. Mali has undergone five major droughts since 1970, and is now experiencing increasingly severe climatic conditions with greater variations in climate trends (see Box 1.1).

Lack of rainfall and rising temperatures place greater stress on ecosystems and socio-economic systems, leading to the degradation of natural resources such as agricultural land and pastoral resources, and heightening the risk of food insecurity, which currently affects about 15 per cent of the population (MEA 2011).

BOX 1.1: CLIMATE TRENDS AND FUTURE CLIMATE CHANGE IN THE STUDY AREA*

Mali is characterised by huge climatic disparities between the north and south of the country, with annual precipitation ranging from 0 mm to 1200 mm across the Saharan, Sahelian, Sudanean and Sudano-Guinean zones.

The annual average temperature has increased by 0.7°C since 1960; rising by 0.15°C each decade and with the greatest increases (0.25°C per decade) occurring in the months of April, May and June. The table and figures below show the situation in different parts of the country.

Station	1951–1970 °C	1971–2000 °C	Difference °C
Kayes	36,3	36,5	+0,2
Bamako-Senou	34,4	34,5	+0,1
Sikasso	33,7	33,9	+0,2
Segou	34,8	35,3	+0,5
Mopti	35,0	35,9	+0,9
GAO	37,1	37,3	+0,2
KIDAL	36,1	36,2	+0,1

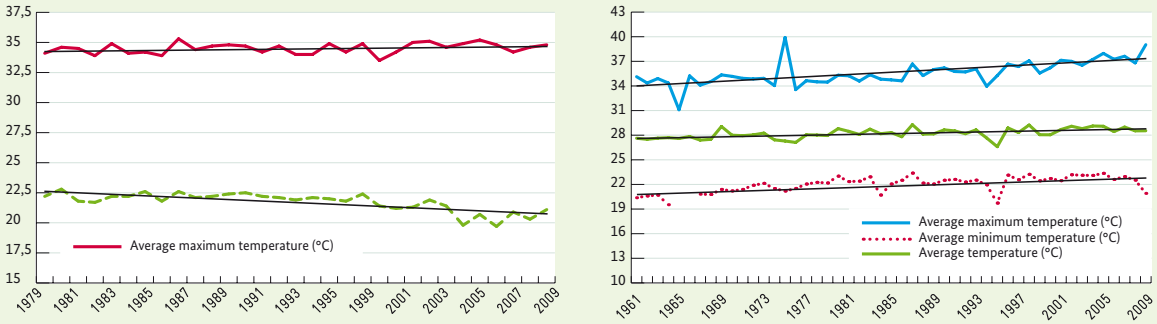


Figure 1.1: Temperature changes over time in Bamako-Sénou (left) and Ségou (right)
This projection anticipates that temperatures across the country as a whole will increase by 1.2°C to 3.6°C by 2060, and 1.8°C to 5.9°C by 2090 (see figure below).
Compiled out of the data of the respective meteorological stations.

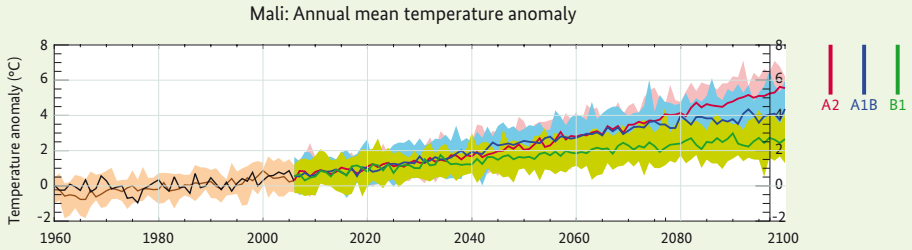


Figure 1.2: Projected temperature changes in Mali
Source: M.C. Sweeney et al. (2008).
The spatial and temporal distribution of rainfall in Mali varies considerably on an annual and ten-yearly basis, as can be seen by comparing three periods between 1921 and 2001. Between 1921 and 1941 average rainfall was around 700mm, falling slightly towards the end of this period, and was lower between 1941 and 1971 than in the two previous decades. It continued to fall between 1971 and the 1980s, dropping to an average of 400mm in the 1980s (see Figure 1.3 below).

BOX 1.2: CLIMATE TRENDS AND PREDICTED CLIMATE CHANGE IN THE STUDY AREA (CONTINUED)*

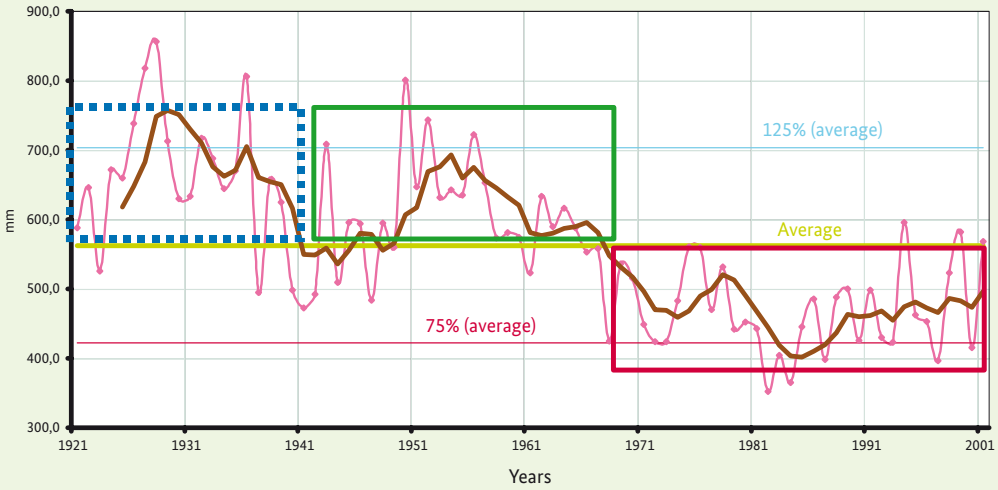


Figure 1.3: Changes in rainfall in Mali between 1921 and 2001
Average rainfall increased after a period of drought in the 1980s, but with significant year-on-year variations (see Figure 1.4). On average, rainfall declined by 20 per cent between 1951-1970 and 1971-2000 which corresponds to a movement of the isohyets of about 200 km to the south (MEA 2010). The rainy season has become shorter, contracting from five months in the 1950s to three to four months nowadays, and it is becoming increasingly difficult to predict when it will start and finish.

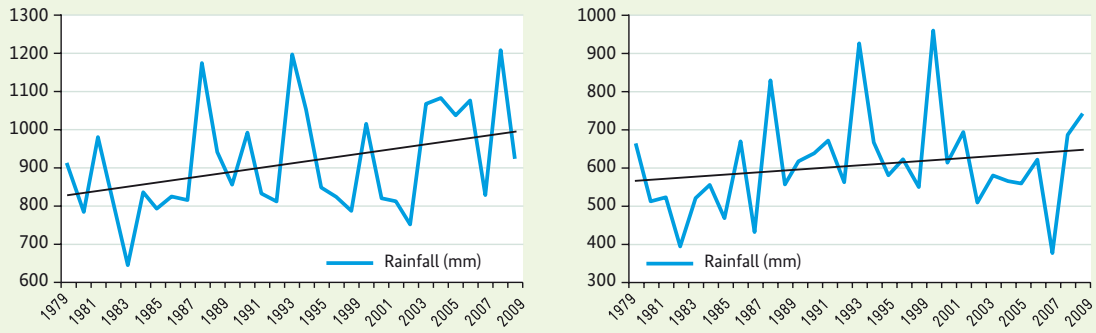


Figure 1.4: Changes in rainfall in Bamako-Sénou (to the left) and Ségou (to the right) between 1979 and 2009
Climate models show different projections for rainfall. A slight overall decrease is predicted, particularly in northern Mali and in the southwest during the rainy season. Figure 1.5 below shows how the monthly spatial distribution of rainfall in the middle of the rainy season has changed (June, August and September: (scenario A2, reference period 1970-1999).

*M.C. Sweeney et al. (2008) and National Directorate of Meteorology, Republic of Mali (2007).

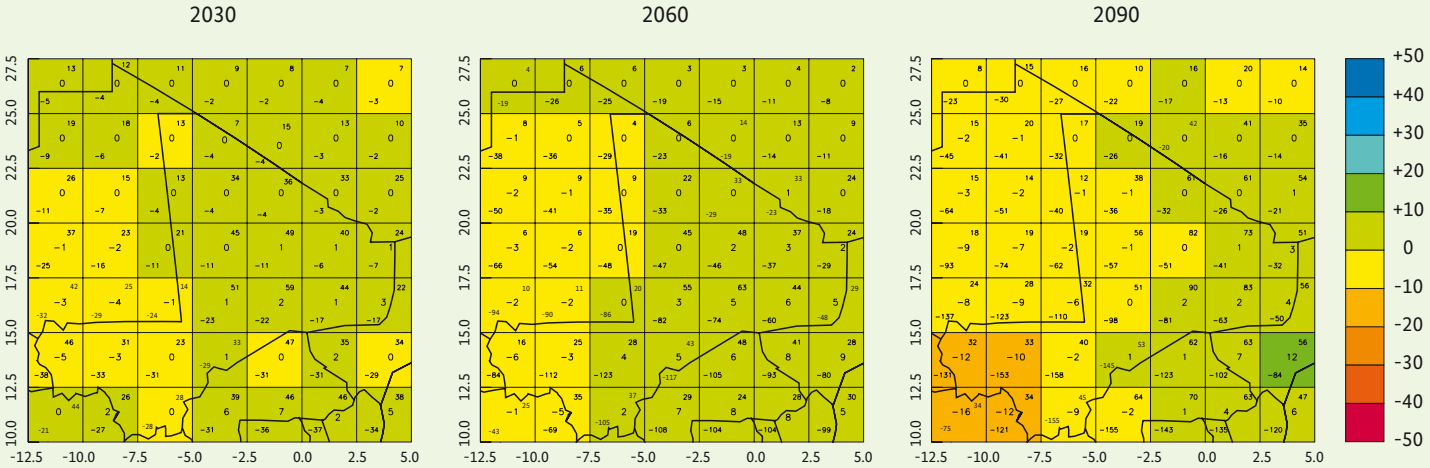


Figure 1.5: Projected changes in rainfall in Mali (June, August, September)
Source: M.C. Sweeney et al. (2008)

Mali is particularly vulnerable to climate change and variability, especially in rural areas where poor communities already have to contend with degraded land and natural resources.

Sustainable land management (SLM) techniques and strategies have enormous potential to help people deal with this situation, by:

- Re-establishing and maintaining the productive potential of degraded ecosystems;
- Strengthening resilience to the impacts of climate change and increasing the adaptive capacity of ecosystems and socio-economic systems;
- Mitigating climate change by increasing and maintaining carbon stocks in soils and the atmosphere (TerrAfrica 2009).

The Malian government aims to promote sustainable land management through a strategic investment framework that will facilitate effective, coherent and complementary implementation of SLM measures by different partners. As climatic conditions become increasingly harsh, it is essential to make measures and strategies for sustainable land and natural resource management an integral part of sustainable development in rural areas.

Because responsibility for natural resource management was transferred to local governments during decentralisation,[2] this challenge now needs to be addressed through the municipal planning process. However, few existing economic, social and cultural development plans (PDESCs)[3] take account of the issues associated with climate change, because actors at this level do not sufficiently understand them and do not have the tools to analyse vulnerability or plan for adaptation to climate change.

In order to address this problem, a pilot project designed and tested a procedure to facilitate reflection and analysis and identify adaptive strategies and measures that will become an integral part of the planning process at the municipal level. One of the key elements of this procedure is the 'climate proofing for development tool' developed by GIZ.

This pilot project, 'Incorporating climate change into municipal planning' was implemented by the Agency for Environment and Sustainable Development (AEDD) and the German Cooperation under the auspices of the Ministry of Environment and Sanitation (MEA), through the following projects and programmes: the Local government support programme (PACT), the Environmental policy support project (PAPE) and the Sector project to combat desertification (SV-CCD/GIZ-Bonn).

2 Municipal responsibilities for natural resource management are defined in several items of legislation, such as the Local Government Code and the Pastoral Charter.

3 In Mali, PDESCs are reference documents for municipal development, constituting the equivalent of the municipal development plans (MDPs) in force in other countries.

2. OBJECTIVES OF THE PILOT PROJECT

2

The general objective of the pilot project 'Incorporating climate change into municipal planning' was to support communes in their efforts to identify appropriate measures for adapting to climate change and incorporate them into municipal planning and implementation processes across Mali.

The aim was to ensure that rural communes have economic, social and cultural development plans (PDESC) that take account of adaptation measures, and thereby make rural communities and ecosystems more resilient to the effects of climate change. A number of specific sub-objectives needed to be achieved in order to do this, namely:

- Analysing the process of formulating PDESCs to identify points where the climate-proofing (CP) tool could be used to take account of the negative impacts of climate change.
- Designing a methodological approach that was tailored to local contexts, so that the concept of adaptation to climate change could be incorporated into PDESCs, and testing this approach in pilot communes.
- Consolidating the results and lessons learned from these initial experiences with local-level adaptation, and sharing them with technical departments and other actors involved in municipal planning in order to promote the incorporation of climate change into national PDESC planning procedures.

3. INTERVENTION STRATEGY

3

The project intervention strategy was based on OECD guidelines for adaptation to climate change in a development context. It was structured around the following elements:

1. **Incorporating climate change into local development planning processes.** The process of incorporating climate change adaptation into municipal PDESCs needs to tie in with existing procedures to avoid any duplication of procedures and ensure that adaptation measures can be tailored to local development needs.
2. **Developing a methodology.** Climate proofing is a tool that can be used within the municipal planning framework to identify adaptation gaps and prioritise adaptation measures (see Box 4.13). This tool will be adapted to the municipal planning process and should be incorporated into preparations for PDESCs to reduce the need for additional planning effort.
3. **Capacity building.** Carry out national, regional and local information and training workshops on climate change and the climate-proofing tool, and advise actors on its practical application to build their capacities in this field.
4. **Support for implementation.** Support communes in implementing pilot measures.
5. **Institutionalisation.** Work with the national departments concerned (STP/CIGQE and its consultative committee) from the outset, to help institutionalise the process and ensure that the PDESC planning mechanism can be adjusted at a later stage to incorporate climate change adaptation measures.
6. **Consolidation and dissemination.** Produce a document describing the process of incorporating climate change into municipal planning and presenting the results of the project; send it to the national departments concerned, the consultative committees responsible for municipal planning, technical and financial partners, GIZ programmes and projects in the sub-region, and various networks and platforms that exchange experiences and information at the national and international level.

4. METHODOLOGICAL APPROACH

This project was steered by a multi-disciplinary team representing the main stakeholders in the initiative (AEDD, PACT/GIZ, PAPE/GIZ). Its three guiding principles were to:

- Make municipal planning more sustainable by incorporating climate change adaption into PDESCs;
- Avoid parallel procedures and find appropriate points to incorporate climate proofing into PDESC planning procedures;
- Build the communes' capacity to become key actors in the implementation of adaptation programmes, which should be an integral part of their PDESCs.

This participatory and iterative approach consisted of three phases: preparation, operation and consolidation. The different steps in each phase are summarised below.

PREPARATORY PHASE

- Comparative analysis to identify the similarities and differences between procedures for formulating municipal PDESCs and climate-proofing procedures.
- Identify points where climate proofing can be incorporated into the process of formulating municipal PDESCs.
- Select six pilot communes on the basis of criteria such as:
  - (*) geographic distribution (Ségou, Koulikoro and Mopti regions)
  - (*) whether or not the commune has a PDESC
  - (*) level of motivation
  - (*) localisation in the AEDD, PAPE and PACT intervention zone.
- Recruit qualified service providers with experience in climate change, climate proofing and municipal planning.
- Inform communes about the procedure for the pilot project and options for participation in it.
- Analyse the communes' vulnerability (this was only done partially).

OPERATIONAL PHASE

- Information, sensitisation and training on climate change and climate proofing for actors involved in PDESCs at the national, regional and local levels.
- Use the climate-proofing tool to identify the points where climate change can be taken into account in PDESCs (see Box 4.1 below).
- **Prepare or revise** PDESCs that include the adaptation options identified.
- Design new technical diagnostic tools and modify certain participatory diagnostic tools according to climatic parameters and the effects of climate change.
- **Produce a concept note on incorporating climate change adaptation into municipal planning.**
- Support the implementation of one adaptation measure in each of the six pilot communes.
- **Develop a strategy to disseminate climate proofing adapted to the Malian context.**

CONSOLIDATION

- Evaluation of the results by the multi-disciplinary team.
- Monitoring mission in the pilot communes.
- Make a documentary film.
- Produce a report to build on the whole process.
- Reflect on a strategy to expand the process.

BOX 4.1 : VULNERABILITY, ADAPTATION AND CLIMATE PROOFING

Vulnerability can be defined as "the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity." *

Evaluating the vulnerability of a system is not simply a matter of assessing climatic factors, because the causes of degradation, which are accentuated by climate change, are generally complex.

Adaptation is defined as "the adjustment of natural or human systems to a new or changing environment. Adaptation to climate change refers to the adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, in order to mitigate the damaging effects of climate change or exploit the beneficial opportunities it presents."

It is essential to understand how climate change increases vulnerability in order to identify realistic and effective adaptation options. This requires a combination of scientific knowledge and local knowledge and expertise.

Climate proofing is a useful tool that provides a methodological framework for analysing the effects of climate change, as shown in table 4.1 below.

Table 4.1 : Climate proofing analysis

A	B	C	D	E	F
Climate trend	Unit of exposure	Biophysical effects	Socio-economic effects	Relevance for planning	Options for action
Increase in average temperatures Prolonged periods of drought	Forests	Changes in environmental factors (migration of species, shifting ecological zones) More intense and frequent forest fires	Limited potential to use forest products (timber, consumable and commercial non-timber forest products) Fewer jobs in the forestry sector	Direct link with the planning objective 'Sustainable forest management' Average probability of occurring	Bio-monitoring Integrated fire management

Source: Hahn and Fröde (2011), modified.

* http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf

Joint discussions with stakeholders are used to identify possible adaptation options for the units of exposure concerned, and prioritising them according to different criteria.
A key factor in the success of this process is its participatory nature.

Adaptation options	Cost	'No-regret' measures	Usefulness (degree of effectiveness)	Impact (extent to which vulnerability is reduced)	TOTAL	Ranking
Management of water sources	3	2	3	5	13	1st
Raising local awareness	2	2	3	5	12	2nd
AES measures	1	2	4	5	12	3rd
Local NRM rules and conventions	3	2	3	4	12	4th

Source : RÉPUBLIQUE DU MALI, Ministère de l'Environnement et de l'Assainissement (2009)

Grid showing scores for ranking criteria

Factor	Characteristics	Score
Cost	Very high: requires funding from a group of communes (joint communal effort) or external source	1
	High: can be covered by a single commune	2
	Moderate: can be covered by the village	3
	Moderate: can be covered by a family	4
	Very low: can be covered by one person	5
No regret measures	With regret	1
	No regret	2
Usefulness (level of effectiveness)	At the individual level	1
	At the family level	2
	At the village level	3
	At the communal level	4
	At the watershed level/across several communes	5
Impact (extent to which vulnerability is reduced)	Little impact	1
	Moderate impact	2
	High impact	3
	Very high impact	4
	Wide-ranging	5

Source : RÉPUBLIQUE DU MALI, Ministère de l'Environnement et de l'Assainissement (2009)

5. INTERVENTION ZONES FOR THE PILOT PROJECT

5

The six communes involved in the pilot project (Banamba, Koussané, Macina, Sanankoro-Djitoumou, N'Gassola and Dandoli) are shown on the map in Figure 5.1 opposite.

Socio-economic activities in all six pilot communes are based on natural resources, and productive activities are highly dependent on climatic conditions. The rainy season lasts for 4-5 months, and the dry season for 7-8 months. Main activities in these pilot communes include:

- growing rainfed crops (millet, sorghum, maize, groundnuts, rice, etc.)
- vegetable gardening
- rearing cattle, goats and sheep (semi-transhumant)
- using forest resources (producing charcoal, wild harvesting, etc.)
- fishing.

Natural resources in all six communes have been degraded by the combined effects of unsustainable use and climatic variability and trends (see Box 1.1 above), which have led to

- the degradation of forest resources
- wind and water erosion
- cultivable land becoming increasingly sandy and degraded.

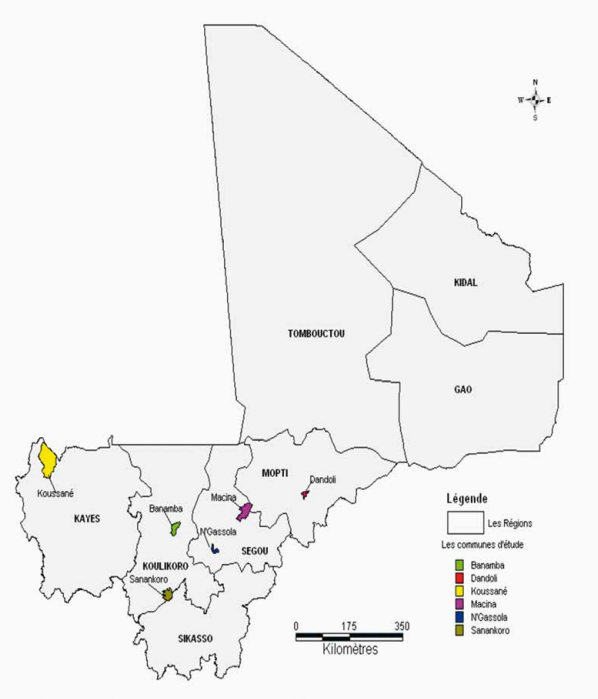


Figure 5.1: Location of pilot communes

Table 5.1 below presents some general information on the pilot communes.

Table 5.1: General information on the pilot communes

Commune	PDESC available*	Area (km²)	Population	Climatic zone (rainfall in mm)
Banamba	Yes	551	23,700	Sudano-Sahelian (615)
Koussané	Yes	3,200	23,500	Sahelian (500)
Dandoli	Yes	800	4,800	Sahelian (500)
Macina	No	?	36,200	Sahelian (700)
Sanankorodjitoumou	No	360	13,400	Sudano-Sahelian (650)
N'Gassola	No	25	5,600	Sudano-Sahelian (400-800)

*at the start of the pilot project

6. RESULTS ACHIEVED BY THE PROJECT

6.1 OVERVIEW

The results described below centre around capacity building for various actors: the technical departments involved in municipal planning, steering committees, municipal councils and others involved in preparing PDESCs.

The key output of the project was a methodology for identifying appropriate adaption measures to reduce vulnerability to climate change at the municipal level. This methodology has been incorporated into existing municipal planning procedures.

The methodology was tested and validated in six pilot communes, which all had a PDESC that incorporates the concept of adaptation to the effects of climate change by the end of the project.

The project helped each commune implement one test adaptation measure, thereby producing a concrete achievement and showing that the procedure is both useful and relevant.

6.2 DETAILED PRESENTATION OF PROJECT OUTCOMES

6.2.1 ADAPTED METHODOLOGY

In order to strengthen resilience to the effects of climate change, adaptation measures need to be based on a good understanding of the climate, how it is changing, its effects on local ecological and socio-economic systems, and how these factors interact with each other.

It is important to ensure that actors can understand and appropriate the issues associated with climate change at each stage of the municipal planning process, and to build on their own relevant knowledge and experiences.

Table 6.1: Stages involved in formulating a PDESC

Phase	Stage		Changes to the approach
Preparation	1	Put in place an institutional and technical mechanism	
	2	Train actors in the planning process	
	3	Process planned by the municipal steering committee	
	4	Information and awareness-raising campaign for all actors concerned (municipal authorities and local population)	
	5	Assess previous PDESC	
Diagnosis	6	Train actors in the diagnostic process, climate change and the climate-proofing tool	New stage
	7	Gather data for the technical diagnosis and thematic maps of the commune	Design/adapt tools, collect and analyse climate data
	8	Technical services provide technical standards and summary of costs	
	9	Prepare participatory assessments	Design/adapt tools
	10	Hold village-level sessions on participatory assessment	Design/adapt tools
	Intermediate stage: Share opportunities/advantages and problems/constraints in the commune		Design/adapt tools
	11	Identify climate change adaptation measures (using CP tool)	New stage
	12	Organise inter-community consultation days	Design/adapt tools
	13	Summarise the diagnostic process	
Planning	14	Define guidelines and objectives	
	15	Hold a planning workshop	
Finalisation[5]	16	Produce preliminary version of the plan	
	17	Present the provisional PDESC at the communal level	
	18	Validate the PDESC	
	19	Disseminate the PDESC	

5 This finalisation phase is followed by a monitoring and evaluation phase, as in the conventional PDESC procedure.

Table 6.1 summarises the methodology used for preparing PDESCs that include climate adaptation measures (see also section 6.2.2 and Annex 8.2)[4].

This table shows that all the amendments that were made to allow the process to take account of climate change adaptation occur in the diagnostic phase.

Thematic maps should be used as much as possible during the diagnostic phase and when preparing the plan, to ensure that the planned measures are consistent with existing potential in the commune.

4 Each stage of the process and the corresponding tools are numbered in line with the system used in the document *Contribution à la demarche méthodologique d'élaboration des PDESC – Niveau Communal* – REDL (2010).

BOX 6.1: NEW AND IMPROVED TOOLS DEVELOPED FOR THE METHODOLOGY

In stage 7 (technical diagnosis), a tool was introduced to make it easier to determine climate trends in the locality. If the commune does not have the necessary data for this exercise, the nearest weather station can be contacted through the regional meteorology office.

Climatic parameters in the commune			
Year	Annual maximum temperature	Annual minimum temperature	Annual rainfall
1930			
1931			
...			
...			
2009			

Comparing the average baseline climate data (temperature and rainfall) for the periods 1931-1970 and 1971-2009 provides a striking illustration of the climate change that has already occurred, and could act as a useful starting point for discussions about this issue.

In stage 10 (participatory diagnosis), tools 5 and 6 were amended so that the problems and constraints caused by climate change can be identified.

Tool 5: Grid to assess the opportunities/advantages in the village			
Name of village:..... Name of project worker:..... Date:.....			
Opportunities at village level	Opportunities before 1970	Current opportunities	Possible ways of exploiting opportunities
1.			
2.			

The column 'Opportunities before 1970' allows us to compare the situation during the wet period between 1951 and 1970 with the current situation, and show the effects of climate change.

Tool 6: Sheet identifying problems and their causes and effects				
Name of village:..... Name of project worker:..... Date:.....				
Problems/ constraints	Causes of problem (taking account of climatic causes)	Effects of the problem	Local opportunities available to resolve problem	Domain/sector
1.				
2.				

Discussions about the causes of the problems were structured to enable participants to identify which problems were caused or exacerbated by climate change.

6.2.2 INCORPORATING CLIMATE CHANGE ADAPTATION INTO PDESCS

The project piloting the incorporation of climate change adaption into municipal planning processes worked with six communes: three that had already prepared PDESCs and three that had not done so when the project started.

Incorporating climate change adaptation into PDESCs

In accordance with the guidelines set out in Table 6.1, the opportunities/advantages and constraints/problems in different villages should be identified and shared during the diagnostic phase in order to develop a coherent picture of the whole commune.

This exercise is a *preliminary stage* that takes place before the consultation days and inter-community consultations. It is carried out by the municipal council, the municipal steering committee, the technical services, the supervising agency, a climate change expert and representatives from the support structure. The main tools for this stage are shown in Box 6.2 below

BOX 6.2: IMPROVED TOOLS DEVELOPED FOR THE METHODOLOGY

As noted above, a new tool was introduced for stage 7 (technical diagnosis) to make it easier to determine climatic trends in the locality. If the commune does not have the necessary data for this exercise, the nearest weather station can be contacted through the regional meteorological office.

Tool 8. Sheet showing the overall opportunities/advantages in the commune

Domain/ sector	Opportunities in the commune	**Opportunities before 1970**	Current opportunities	Location	Possible ways of exploiting opportunities	Possible collaboration between communes (yes/no)
1.						
2.						

Tool 9. Sheet showing the overall constraints in the commune, and their causes and effects

Sectors/ sub-sectors	Problems/ constraints	Cause of problems (taking account of climatic causes)	Effects of the problem		Solutions envisaged*	Local opportunities available to resolve problem	Affected villages
			Bio-physical effects	Socio-economic effects			
1.							
2.							

* The 'Solutions envisaged' column will be completed once the gravity of the problems/constraints has been determined and climate change adaptation measures have been identified – see Box 6.3.

Tools 8 and 9 are used to present the results of the diagnosis to the villages concerned. Climatic factors (opportunities before 1970 and biophysical and socio-economic effects) are specifically considered to ensure that the whole community can understand and discuss them.

After identifying and discussing all the constraints/problems in the commune, participants categorise them in order to differentiate between the various effects of climate change.

Category 1 : Constraints/problems directly linked to ecological vulnerability to climate change, such as

- disrupted growing seasons
- reduced regenerative capacity in vegetative cover (forests, pastures, fallow land)
- increased water and wind erosion

and socio-economic vulnerability to climate change, such as

- lower agricultural yields
- increased pressure on natural resources
- lower household incomes
- food insecurity

Category 2 : Constraints/problems not related to climate change, such as

- poorly attended markets
- lack of artisanal production centre
- lack of teachers

The climate-proofing tool only applies to constraints/problems that are directly related to the impacts of climate change, in order to help identify relevant adaptation measures (see Box 6.3).

BOX 6.3: NEW STAGE 11 – USING THE CLIMATE-PROOFING TOOL TO IDENTIFY CLIMATE CHANGE ADAPTATION MEASURES

The objective of this stage is to identify effective and realistic adaptation measures that address a specific problem analysed by the whole commune. It is essential to mobilize and build on local knowledge and experience to ensure that activities are adapted to suit the local level.

Participants in this climate-proofing session include the municipal council, the municipal steering committee, the technical services, the supervisory authority (the prefect or his representative), a climate change expert and representatives from the support structure helping prepare the PDESC.

To help local actors understand the climate-proofing tool, the terminology was adapted to the local language and existing planning terminology in each commune. Thus, the term 'unit of exposure' was changed to 'sub-sector' (see Annex 8.3).

In the agriculture sub-sector in the commune of Sanankoro-Djitoumou, the following biophysical effects of climate change were identified:

- withered crops and parched plots of land (soil)
- impoverished and eroded soil
- flooded crops
- more parasites on crops
- disrupted growing seasons.

The following adaptation options were suggested to tackle these problems:

Biophysical effect	Socio-economic effects	Adaptation options
Soil erosion	• Declining agricultural productivity • Hindrance to extensive production • Need to farm new land	Anti-erosion measures • grass buffer strips • stone bunds • fascines, living hedges • reforestation • training and support for producers • materials for technical teams
…	…	…

The results of the participatory diagnosis were presented and validated at one-day inter-community consultations held in the main town of each commune (stage 12). These were organised by the municipal steering committee, and attended by representatives from the villages concerned (Konaté et al., 2010).

The development priorities of different socio-professional groups in the commune were identified, using jointly defined criteria to rank the problems/constraints that the commune is responsible for tackling. Possible solutions to these problems were then identified, using a tool that had been adapted to take account of climate change-related factors (see Box 6.4).

BOX 6.4: SELECTING PRIORITY CONSTRAINTS

The tool shown below enables participants to identify solutions to priority problems and constraints that are not influenced by climate change. Solutions to problems that are linked to climate change are documented using tool 9 (Box 6.2).

Tool 11: Grid showing priority constraints that the commune is responsible for tackling and their possible solutions

Priority constraints/ problems	Causes of the problem (taking account of climatic causes)	Effects of the problem		Names of villages affected by the problem	Possible solutions (including inter-communal initiatives)	Implementation period	
		Biophysical effects	Socio-economic effects			Short term	Medium term
1.							
2.							

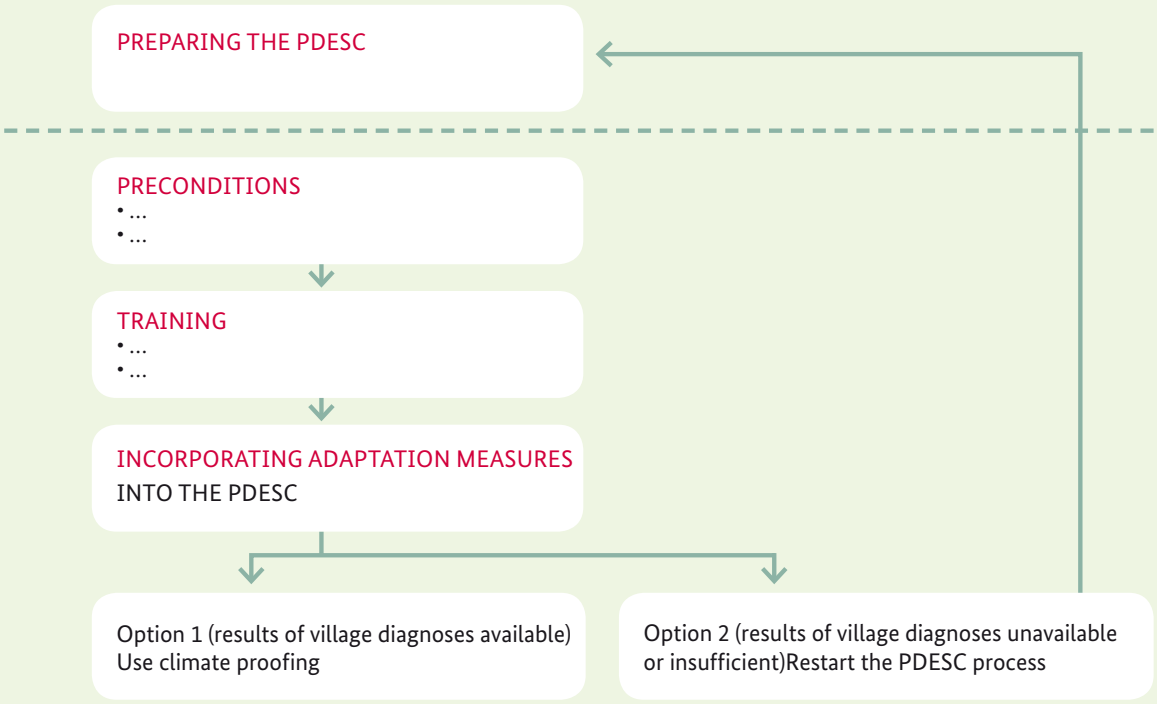
The climate change adaptation options that best address the commune's priority problems and meet specific planning objectives were prioritised during the PDESC preparation phase.

By the end of this process, the three pilot communes that had not prepared a PDESC when the project started had developed a plan that included options for adaptation to climate change.

Incorporating climate change adaptation into existing PDESCs

Figure 6.1 below shows the procedure for incorporating climate change adaptation measures into an existing PDESC.

Figure 6.1: Stages in revising an existing PDESC to incorporate climate change



PRECONDITIONS

A commune that wishes to start the process of incorporating adaptation to the effects of climate change into its PDESC should

- consult the supervisory authority about its plans to revise the PDESC
- inform the villages and all actors concerned about the objectives of incorporating climate change into the PDESC
- deliberate on the revision of the PDESC in order to take account of climate change
- put in place a municipal steering committee (if possible composed of members of the steering committee involved in producing the PDESC that is to be revised)
- establish a partnership with an appropriate organisation/institution to support the process (technically and financially)

TRAINING

The process should start with capacity building for actors involved in incorporating climate change into the PDESC, so that they are better able to follow the process and take ownership of it.

CHOOSING OPTIONS FOR INCORPORATING CLIMATE CHANGE ADAPTATION INTO AN EXISTING PDESC

Where the results of the village diagnosis are available and sufficiently detailed (Option 1), the climate-proofing tool can be applied directly to the problems/constraints associated with climate change. The adaptation options that are identified and selected should also be incorporated into the municipal investment plan when it is revised.

It is important to

- use the results of the exercise to discuss common opportunities/advantages and problems/constraints in order to identify the problems/constraints in each sub-sector that may be caused or aggravated by climate change
- collect or make available historical climate data for the commune/region, to determine current and future climate trends in the zone (seek support from the meteorological services)
- apply the climate-proofing tool on the basis of future climate trends, in order to identify appropriate adaptation options
- update the table presenting common opportunities/advantages and problems/constraints
- identify priority problems/constraints that the commune is responsible for tackling

Where data from the village diagnosis is unavailable or insufficient (Option 2), it will be necessary to restart the planning process, following the approach taken in communes without a PDESC.

6.2.3 SUMMARY OF ADAPTATION MEASURES IDENTIFIED IN THE PILOT PROJECT

The six communes involved in the pilot project identified various adaptation measures for different sectors. Table 6.2 below shows some of the measures that were selected as priority actions.

TABLE 6.2: SUMMARY OF ADAPTATION MEASURES BY SECTOR (EXAMPLES)

Sector	Negative effects of climate change	Adaptation measures	
		Type of activity	Activities
Agriculture	• Crops wither before maturing • Increasingly eroded and degraded soils • Flooded crops • More weeds and parasites • Disrupted growing seasons • Declining agricultural productivity • Water points and wells dry up early	Anti-erosion measures	• Stone bunds, grass buffer strips, fascines, etc. • Set aside plots of land for rehabilitation • Work along contours • Use zai (planting pits) • Reforestation of strategic sites (watersheds)
		Improve agricultural techniques	• Use adapted seeds (short-cycle, drought-tolerant) • Soil and water conservation techniques • Enrich soils (manure pits, composting) • Agro-forestry techniques
		Improve water management	• Deepen pools and wells • Clear sand from dams • Construct water points and dams • Adjust growing times to predicted weather patterns • Put in place early warning systems
Livestock rearing	• Impoverished and degraded pastures • Water points and wells dry up early • Declining productivity	Strengthen governance	• Draw up local agreements • Manage pasture land • Rotate grazing • Adapt herd sizes to carrying capacity
		Improve the quantity and quality of grazing land	• Encourage assisted natural regeneration • Increase the use of adapted fodder crops • Establish fodder stocks
		Improve the availability of water	• Deepen water holes and wells • Clear sand from dams • Construct water points and dams
Forestry	• Increasingly degraded forest resources • Accelerated desertification • Poor natural regeneration • Disappearance of certain types of flora and fauna • Fewer wild harvest products	Strengthen governance	• Prepare and implement local development plans • Draw up local agreements • Integrated fire management • Create rural timber markets
		Rehabilitate forests	• Set aside plots of land to encourage natural regeneration • Assisted natural regeneration • Forest enrichment
		Reduce pressure on forest resources	• Promote improved stoves • Use woodcutting techniques that encourage regeneration
General		Livelihood diversification	• Process produce locally (to create local added value) • Promote alternative income-generating activities

6.2.4 SUPPORTING THE IMPLEMENTATION OF TRIAL MEASURES

After incorporating climate adaptation measures into their PDESCs, each of the six pilot communes was given assistance in implementing a trial adaptation project.

By helping them take climate change into account in the municipal planning process and undertake certain actions to adapt to its effects, the project encouraged the communes to organise themselves so that they can better mobilize resources to implement planned activities in their PDESCs.

Some of the trial measures that were supported over an eight-month period are summarised in Box 6.5 and Table 6.3 below.

BOX 6.5: PILOT SOIL AND WATER CONSERVATION PROJECT IN THE RURAL COMMUNE OF BANAMBA

Description	During the diagnosis, local people cited the degradation of natural resources as a major problem, especially degraded soils. Therefore, one of the priorities in this commune's PDESC is to rehabilitate degraded areas and promote land management techniques that avoid erosion.
Objectives	The project aims to strengthen local people's capacity to use soil and water conservation techniques (SWC) to stabilise agricultural and livestock production.
Expected impacts	Capacity-building measures will enable the target population to design and plan appropriate SWC measures. The introduction of concrete measures will have a positive impact on agricultural land and encourage people to use more SWC techniques on their plots.
Costs	

	FCFA	EUR
Total	4,500,000	6,920
Subsidy	4,000,000	6,150

TABLE 6.3: EXAMPLES OF PILOT MEASURES SUPPORTED BY THE PROJECT

Type of measure	Setting up vegetable gardens	Processing groundnuts and derived products
Commune	Sanankoro-Djitoumou	N'Gassola
Description	Develop two one-hectare plots in two villages in the commune for use as vegetable gardens. The main focus of activities is producing and processing fruit and vegetables.	CThis project focused on locally produced peanut butter. It worked with the N'Gassola agricultural produce processors association, and aimed to produce at least 8,000kg of peanut butter per year.
Objectives	Food security for local families and higher incomes for women in the villages involved in the project.	Improve local living conditions by helping create local jobs.
Expected impacts	Diversifying their sources of income will make farming households less vulnerable to poor harvests caused by climatic risks. Growing and selling products in vegetable gardens generates jobs and additional income for women and families.	Diversifying their income makes people less dependent on agriculture in a context of climate change. Promoting local supply chains also makes them less dependent on volatile markets, and helps make this rural area a more stable place to live and work. The waste products from peanut butter production were used to help regenerate soil fertility, and thus improve human and animal nutrition.
Costs	FCFA / EUR Total: 5,181,000 / 7,970 Subsidy: 4,000,000 / 6,150	FCFA / EUR Total: 4,200,000 / 6,460 Subsidy: 3,993,500 / 6,140

6.3 COSTS ASSOCIATED WITH INCORPORATING CLIMATE CHANGE ADAPTATION INTO MUNICIPAL PLANNING

To help estimate the costs of incorporating the concept of climate change adaptation into municipal planning, Table 6.4 below shows the costs associated with this process in the six pilot communes.

Taking account of climate change incurs additional costs due to the need to involve climate change experts in the process and allow more time for workshops, especially during the diagnostic phase. These costs represent about 20 per cent of the total cost of revising existing PDESCs, and about 10 to 15 per cent of the cost of preparing new PDESCs. Certain activities also required one-off investments (such as funding for consultants), which will ultimately benefit a large number of communes:

- Training for actors involved in the process
- Designing the training modules
- Designing and improving tools to adapt the methodological procedure for preparing PDESCs
- Analysing and sharing climate information.

TABLE 6.4 : COSTS OF INCORPORATING CLIMATE CHANGE ADAPTATION INTO PDESCS

Stage	Type of expense	Revising existing PDESCs			Preparing new PDESCs		
		Dandoli	Banamba	Koussané	Sanan-koro-Djitou-mou	N'Gassola	Macina
Awareness-raising and training for municipal actors; diagnostic support	Consultancy fees for climate change expert	250,000	250,000	250,000	760,000	760,000	760,000
	Expenses for co-trainers and climate change expert	300,000	300,000	300,000	1,301,850	788,200	1,304,750
	Participants' expenses (travel, food, etc.)	670,000	670,000	670,000			
	Materials	30,000	30,000	30,000	56,000	56,000	56,000
	Additional costs associated with climate change	292,500	292,500	292,500	213,350	266,000	280,000
Planning support	Fees for co-trainer, travel expenses, per diems, board and lodging	155,000	155,000	155,000	881,700	647,000	1,228,000
	Participants' expenses (travel, food, etc.)	576,500	596,500	586,500			
	Materials	77,950	77,950	77,950	100,000	100,000	100,000
	Additional costs associated with climate change	146,300	150,300	148,300	176,340	129,400	245,600
Revise and draft PDESCs	Consultants' fees	240,000	240,000	240,000	353,000	461,000	530,000
	Total (FCFA)	22,99,450	2,319,450	2,309,450	3,452,550	2,812,200	3,978,750
	Total (EUR)	3,538	3,568	3,553	5,312	4,326	6,121
	Addl climate change costs (FCFA)	438,800	442,800	440,800	389,690	395,400	525,600
	Addl climate change costs (EUR)	675	681	678	600	608	809
	Addl climate change costs (%)	19	19	19	11	14	13

6.4 ASSESSMENT OF THE APPROACH

Overall, using the climate-proofing tool to incorporate climate change adaptation into the PDESC planning process had positive impacts on both the methodological and technical aspects of the planning exercise. The climate-proofing sessions in the communes provided a platform for useful discussions and debates about planning PDESCs between representatives of the technical services, the municipal councils and the municipal steering committees, which helped the actors involved better understand and take ownership of the issue.

The following aspects of the approach merit particular mention:

Relevance to the communes

Participating in the design and implementation of pilot measures enabled municipal actors to better understand and take ownership of the approach. This was helped by certain methodological features, such as:

- The fact that the commune was responsible for the planning process (setting up a team to lead the whole process on behalf of the municipal council).
- Climate proofing was incorporated into the existing planning approach, rather than creating a new process.

- Climate-proofing terminology was harmonised with that of the PDESC planning process.
- The participatory nature of the process made it possible to mobilize and build on local knowledge of the problems associated with climatic variability and change, their impacts, and possible adaptation options.
- The project did not intervene in municipal decision-making processes regarding development guidelines, objectives and actions.
- Supporting the implementation of priority adaptation measures encouraged communities to direct more energy and resources into PDESC-related activities.

Added value

In general, it is fair to say that the communes whose development plans take account of the negative impacts of climate change have a more sustainable vision, as their planned measures already consider of climatic risks and their effects on investment, etc. This should improve their chances of securing funding, as more and more donors include these factors in their plans.

The climate-proofing tool allows the process of preparing and updating PDESCs to take more systematic account of climatic and environmental factors. The logic behind this tool encourages more in-depth discussion and analysis of the causes and effects of degraded natural resources. Looking beyond the purely climatic dimension of this issue generates environmental analyses that are based on local experience and knowledge.

Unfortunately, the lack of reliable climate data and limited scientific knowledge regarding the impact of climate change on ecosystems made it impossible to evaluate the vulnerability of ecosystems and socio-economic systems in any detail. Nevertheless, the process generated relevant information that can be used to develop strategies to help improve resilience to climate change.

Additional costs of the approach

Incorporating aspects of climate change into municipal planning adds about 30 per cent to the cost of the process (about 1,000 Euros). This is a worthwhile investment when one considers that the overall quality of PDESCs is improved by more in-depth analysis of environmental factors, which in turn leads to better and more realistic planning and assessment of natural resource management priorities. Implementing planned measures ultimately helps increase the communes' resilience to the effects of climate change.

Relevance of the adaptation measures

Several types of adaptation measure were identified:

- Anti-erosion measures and soil and water conservation techniques
- Improved agricultural and pastoral production techniques
- Improving the availability of water
- Stronger governance of natural resources
- Rehabilitation and sustainable management of natural resources
- Income diversification.

Most of these measures meet the requirements for sustainable development, which is one of the basic principles of development plans. Incorporating climate change into PDESCs helps prioritise these measures in relation to other measures such as improving infrastructure.

From the technical point of view, the measures identified should help make ecosystems and socio-economic systems more resilient to the effects of climate change. They largely meet the technical and scientific recommendations for sustainable development (GIZ, 2011; Dorlöchter-Sulser, Nill, 2012; Liniger et al., 2011; Woodfine, 2009).

In terms of gender, the climate-proofing approach helps strengthen the role of women in the planning process. Women were involved throughout the diagnostic and planning process in the six pilot communes, and certain adaptation measures reflect their priorities and will be of direct benefit to them (see Table 6.3).

In terms of implementing the PDESCs, it should be noted that a number of planned activities will require external support. In many cases provision should be made for technical and financial capacity building. PDESCs that take account of climate change can provide a reference framework for development programmes in which the communes are involved as partners.

6.5 RECOMMENDATIONS

The recommendations presented below draw on the experiences of this pilot project:

1. **Broaden the approach across several levels to ensure vertical coherence, by:**
   - → Taking account of the district and regional levels when incorporating climate change into development planning.
   - → Defining and promoting the complementarity between different levels (for example, by analysing the vulnerability of ecosystems across the whole region to provide a reference framework for the communes).

2. **Strengthen the empirical basis of the climate-proofing approach at the municipal level, by:**
   - → Disseminating the concept of incorporating climate change adaptation into PDESCs so that it can be incorporated into municipal planning in other agro-ecological zones.
   - → Disseminating this tool among other actors that help communes prepare PDESCs.
   - → Assessing the communes' chances of gaining access to funding.
   - → Evaluating the implementation of planned measures in these communes.

3. **Improve the scientific and conceptual basis of the approach by:**
   - → Developing standard tools for analysing vulnerability that are adapted to the municipal level and which incorporate local experience and knowledge.
   - → Mobilizing knowledge about local climate change scenarios.
   - → Clarifying the concept of 'adaptation measures'. There is a certain overlap between adaptation and development, which can be seen as a continuum from general development activities to explicit measures to respond to the impacts of climate change (OECD 2009). In the municipal procedure, having a clear definition of 'eligible' adaptation measures can help ensure that the climate-proofing approach is relevant and adds value to the process.

4. **Control costs, by:**
   - → Continuing to evaluate the cost of incorporating climate change adaptation into municipal planning, taking account of the human and financial resources this will require.
   - → Seeking to rationalise the approach in order to avoid economic obstacles to its adoption.
   - → Analysing vulnerability on a larger scale (eco-region) in order to make the process more effective and minimise the investment needed.
   - → Taking account of the municipalities' capacity to mobilize financial resources.

5. **Be inclusive:**
   - → Involve rural organisations and NGOs in the training of trainers.
   - → Systematically promote women's involvement in the process of planning and implementing PDESCs.

6. **Communication :**
   - → Share and discuss experiences with technical and financial partners.
   - → Produce a factsheet on this experience.
   - → Ensure that all the actors involved in planning are aware of the need for the PDESC planning process to take account of measures to adapt to the harmful effects of climate change, which threaten to undermine the huge efforts invested in municipal development.
   - → Develop a strategy to inform municipalities about the approach and disseminate a package that includes teaching materials in local languages.

7. **Build on experiences and adjust the regulatory framework:**
   - → Evaluate experiences in this field and ensure that the regulatory framework and tools needed to develop PDESCs are adapted accordingly.
   - → Develop and adapt local services and ensure that the necessary capacity building is in place.

7. RÉFÉRENCES BIBLIOGRAPHIQUES

COULIBALY, I.B. (2010) : *Rapport du processus d'élaboration du Plan de Développement Économique, Social et Culturel (PDESC) intégrant les aspects de changement climatique. Commune Rurale de N'Gassola.* STP/CIGQE, PAPE, PACT and SV-CCD/GIZ Bonn, October 2010.

CNRST (2003) : *Élaboration de scénarios de changement climatique pour le Mali – Projet CLIMAT.* CNRST, April 2003.

DOLO, D. (2010) : *Rapport du processus d'élaboration du PDESC (2011–2015) avec intégration des aspects de changement climatique. Commune Rurale de Macina.* STP/CIGQE, PAPE, PACT and SV-CCD/GIZ Bonn, October 2010.

DORLÖCHTER-SULSER, S. ; NILL, D. (2012) : *Recueil de bonnes pratiques de conservation des eaux et de restauration et de protection des sols et de leur potentiel pour l'adaptation au changement climatique. Une analyse des projets de gestion des ressources naturelles au Sahel.* GIZ. At press.

FOMBA, Y. (2010) : *Rapport d'accompagnement du processus d'élaboration du Plan de Développement Économique, Social et Culturel (PDESC) 2010 – 2014, intégrant des aspects de changements climatiques. Commune Sanankoro-Djitoumou.* STP/CIGQE, PAPE, PACT and SV-CCD/GIZ Bonn, October 2010.

GIZ (2011) : *Aides sectorielles d'adaptation – agriculture ; ressources naturelles ; désertification.* Internal reference documents for environmental and climatic studies.

KEITA, M. ; MUSHINZIMANA, G. (2010) : *Mise en œuvre du PDESC communal, Commune rurale de Macina. Projet d'adaptation aux changements climatiques – projet de boisement des bosquets villageois.*

KEITA, M. ; MUSHINZIMANA, G. (2010) : *Mise en œuvre du PDESC communal, Commune rurale de N'Gassola. Projet d'adaptation aux changements climatiques – projet de transformation de l'arachide et de ses dérivés.*

KEITA, M. ; MUSHINZIMANA, G. (2010) : *Mise en œuvre du PDESC communal, Commune rurale de Sanankoro-Djitoumou. Projet d'adaptation aux changements climatiques – projet d'installation de périmètres maraichers.*

KONATE, S. ; MODIBO, L. ; MUSHINZIMANA, G. ; SOERENSEN, L. (2010) : *Intégration des changements climatiques dans la planification communale. Concept note, draft version.* AEDD, PAPE, PACT, CCD/GIZ Project. Bamako, Mali.

LINIGER; H. ; MEKDASCHI, R. ; HAUERT, C. ; GURTNER, M. (2011) : *La pratique de la gestion durable des terres. Directives et bonnes pratiques pour l'Afrique subsaharienne.* WOCAT, FAO, TerrAfrica.

OCDE (2009) : *Adaptation to climate change and development cooperation: policy paper.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE BANAMBA (2010) : *Plan de Développement Économique, Social et Culturel de la commune rurale de Banamba, intégrant des aspects du changement climatique, 2010-2014.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE DANDOLI (2010) : *Programme de Développement Économique, Social et Culturel de la commune rurale de Dandoli, intégrant des aspects du changement climatique, 2010-2014.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE KOUSSANE (2010) : *Plan de Développement Économique, Social et Culturel de la commune rurale de Koussane, intégrant des aspects du changement climatique.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE SANANKORO-DJITOUMOU (2010) : *Plan de Développement Économique, Social et Culturel de la commune rurale de Sanankoro-Djitoumou, intégrant des aspects du changement climatique, 2010 – 2014.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE NGASSOLA (2010) : *Plan de Développement Économique, Social et Culturel (PDESC), intégrant les aspects des changements climatiques, 2011 – 2015.*

RÉPUBLIQUE DU MALI, COMMUNE RURALE DE MACINA (2010) : *Plan de Développement Économique Social et Culturel (2011 – 2015), intégrant les aspects du changement climatique.*

RÉPUBLIQUE DU MALI, DIRECTION NATIONALE DE LA MÉTÉOROLOGIE (2007) : *Programme d'Action National d'Adaptation aux Changements Climatiques.*

RÉPUBLIQUE DU MALI, MINISTÈRE DE L'ENVIRONNEMENT ET DE L'ASSAINISSEMENT (2009) : *Manuel d'utilisation du Climate Proofing dans les projets et programmes de Gestion Durable des Terres au Mali.*

RÉPUBLIQUE DU MALI, MINISTÈRE DE L'ENVIRONNEMENT ET DE L'ASSAINISSEMENT (no date) : *Dégradation des sols.* http://www.environnement.gov.ml/index.php?page=degradation-des-sols. Consulted on 20 January 2012.

RÉSEAU DE RÉFLEXION ET D'ÉCHANGES SUR LE DÉVELOPPEMENT LOCAL / REDL (2010) : *Contribution à la démarche méthodologique d'élaboration des PDESC – Niveau Communal.*

TERRAFRICA (2009) : *La gestion durable des terres en Afrique. Des opportunités pour augmenter la productivité agricole et atténuer les émissions de gaz à effet de serre.* Information memo on climate n° 2

WOODFINE, A. (s.d.) : *Using sustainable land management practices to adapt to and mitigate climate change in sub-Saharan Africa. Resource Guide – version 1.0.* www.terrafrica.org

8. ANNEXES

8.1 ADDITIONAL INFORMATION ON THE PROCESS OF REVISING/FORMULATING PDESCS THAT TAKE ACCOUNT OF CLIMATE CHANGE

Duration of the process

On average, the process of preparing a PDESC that takes account of climate change takes **almost the same time** as the conventional process (between three and six months). As a general rule, **three extra days** are needed to prepare a PDESC that takes account of climate change. This extra time is needed to incorporate information about the problems and risks associated with climate change into the training and diagnoses. This training therefore takes three days instead of two. The diagnostic phase of the new process includes **one new stage** that lasts for two days: stage 11, 'Incorporating measures to adapt to climate change'.

Quality and nature of the data to be gathered

Both processes require relevant, accurate, up-to-date, accessible, interpretable and consistent data.

In addition to the data normally required for the conventional process, the new procedure also involves **collecting and analysing meteorological data** in order to establish current climate trends in the intervention zone. Information on future climate trends should be obtained from the national Directorate of Meteorology or the AEDD. Certain aspects of the diagnosis will need to be more detailed to take greater account of factors relating to climate change.

Quality of the human resources involved

The new process not only requires conventional development planning skills, but also **knowledge of climate change and its effects**. This knowledge is needed for the training and to guide the sessions where measures to adapt to the constraints associated with new climatic trends are identified. It should be fairly easy for people who are familiar with municipal planning processes (PDESCs) to assimilate this kind of knowledge.

The budget for preparing PDESCs

The new process may increase the cost of the process by about **10 to 20 per cent**, as the PDESC takes longer to prepare and requires expertise in climate change and vulnerability analysis.

The cost will increase by about 10 to 15 per cent in communes that have not prepared a PDESC, and about 20 per cent where an existing PDESC has to be revised to take account of climate change. This additional expense can largely be justified by the fact that actions that take account of climate change are affordable and sustainable, and are therefore quickly defrayed.

8.2 MAIN STAGES AND TOOLS INVOLVED IN PREPARING PDESCS THAT TAKE ACCOUNT OF CLIMATE CHANGE

	Stage		Tool		Requirements for the process to take account of climate change
Preparation	1	Put in place an institutional and technical mechanism			Expert climate advice and support for the technical team
	2	Train actors in the planning process			
	3	Steering committee plans the process	1	Grid estimating the actual municipal budget over the last 3 years	Terms of reference take account of climate change issues
			2	Grid of the commune's estimated financial commitments	
			3	Example of a communication plan	
	4	Information and awareness-raising campaign for actors			
	5	Assessment of the previous PDESC	4	Grid assessing the previous PDESC	
Diagnosis	6	New stage: train actors on the diagnostic process, aspects related to climate change and use of the climate-proofing tool			Prepare a participant's workbook on climate change for the steering committee and organise a day of training on climate change
	7	Technical diagnosis or reference situation		Sheet to collect climate parameters in the commune	Analyse observed and projected climate trends (literature, meteorological service)
	8	Provide technical standards and cost summaries			
	9	Prepare participatory village diagnostics			
	10	Undertake village diagnostics	5	Grid summarising the village's opportunities/advantages	
			6	Sheet identifying the problems and their causes and effects	Systematic consideration of the effects of climate change as a possible cause of problems; identify adaptation options
			7	Sheet showing priority constraints	
	Intermediate stage: share the opportunities/advantages and problems/constraints in the commune		8	Sheet showing all the opportunities/ advantages in the commune	
			9	Sheet showing all the constraints in the commune, and their causes and effects	Problems classified according to whether or not they are influenced by climate change
	11	New stage: identify measures to adapt to climate change		Use the climate-proofing tool	
	12	Inter-community consultation days	10	Sheet classifying priority constraints that the commune is responsible for tackling	
			11	Grid selecting priority constraints that the commune is responsible for tackling	Use tool 11 to identify solutions to the priority constraints/problems not influenced by climate change. Use tool 9 to take account of solutions to priority problems/constraints that are influenced by climate change
	13	Summarise the diagnostic process			

	Stage		Tool		Requirements for the process to take account of climate change
Prepare plan	14	Set development guidelines and PDESC objectives	12	Grid summarising the different plans	
			13	Grid formulating objectives	Take account of adaptation options when formulating objectives
	15	Planning workshop	14	Sheet analysing and reformulating problems and their causes and effects	Reformulate objectives (in communes with PDESCs)
			15	Grid estimating the cost of actions to be implemented	Take account of the costs of adaptation to climate change
			16	Grid identifying achievable actions to overcome constraints	
			17	Multi-year investment and development plan for the commune	
			18	PDESC financial planning tables	
			19	Progress in mobilizing resources required for the PDESC	
			20	Annual investment plan	
	16	Produce provisional version of the PDESC			
Finalisation	17	Present provisional PDESC to the commune	21	Grid summarising the PDESC	
	18	Validate the PDESC			
	19	Disseminate the PDESC			

8.3 TOOLS FOR DETERMINING THE GRAVITY OF THE PROBLEMS/CONSTRAINTS AND IDENTIFYING MEASURES TO ADAPT TO CLIMATE CHANGE

Future climate trends at the communal level, such as

- Higher temperatures
- Lower and poorly distributed rainfall (temporal and spatial distribution)
- Intensification of extreme weather events (droughts, floods)

A Sub-secteur	B Biophysical effects	C Socio-economic effects	D Level of risk (high, medium, low)	E Possible solutions	F Local opportunities to resolve the problem	G Villages concerned
	Key question: What are the biophysical effects of climate trends on the sub-sector concerned?	Key question: What social and economic effects does the biophysical effect have on the local population?	Key question: Based on predicted and actual climate trends (from 1970 to the present day), what is the probability that this biophysical effect will occur? a) Next year b) Over the next 10 years (high/medium/low) If the answer to both questions is high or medium, or high for one and medium for the other, solutions need to be found. If the answer to both questions is low, or low and medium, no solution needs to be considered.	Key question: What solutions are envisaged to reduce or avoid the effects on the sector/ sub-sector and the local population?	Key question: Are there local opportunities (human, material, financial, institutional or other resources) to implement the solutions envisaged in column E?	Key question; Which villages are affected by the biophysical effect?

Source : KONATE *et.al.* (2010)

Published by
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Convention Project to Combat Desertification

Friedrich-Ebert-Allee 40
53113 Bonn, Germany
T +49 228 44 60-0
F +49 228 44 60-17 66

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15

ccd-projekt@giz.de
www.giz.de/desertification

Design and layout
MediaCompany GmbH, Bonn

Printed by
Druckerei Kliewer GmbH
Printed on FSC-certified paper

Photo credits
Cover page, pages 17, 21, 25, 31, 34, 39: Michael Martin
Pages 8, 27: Mafing Koné
Page 22: Modibo Ly

As at
December 2012

GIZ is responsible for the content of this publication.

On behalf of
Federal Ministry for Economic Cooperation
and Development (BMZ);
Division for rural development; global food security

Addresses of the BMZ offices
BMZ Bonn
Dahlmannstraße 4
53113 Bonn
Germany
T +49 228 99 535 - 0
F +49 228 99 535 - 3500

BMZ Berlin
Stresemannstraße 94
10963 Berlin
Germany
T +49 30 18 535 - 0
F +49 30 18 535 - 2501

poststelle@bmz.bund.de
www.bmz.de