TERMINAL EVALUATION: ENHANCING ADAPTIVE CAPACITY AND RESILIENCE TO CLIMATE CHANGE IN THE AGRICULTURAL SECTOR IN MALI

Terminal Evaluation: Final Report

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Project Name	Enhancing adaptive capacity and resilience to climate change in Mali's agricultural sector
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Executing Agency	National Directorate of Agriculture
Implementation Timeframe	2010-2014, with a two-year extension at no cost
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Terminal Evaluation Timeframe	October-November 2016
Evaluator	Jessy Appavoo from SouthSouthNorth and Djibril Doucoure from AE2C

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Abbreviations and Acronyms

ACDI	Canadian International Development Agency
AEDD	Environmental and Sustainable Development Agency
CbA	Community-based Adaptation
CCC	Communal Consultative Committee
CMDT	Malian Textile Development Company
CNRST	National Scientific Research and Technology Council
CPS/MA	Ministry of Agriculture: Statistical Planning Unit
DFM/MA	Ministry of Agriculture: Finance and Equipment Directory
DNA	National Directorate of Agriculture
DNACPN	National Directorate of Sanitation and Pollution Control
DNEF	National Directorate of Water and Forestry
DNPA	National Directorate of Production and Husbandry
DNSV	National Directorate of Veterinary Services
EbA	Ecosystem-based Adaptation
ENI-ABT	Abderhame Baba Touré National Engineering Institution
GCAM	Meteorological Assistance Group
GEF	Global Environment Facility
IER	Rural Research Institute
IPCC	International Panel for Climate Change
JICA	Japan International Cooperation Agency
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
M&E	Monitoring & Evaluation
NAPA	National Adaptation Programme of Action
OHVN	Niger Valley Office
PDSEC	Economic, Social and Cultural Development Plan (*PDSEC*)
PIF	Project Identification Form
PMU	Project Management Unit
SIDA	Swedish International Development Agency
TE	Terminal Evaluation
UNDP	United National Development Programme
WFP	World Food Programme

Please note that the acronyms listed in *italics* in the table above and throughout this report highlight the acronyms as they would be used in French.

Purpose of the evaluation

The evaluation focused on the effectiveness and quality of implementation of the activities. Through this evaluation, it was determined whether the Project Management Unit and on-the-ground staff had the required technical expertise for the successful implementation of the project. The adaptation activities developed and implemented during the implementation phase and the risks and assumptions identified in the ProDoc were also evaluated.

The evaluation of the project was undertaken partly through an analysis of the Results Framework, which is an implementation tool to: i) analyse alignment of project activities with the overall objectives and expected results; and ii) measure the success of a project through the targets reached. Another aspect explored in this evaluation is the management of funds during the implementation phase. This particular aspect of the evaluation is based on the degree of use of the funds as intended at the approval of the CEO endorsement and on the use of additional funds to implement project activities.

The quality of implementation of the project by the implementing and executing agencies was assessed. This aspect primarily pertained to whether the project results, the level of support provided, the implementation of good risk management practices and the information contained in the annual reports compiled are results oriented. This aspect is important because it assesses whether an appropriate team has been put in place to implement the project.

An important aspect of implementation is the Monitoring and Evaluation (M&E) system developed and implemented throughout the lifespan of the project. Therefore, the Evaluation Team undertook an in-depth evaluation of the M&E system applied by the Project Management Unit in this project. The M&E system is evaluated in terms of the relevance of the M&E plan and its implementation, adaptive management such as the development and implementation of adaptation measures based on the results of the M&E system as well as the conclusion and recommendations of the mid-term evaluation. The Evaluation Team also examined compliance with progress and financial reporting requirements.

Purpose and Objective of the Evaluation

The project entitled "Enhancing adaptive capacity and resilience to climate change in Mali's agricultural sector" began in 2010 and is currently being implemented. The project is expected to be completed in December 2016. The project is financed by the Least Developed Countries Fund through the Global Environment Facility. The designated executing and enforcement authorities are the United Nations Development Program and the National Directorate of Agriculture.

The objective of the evaluation is to assess the achievement of project results and to draw lessons that could improve the sustainability of the benefits arising from the project and contribute to improving the overall UNDP programming in Mali.

The project is in the final quarter of implementation and, as part of the contractual obligations to the donor, an independent Terminal Evaluation of the project has been undertaken. The purpose of this final evaluation is to assess: (i) the project strategy; (Ii) progress towards results; (Iii) implementation on the ground of the project; and (iv) the sustainability of the interventions implemented to achieve the overall objective of the project.

Approach and methodology

An evidence-based assessment was undertaken to assess the relevance, effectiveness, efficiency, impact, and sustainability of the project. This evidence-based assessment relied on input from key stakeholders who have been involved in the design and formulation, implementation, and monitoring of the project. In addition, the information collected from these stakeholders was supplemented and corroborated with project-related documents compiled throughout the lifespan of the project. Site visits were undertaken during a field mission in Mali to ground-truth the information contained in the project-related documents and to consult with beneficiaries.

The overall approach and methodology of this evaluation was aligned with evaluation guidelines. This evaluation was undertaken by an International Consultant and a National Consultant and included the following activities:

- An evaluation mission was undertaken in Mali from 10-19 October 2016.
- Key stakeholders were consulted during the in-country mission.
- Field visits to three of the beneficiary communities.
- A desk review of the information available on the financed project.
- A debriefing meeting with the UNDP and the Project Management Unit.

Key Findings and Recommendations

On the basis of the information presented in this report, the project performance was satisfactory. During the field mission, it was apparent that the beneficiaries are satisfied with the project and have ownership of the interventions implemented. The interventions implemented under the project to increase resilience to climate change have improved food availability through the use of climate-resilient seeds as well as new land and water management activities.

The evaluation of the project led to the identification of several strengths and shortcomings. As the project was implemented in a satisfactory manner, there were more strengths than shortcomings. The strengths identified are:

- The establishment of the Communal Consultative Committee.
- Involvement of beneficiaries.
- Partnerships created in the implementation of the project.
- Gender mainstreaming in the formulation of activities.
- Adaptation interventions customised to the needs of the beneficiary communities.
- Consideration of climate information in developing the planting schedules.
- Co-funding from the Canadian International Development Agency.
- Improved food security in beneficiary communes.

Despite the strengths mentioned above, the following shortcomings were noted:

- Limited availability of baseline information to measure the results of the project.
- Some of the performance indicators lacked clarity and were too vaguely articulated.
- A weak M&E system.
- The Meteorological Assistance Groups were not functional and did not fulfil their role.
- A budget that was not clearly articulated in the ProDoc.
- The delay in the implementation of the activities of Component 3.

Based on the results of the overall evaluation, the following key recommendations were made:

- The interventions of Component 3 need to be implemented as soon as possible. A qualified Communication Specialist should be contracted to develop the material to communicate the lessons learnt to key stakeholders.
- It would be beneficial if the Meteorological Assistance Groups are revived before the end of the project. This would ensure that the climate information aspect of the project does not fall apart after its completion.
- The project team should as soon as possible define the modalities for setting up and operating the micro-credit fund. The Project Team should request the expertise of reputable consultants in the field to ensure the financing of the alternative climate-resilient income-generating activities.

1. INTRODUCTION

1.1. Purpose of Evaluation

The project entitled "Enhancing Adaptive Capacity and Resilience to Climate Change in the Agricultural Sector in Mali" started in 2010 and is expected to close-out in December 2016. The project is financed by the Least Developed Countries Fund (LDCF) fund through the Global Environment Facility (GEF). The designated implementing and executing authorities are the United National Development Programme (UNDP) and the National Directorate of Agriculture (*DNA*).

The objective of the evaluation was to assess the achievement of project results, and to draw lessons that can improve on the sustainability of the benefits derived from the LDCF-financed project thus far, and contribute towards improving the overall UNDP programming in Mali.

The project is in the last implementation quarter and as part of the contractual obligations to the donor, an independent Terminal Evaluation (TE) of the project was undertaken. The purpose of this TE was to assess: i) the project strategy; ii) the progress towards results; iii) the on-the-ground implementation of the project; and iv) the sustainability of the interventions implemented to achieve the overall objective of the project.

1.2. Evaluation Scope and Methodology

An evidence-based assessment was undertaken to assess the relevance, effectiveness, efficiency, impact, and sustainability of the LDCF-financed project. This evidence-based assessment relied on input from key stakeholders who have been involved in the design and formulation, implementation, and monitoring of the project. In addition, the information collected from these stakeholders was supplemented and corroborated with project-related documents compiled throughout the lifespan of the project. Site visits were undertaken during a field mission in Mali to ground-truth the information contained in the project-related documents and to consult with beneficiaries.

The overall approach and methodology of this evaluation was aligned with the guidelines outlined in the UNDP Guidance for Conducting Terminal Evaluation for projects financed by the GEF. This evaluation was undertaken by an International Consultant and a National Consultant and included the following activities:

- An evaluation mission was undertaken in Mali from 10-19 October 2016. The itinerary and programme of the mission is included in the Mission Report. See Annex A.
- Key stakeholders were consulted during the in-country mission. The list of stakeholders consulted is included in Section 3.1.1 of this report.
- Field visits to three of the beneficiary communities in the communes of Sandaré, Massantola and Cinzana. A Mission Report detailing the consultations held, the data gathered, and the on-the-ground interventions visited is included in Annex A.
- The Evaluation Team conducted a desk review of the information available on the LDCF-financed project. These include *inter alia* the Project Document (referred to as the ProDoc from hereon), progress reports, midterm review, financial reports and key deliverables. A list of the documents consulted is included in Annex B.
- A debriefing meeting was scheduled for 18 October with the project team and the UNDP staff. However due to schedule clash, the UNDP staff member could not be present and therefore the debriefing session was re-scheduled for 30 October 2016. The National Consultant led the meeting and the International Consultant joined in via skype.

Data collected during the fact-finding phase of the mission was cross-checked between many sources to validate the findings. The Results Framework as stated in the ProDoc was used as an evaluation tool. An evaluation matrix was adapted and used as an evaluation tool to determine the overall performance of the project.

1.3. Structure of the Evaluation Report

The evaluation report has been structured in such a way as to provide a detailed description of the LDCF-financed project, objectives, targeted beneficiaries, results, and impacts. The findings of this evaluation are structured per project phase – i.e. formulation, implementation and results.

1.3.1. Project Formulation

Under project formulation, the evaluation is focused on how clear and practical were the project's objectives and components as stated in the ProDoc. This section of the evaluation is also focused on the alignment of the project outcomes as articulated in the Results Framework with the SMART criteria. According to the UNDP guidelines on conducting evaluation, the SMART criteria is as follows:

Table 1: SMART criteria

S	**Specific**: Outcomes must use change language thereby describing a specific future condition
M	**Measurable**: Results – whether quantitative or qualitative – must have measurable indicators, making it possible to assess whether they were achieved or not
A	**Achievable**: Results must be within the capacity of the partners to achieve
R	**Relevant**: Results must make a contribution to selected priorities of the national development framework
T	**Time-bound**: Results are never open-ended, there should be an expected date of accomplishment

The evaluation on the project formulation was largely guided by the above criteria and formed the basis of the assessment.

1.3.2. Project Implementation

In addition to evaluating the appropriateness of the project objectives, this evaluation includes whether the technical capacity of the Project Management Unit (PMU) and the on-the-ground staff was considered for the successful implementation of interventions. Partnership arrangements for the implementation phase as well as the risks and assumptions as identified in the ProDoc are assessed.

The section of the report on project formulation focuses on the use of the results framework as a Monitoring and Evaluation (M&E) tool during the lifespan of the project. The objective of the results framework is to guide the implementation of the LDCF-financed project and to implement corrective actions, if necessary, to meet targets so that the overall objective of the project is achieved. The above is aligned with the assessment of the level of adaptive management – i.e make the necessary changes to the mode of implementation that are to be applied in response to risks and changes that arise – adopted by the PMU. Another theme to be explored under this assessment is project finance. This aspect of the evaluation is based on the degree to which the co-financing that was initially committed at the CEO endorsement level has materialized and if any additional funding was leveraged for the LDCF-financed project. In line with the project finance aspect, the cost-effectiveness of the project was evaluated by analyzing the costs of implementing each activity in relation to what was planned at CEO endorsement. This aspect of the evaluation was further bolstered by considering the time factor – i.e. the implementation of interventions over the specified timeframe to meet or exceed the outcomes. Due diligence in terms of managing the project-related finances is also assessed.

The evaluation criteria mentioned above, especially those pertaining to project finance, have been applied in the context of the LDCF-financed project. For example, it is acknowledged in this evaluation that the costs provided in the ProDoc have to be adjusted for inflation. The criteria used to assess the project formulation have been applied in a manner that is sensitive to the political economy in which the project was implemented. Applying these criteria in a sensitive manner to the prevailing socio-economic conditions coupled with the on-the-ground visits provide a comprehensive and realistic picture of the implementation of the LDCF-financed project.

The quality of execution of the LDCF-financed project by the implementation agency and the executing agency is also evaluated and rated. This aspect pertains mostly to whether there was sufficient focus on the project results, level of support provided, the implementation of good risk management practices and the accuracy of and level of details contained in the annual reports compiled. This is an important aspect as it assesses if the proper support structure was put in place to successfully deliver the LDCF-financed project.

A significant aspect of implementation is the M&E system applied throughout the lifespan of the project. Therefore, in this evaluation, the Evaluation Team has undertaken an in-depth assessment of the M&E system applied in this project. The M&E system is evaluated in terms of the appropriateness of the M&E plan and its implementation. In this assessment, the Evaluation Team looked at the compliance with progress and financial reporting requirements and the adaptive measures developed and implemented in terms of the M&E findings as well as the response findings and the recommendation of the Mid-Term Review undertaken in 2014.

1.3.3. Project Results

In GEF terms, project results include direct project outputs, short- to medium-term outcomes, and longer term impact, including global environmental benefits, replication efforts, and local effects. The main focus is at the outcome level, as most UNDP supported GEF financed projects are expected to achieve anticipated outcomes by project closing, and recognizing that global environmental benefit impacts are difficult to discern and measuring outputs is insufficient to capture project effectiveness.

1.4. Ethical Considerations

The evaluation was conducted in accordance with the United Nations Evaluation Group (UNEG) Ethical Guidelines for Evaluators. The Evaluation Team ensures that the anonymity and confidentiality of individuals who were consulted during the in-country field mission. In addition, the Evaluation Team requested permission from individuals or community representatives before photographs of community members and interventions were taken. In keeping with the UN Declaration of Human Rights, the results of the evaluation are presented in a manner that is respectful of stakeholders' dignity and self-worth.

1.5. Response to Review Comments

The comments of the PMU and the Implementing Agency, i.e. the UNDP, pertained largely to the format of the report and the clarification of certain points made in the report. The questions/clarification points were raised by either the PMU or the UNDP during a meeting held in December 2016:

- The use of the GEF's logo as well as that of the Government of Mali and the UNDP on the cover page.
- The meaning of certain acronyms used in the report.
- The shifting of recommendations for the formulation of future projects from the recommendations section into lessons learned (Chapter 5).
- The statement that there was a lack of clarity in the budget (as contained in the ProDoc) thereby making it difficult for it to be interpreted and used by the PMU.
- The small share of the budget allocated to the operation of the PMU.
- The delay in the implementation of the activities of Component 3.
- The limited number of staff within the PMU.

The Evaluation Team factored the concerns raised by the PMU and the UNDP in the formulation of the final report. Certain changes were made to the content of the report address the concerns above. The UNDP clarified that the structure and composition of the PMU for the LDCF-financed project is consistent with the traditional structure adopted in the implementation of UNDP projects, and therefore the budget allocation for project management was deemed adequate and in keeping with other projects. In addition, the Government of Mali contributed to the LDCF-financed by supporting the salaries of the staff members on the PMU. Despite the concerns raised, the Evaluation Team maintained that there was a lack of clarity in the budget and a considerable delay in the implementation of the activities of Component 3.

1.6. Limitations

The field mission was undertaken over 10 days in October 2016. As a result of time limitation, not all project sites and interventions could be visited during the course of the field mission. In addition, field visits to two of the intervention sites were cancelled on the day because of heavy rains making the access road unusable in Sandaré and the mourning of the passing away of a community member in Cinzana. However, the field mission programme was adjusted accordingly to ensure that the Evaluation Team visited as many different types of on-

the-ground interventions as possible during the field mission to cover most of the interventions implemented under the LDCF-financed project.

As a result of the ongoing conflict in the North, interventions in the sites of Taboye and Mondoro could not be visited. It would be have been useful for this evaluation to understand the implementation of the project in an agro-ecological zone that is different from the sites in the southern parts of the Mali. It needs to be pointed out that few interventions were undertaken in Taboye and Mondoro as implementation was slowed down because of the outbreak of the conflict.

Another limitation identified which is applicable solely for the purpose of this evaluation – and not for the project as a whole – is that it is challenging to isolate the benefits derived from the LDCF from those of Canadian International Development Agency (*ACDI*) given that interventions were financed by both funds in four of the intervention sites; Sandaré, Cinzana, Massantola and M'Pessoba. As the activities financed by the LDCF and *ACDI* are complementary, it is therefore challenging to attribute specific benefits to the LDCF without recognizing that the enhancing benefits from *ACDI*'s interventions. For example, the construction of a dam was financed by *ACDI* in Massantola while the LDCF financed several interventions including the establishment of cereal demonstration plots – using climate-resilient seeds - and market gardens. Because of the dam, the beneficiary communities access water more easily which they use for irrigation purposes in the market gardens. As a result, a good yield was recorded for various produce in the market gardens and the beneficiaries have increased their food production, availability and supply. Therefore as a result of the interventions financed by both the LDCF and *ACDI*, the food security status of the beneficiaries has increased.

The consultations held with beneficiaries and the CCC during the field mission was focused solely on the interventions financed by the LDCF.

1.7. Evaluation Ratings

The findings of the evaluation are compared to the targets that were set at CEO endorsement in the Results Framework. These findings were analysed in light of the local circumstances in which the project was implemented. In this evaluation, the GEF rating scales were used for the different aspects of the project are used. A six point GEF scale is used to assess and rate the outcomes, effectiveness, efficiency, M&E and execution of the LDCF-financed project. The scale ranges from highly satisfactory whereby there were no significant shortcomings to highly unsatisfactory which would depict a situation where severe shortcomings were noted. The sustainability of the project is assessed and the presented on a four point scale, ranging from likely to unlikely. In this instance, the highest rate points out that there are negligible risks to the likelihood of continued benefits after the end of the project, and the lowest rate indicates that there are severe risks that the project outcome will not be sustained beyond the project's lifespan. The impact of the project is presented on a three-point scale from significant to minimal. The rating scales used in this evaluation are presented in the following tables:

Table 2: Ratings for outcomes, sustainability, relevance and impact

Rating for outcomes, effectiveness, efficiency		
Rating score	**Rating**	**Corresponding description**
6	Highly Satisfactory (HS)	The project has had no shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency
5	Satisfactory (S)	There were only minor shortcomings
4	Moderately Satisfactory (MS)	There were moderate shortcomings
3	Moderately Unsatisfactory (MU)	The project had significant shortcomings
2	Unsatisfactory (U)	There were major shortcomings in the achievement of project objectives in terms of relevance, effectiveness or efficiency
1	Highly Unsatisfactory (HU)	The project had severe shortcomings

Sustainability rating		
Rating score	**Rating**	**Corresponding description**
4	Likely (L)	Negligible risks to sustainability
3	Moderately Likely (ML)	Moderate risks
2	Moderately Unlikely (MU)	Significant risks
1	Unlikely (U)	Severe risks

Relevance rating	
Rating score	**Rating**
2	Relevant (R)
1	Not Relevant (NR)

Impact rating	
Rating score	**Rating**
3	Significant (S)
2	Minimal (M)
1	Negligible (N)

2. Project Description

The following table provides a brief timeline of the project lifespan from inception to completion

Table 3: Project Description

PIF approval	October 2008
PPG approval	Jan 2009
Start of implementation	June 2010
Mid-Term Review	December 2014
Project completion (forecasted)	December 2016
Terminal Evaluation	October 2016

2.1. History of the LDCF-financed project

The LDCF-financed project is the very first to be formulated and implemented within the field of climate change adaptation in the agricultural sector in Mali. The project concept was identified in the National Adaptation Programme of Action (NAPA). The Government of Mali received funds from the GEF to identify the main climate change adaptation priorities and develop project ideas to decrease the vulnerability of local communities and economic sectors to the negative effects of climate change. As a result, stakeholder participation was undertaken with state actors, research institutions, and vulnerable local communities. Each stakeholder group raised their own concerns and the common theme was the increasing scarcity of water resources that negatively impacted on lives and livelihoods of Malians. In addition, as rain-fed agriculture is widely practiced in Mali, it became more apparent that the agricultural sector is and will continue to be vulnerable to the current and predicted effects of climate change. This implies a loss in productivity and the availability of arable land, economic losses in an economic sector that employs approximately 80% of the population, and a decrease in food security. The likely effects of climate change would therefore significantly threaten the potential for economic development in Mali.

The LDCF-financed project was formulated to increase resilience to climate change within the agricultural sector. During the process of developing the NAPA, it became apparent that there was a need to develop the capacity of policy- and decision-makers as well as research institutions within the agricultural sector to: i) understand the impacts of climate change on agriculture; and ii) formulate and implement adaptation interventions. The LDCF-financed project was therefore formulated to respond to this need identified in Mali's NAPA. It is the very first adaptation project formulated and implemented in the agricultural sector in Mali. Capacity building was coupled with demonstration activities and a strong focus on information dissemination, as it is a pilot project.

The beneficiary sites for the LDCF-financed project was determined based on a vulnerability assessment undertaken under another donor-funded project in Mali as well as the vulnerability classification of communes included in the programme "l'Initiative 166 Communes." as a means to understand the food security status of communes in Mali and to prioritise interventions to address the increasing threat of food insecurity in the country. Out of the 703 communes in the country, 166 were identified as highly vulnerable to food insecurity. The areas vulnerable to food insecurity as identified in the initiative mentioned above are Massantola, Mondoro and Taboye. The project was implemented in the following areas of Mali:

Table 4: Characteristics of selected communes

Region	Circle	Commune	Population (2009)	Agro-ecological zone
Kayes	Nioro	Sandaré	25,591	Sahelian
Koulikoro	Kolokani	Massantola	35,565	Sahelian
Ségou	Ségou	Cinzana	36,440	Sudanese
Sikasso	Koutiala	M'Pessoba	36,297	Sudanese
Mopti	Douentza	Mondoro	42,631	Sahelian
Gao	Bourem	Taboye	20,503	Saharian

The project is financed by the LDCF fund through the GEF. The designated implementing and executing authorities are UNDP and the *DNA*, respectively. The project is expected to end in December 2016. The project was initially approved for a total of four years – i.e. from 2010 to 2014; however, the GEF has granted the project a two-year extension at no extra cost.

2.2. Project Rationale

The Government of Mali is committed to stimulating rural economies, improving agricultural productivity and promoting sustainable land management. As a result, many interventions have been formulated and implemented with the support of bilateral donors. However, the need remains to build sector-wide resilience to the current and predicted effects of climate change. The projected effects of climate change are likely to be degrading natural resources, increased desertification, and losses in crop and livestock production. Under these conditions, current socio-economic conditions will worsen as Mali's economy is largely built on agriculture, which absorbs most of the working population. If climate change is not addressed, Mali is unlikely to achieve sustainable development.

The LDCF-financed project was therefore formulated to address urgent and immediate adaptation needs as identified in the NAPA process. The project focused on strengthening capacities for adaptation to climate change in the agricultural (including livestock farming) sector in the context of increasing the resilience of rural livelihoods. This project contributed to building resilience to climate change in agricultural production systems in the country and eventually to the food security of the beneficiaries. This was to be achieved through a series of interventions aimed at strengthening the technical capacities of policy- and decision-makers and agricultural research institutions to the effects of climate change as well as the formulation and implementation of corresponding adaptation interventions. The component of the project builds on the process of decentralization in Mali whereby municipalities at the commune level require strengthening of their technical and adaptive capacities to decrease their vulnerability to the effects of climate change. The capacity building activities were further bolstered through demonstration activities on adaptation options in the agricultural sector.

This is a pilot project and is expected to play a catalytic role in developing an evidence base for adaptation and supporting the mainstreaming of best-practices in the agricultural sector in Mali. The project is expected to generate and disseminate valuable lessons on the use of low-technology tools and methods and the diversification of income-generating activities with the objective of stimulating a sector-wide transition towards climate resilience. The best-practices and lessons learnt identified can then be applied to specific agro-ecological zones to upscale and replicate the benefits of the project on a regional or national scale with the objective of achieving food security, which is a national priority in Mali. In addition, the findings of the LDCF-financed project are intended to specifically inform the "Initiative 166 Communes" to increase food security in the most vulnerable communes of Mali.

2.3. Project Goals and Objectives

The project was formulated to address climate change in the agricultural sector and some of the pertinent barriers that have limited the adoption of adaptation strategies to achieve sector-wide resilience. These barriers are:

- Limited awareness and technical capacity of policy- and decision-makers in line ministries and local governing structures on the increasing threats posed by climate change and the corresponding interventions to adapt to or limit their impacts on vulnerable segments of the population.
- A breakdown in the communication of climate information to vulnerable local communities, which results in insufficient consideration of agro-meteorological information in prevailing agricultural practices.
- Limited access to financial resources to finance adaptation interventions.
- Limited capacity of farmers to identify or formulate appropriate adaptation interventions to increase the resilience of their production systems to climate change.
- Insufficient communication of agricultural best-practices to inform local government structures and farmers on building resilience within their own production systems.

The objective of the LDCF-financed project was therefore to enhance the adaptive capacities of vulnerable rural populations to the additional risks posed by climate change on agricultural production and food security in Mali. The objective of the project was to be delivered through three complementary components:

- Component 1: Capacities to prevent and manage the impacts of climate change on agricultural production and food security are improved
- Component 2: Climate resilience of agricultural production systems and the most vulnerable agro-pastoral communities strengthened
- Component 3: Best practices generated by the project capitalized on and disseminated at the national level

Under Component 1, the interventions were targeted at raising awareness and technical capacities of policy- and decision-makers makers, technical staff and research institutions in six pilot municipalities to systematically address climate change and the likely impact on food security. The enhanced awareness and capacity building was delivered through a series of interventions including *inter alia*: i) training provided to officials of technical government structures on the need to mainstream climate change in the rural development agenda; ii) the development and dissemination of guidelines to promote the integration of adaptation considerations in rural development policies and plans; and iii) the revision of Economic, Social and Cultural Development Plan (*PDSEC*). See Annex C for the logframe detailing the interventions implemented under the LDCF-financed project.

Component 2 was focused on developing and implementing on-the-ground adaptation interventions in targeted municipalities. The interventions were used to demonstrate the benefits of practicing climate-resilient agriculture and other income-generating activities, but also to improve food security in some of the most vulnerable communities. The interventions undertaken included *inter alia*: i) the use of climate information to inform agricultural practices such as the type of climate-resilient seeds to be used and the corresponding time for sowing; ii) the establishment of demonstration plots using cereal climate-resilient seeds; ii) the training of beneficiaries on techniques to improve the quality of the soil such as composting and the use of organic manure; iii) the establishment of market gardens (with irrigation facilities) to increase the resilience of the local food production system; and iv) the procurement of tools and equipment to promote the participation of women in income-generating activities.

As this was a pilot project, one of the components focused on the dissemination of best-practices and lessons learned from the demonstration of adaptation interventions as well as awareness raising and capacity building of key stakeholders. This project has contributed to creating an evidence base for adaptation interventions in Mali, from which best-practices and lessons learned can be drawn for implementation in other vulnerable communities, if not on a national scale. In addition, the lessons learned will inform the development and implementation of similar projects in the future.

2.4. Climate Change Impacts Expected to be Addressed by the Project

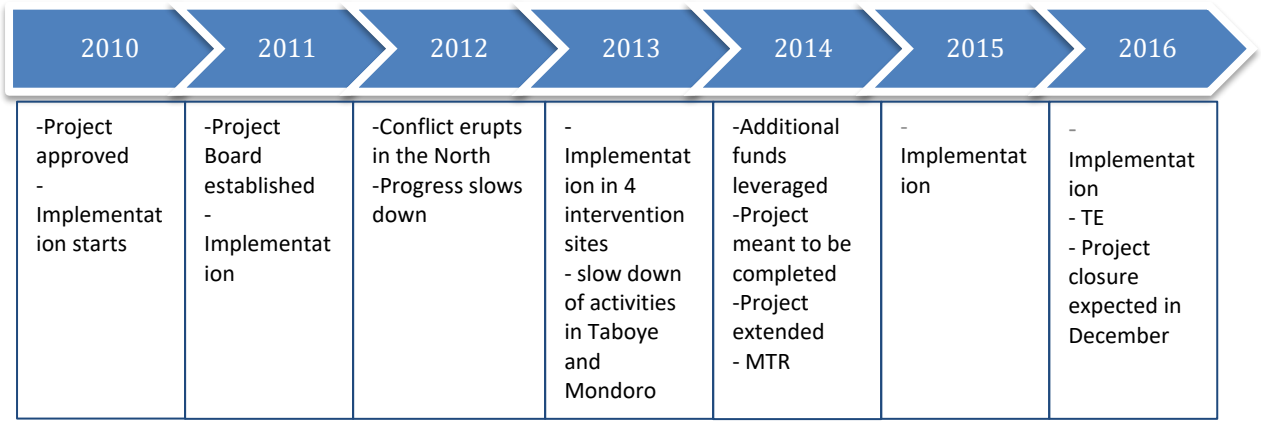
Although only 14% of Mali's land is arable, approximately 80% of the national workforce is absorbed by agriculture. Mali's agricultural production is a mix of subsistence and commercial farming. The country's primary agricultural products are grains such as millet, sorghum, rice, and corn, cotton, sugar cane, peanuts as well as fruits and vegetables. The type of livestock raised includes cattle, dromedaries, sheep, goat and donkeys. Mali's economy is largely built on the agricultural sector with rain-fed primary crops. This particular sector is therefore dependent on climatic conditions and will likely be most impacted by the negative effects of climate change. It is projected that significant losses in crop production will be experienced as a result of water shortages and temperature increases. According to certain models, a loss of up to 25% might be experienced for sorghum (variety CSM 63E), which would result in significant income loss for many vulnerable communities and decreased food availability thereby leading to an increase in food insecurity among the population. Changes in temperature will also affect cattle, which is not heat tolerant. In essence, the predicted effects of climate change will significantly impact the 80% of the workforce whose livelihood is dependent on agriculture.

Agriculture will be significantly impacted by increased intensity and frequency of extreme weather events, changes in the rainfall regime, decreased water availability, decrease in the quality of the soil, and decrease in land covered by pastures. The losses in crops and animals will impact on Mali's food security. The LDCF-financed

project was therefore formulated to implement adaptation interventions to promote food security in the face of the threat posed by the effects of climate change on the agricultural sector. The project aimed to achieve increased food security through a combination of increased technical capacity of regional and especially local government officials at the commune level, agricultural research institutions and line ministries. The project also aimed to develop and implement adaptation interventions to increase the adaptive capacity of the agricultural system. Coupled with this, farmers were trained in techniques to increase resilience to climate change through the use of climate-resilient seeds and climate information. Seed varieties and the timing of sowing was informed by seasonal forecasts and the rainfall data in each beneficiary commune. Specific guidelines on the above have subsequently been developed and disseminated under the LDCF-financed project.

2.5. Project Timeline

A brief timeline of the project is presented below.



The project kicked off in 2010, when the selection of on-the-ground teams at the communal level was undertaken. The selection process was completed in 2011, which led to the implementation of interventions in all of the project sites. The Project Board (usually known as the Project Steering Committee, PSC) was also appointed in 2011 to take high-level management decisions. The Project Board was also responsible for quality assurance of the M&E process and the resulting products. The project was well underway when conflict erupted in the northern part of the country in January 2012. As a result of restricted access, interventions were halted in Taboye and Mondoro. In 2013, the implementation of the project resumed in Taboye and Mondoro to a limited extent.

In 2014, additional funds were leveraged from *ACDI* to enhance the adaptation benefits to the beneficiary communities of the LDCF-financed project. *ACDI* largely financed hard interventions such as the construction of a small dam in Massantola water infrastructure in Gouantiesso (commune located in M'Pessoba) and solar-powered pumps in other interventions sites. A full list of the interventions financed by *ACDI* is included in Annex D. The LDCF-financed project was planned to be completed by March 2014, however with the delays encountered in year 2 of implementation, the GEF provided a two-year extension at no extra cost. A MTR was conducted in 2014 and validated by the PMU and other key stakeholders. This regional GEF team from Addis Ababa strongly recommended than an MTR be undertaken during the course of their in-country mission in October 2014. However, the MTR was not submitted to and validated by the GEF. Based on the recommendations of the MTR, several amendments were made to the *modus operandi* of the implementation of the project. For instance, an M&E manual was compiled to guide the M&E process. The MTR highlighted that tangible yield improvements were noted with several climate-resilient cereal seed varieties within specific demonstration plots. For example, maize (variety: *zanguereni* on demonstration plot 1862) in Massantola and black-eyed peas (variety: *korobalen* on demonstration plot 800) in Sandaré, increased by 100% and 220% respectively in 2012 compared to the local average yield. Although not all climate-resilient seeds performed as well as those mentioned above in general an increase was noted in yield in the demonstration plots in the interventions sites.

Implementation of the project continued in 2015. The project was scheduled to end in December 2016, which coincides with the end of the *ACDI*-financed project. The TE was undertaken over the course of several weeks from October to December 2016. At the time of compiling this report, most of the interventions of Component 3 had not yet been completed. Two regional workshops (out of four) have already been undertaken to date. The activities of Component 3 pertain to the dissemination of information and lessons learnt as well as the sharing of knowledge and success stories to inform future adaptation projects and to promote best-practices in the agricultural sector. The PMU is committed to completing the LDCF-financed project by the end of 2016.

2.6. Organisational Structure

According to the ProDoc, the project was designed to use a National Execution (NEX) modality. The management structure is detailed in the following diagram:

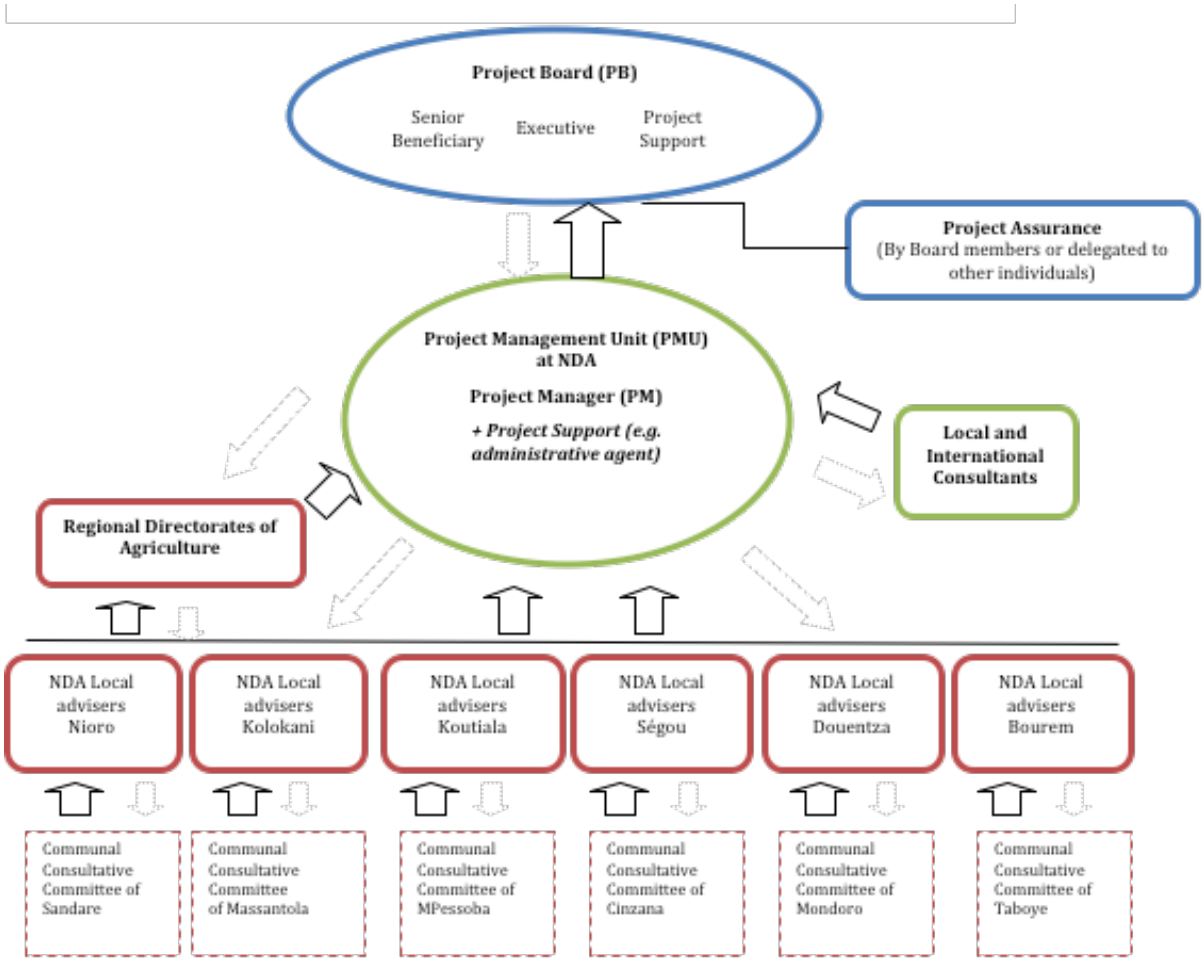


Figure 1: Management arrangement

The management arrangement, as stated in the ProDoc, determined that each Communal Consultative Committee (CCC) appointed in the selected intervention areas reported to the local DNA advisers at the circle level. These advisers then reported to the PMU. The Project Board, to which the PMU reported to, was appointed to oversee and provide support to the PMU for high-level management decisions and to undertake quality assurance of the products and the M&E process.

2.6.1. Project Management Unit

The PMU consisted of a coordinator and a project assistant. The ProDoc stated that a part-time M&E officer should be appointed to provide periodic assistance. However, the coordinator requested that a permanent staff member be appointed to undertake this task from the outset. The PMU was therefore strengthened by the addition of a permanent M&E officer.

The coordinator and the M&E officer have been involved since the outset of the implementation of the project in 2010. The project assistant assigned to the project has changed in 2015.

2.6.2. Project Board

The Project Board was appointed in 2011 and consists of the following stakeholders:

- *DNA*
- National Directorate of Meteorology (*DNM*)
- National Directorate of Production and Husbandry (DNPA)
- National Directorate of Water and Forestry
- Environmental Research Institute *(IER)*
- National Scientific and Technological Research Centre
- Ministry of Territorial Administration and Local Authorities
- Committee of Sustainable Land Management
- Representative of UNDP's Environment Department
- *AEDD*
- Representatives of the beneficiary communes (mayors of selected communes)
- Representative of the Coordination and Reinforcement of the National Execution
- Regional agricultural chambers in the selected communes

The functions of the Project Board were elaborated in the ProDoc. Their responsibility largely consisted of making high-level management decisions related to the LDCF-financed project. They were responsible for ensuring that the interventions implemented corroborate with the details provided in the ProDoc, which had been validated by the GEF. The interventions need to be implemented in line with the Logframe, the budget and implementation plan included in the ProDoc. Any significant deviations from the ProDoc needed to be approved by the Project Board. The board was required to meet twice a year to review the implementation progress, the results achieved, the M&E process and the spend achieved. However, it was confirmed that the PMU only met once a year, contrary to what was specified in the ProDoc.

2.7. Main Stakeholders

2.7.1. International

The international stakeholders in the LDCF-financed project included the GEF as the main source of funding, UNDP as the Implementing Agency, and ACDI as a key partner. OXFAM was meant to be involved in the project, particularly relating to Activity 2.4 to deliver the micro-finance solution relating to cotton in Mali. However, no partnership was secured and this activity was not implemented[1]. Several international non-governmental organizations including the Swedish International Development Agency (SIDA), IOM and Planet Guarantee were involved in the project and contributed in-kind co-financing through their various activities.

2.7.2. National

Several government stakeholders were involved in the implementation of the LDCF-financed project at the national level. These authorities provided varying levels of support – from being a member of the Project Board to delivering capacity building training to other government officials. These government stakeholders include:

- *DNA*
- Mali-Météo

[1] There were no budgetary provisions for this activity in the LDCF-financed project. This activity was to be financed by the OXFAM project and delivered through the organization. It was intended as a knowledge sharing exercise.

- *AEDD*
- Statistical Planning Unit (within the Ministry of Agriculture, CPS/MA)
- *IER*
- *DNPIA*
- National Directorate of Water and Forestry *(DNEF)*
- Niger Valley Office (*OHVN*)
- Malian Textile Development Company (*CMDT*)
- National Scientific Research and Technology Council (*CNRST)*
- Finance and Equipment Directory (Ministry of Agriculture*, DFM/MA*)
- National School of Engineers (*ENI)*

The LDCF-financed project was housed within and its implementation coordinated by the DNA. The appointed coordinator, M&E of the project was a staff member from the *DNA*.

Mali-Météo was instrumental in designing the project 2009 and, at the time, was the focal point for climate change projects in Mali. This responsibility has since been transferred to the *AEDD* as international best practice determined that issues relating to climate change should be addressed by environmental authorities and not the meteorological agencies. Mali-Météo has extensive experience in providing technical assistance for addressing climate change. This began in the 1970s when Mali-Météo expanded its services to provide technical assistance in the rural parts of the country, which experienced a severe drought. Since then, the agency has promoted the extensive adoption of climate information and services to combat climate change. In the 1980s, their expertise was sought to promote the use of climate information and services in Mali to increase food security. As a result of increased awareness of climate change on a global scale in the 1990s, Mali-Météo was involved in developing the adaptation and mitigation fields. However, in the 1990s, climate change adaptation was not known as such, but rather as the need to address the impacts of droughts.

Mali-Météo played a crucial role during the implementation phase of the LDCF-financed project. Their role included *inter alia*: i) design of a low-tech rain gauge with a local supplier; ii) facilitation of the procurement of low-tech rain gauges; iii) capacity building interventions including the training of selected members of the beneficiary communities and members of the GCAMs to read and record rainfall data; iv) supporting the dissemination of agro-meteorological services; and v) capacity building of key stakeholders to use agro-meteorological services to enhance agricultural production. Mali-Météo's involvement was instrumental during the implementation phase as they worked with a local supplier to deliver low-tech rain gauges for approximately 3000 CFA ($ 6) compared to the imported ones that cost approximately 150,000 CFA ($ 300).

As the current focal point for climate change in Mali, the **AEDD** was instrumental in the implementation of the project. There was a close collaboration between the PMU and the AEDD during implementation. The AEDD has provided support to implement interventions and have even led some of them. The interventions supported and/or led by the AEDD includes *inter alia*: i) the development of short guidelines to promote the mainstreaming of adaptation interventions in PDSECs; ii) conduct participatory workshops with CCCs and beneficiaries to identify adaptation interventions that are suited to their needs through the use of their climate proofing tool; and iii) raising awareness of government officials at different levels of governance (national, regional and communal) on the need to adopt an integrated and coherent approach to adaptation at the commune level.

2.7.3. Regional

At the regional level, there were hardly any stakeholders involved. This was identified as a shortfall in the project design. The regional authorities were not fully involved in the implementation of the LDCF-financed project. As the regional government structures were bypassed in the implementation of the project, they provided limited support. However, some authorities were involved including regional branches of technical services and technical services involved in rural development.

2.7.4. Communal

At the communal level, the municipalities of all selected beneficiary were heavily involved in the implementation of the LDCF-financed project. The CCCs in each beneficiary site were chaired by the mayors and included key decision-makers from the municipality as well as representatives of the beneficiary groups. The agricultural

extension officers assigned to the beneficiary areas were included in the CCC and played a key role in disseminating information on the seed varieties to be planted to the beneficiaries in their specific communes. They provided additional support by collecting rainfall data from the community members who were assigned to reading and recording such data. This data was then communicated to other beneficiaries so that they can make informed decisions on the type of seeds to be planted and other agricultural activities based on the amount of rainfall received. The agricultural extension officers distributed climate-resilient seed varieties – financed by the LDCF – and trained the beneficiaries on how to use them.

There was a strong sense of ownership of the project at the communal level, arising from the involvement of local communities in collaboration with climate change experts in formulating adaptation interventions that responded to their needs. The participatory approach garnered support around the LDCF-financed project from government structures and beneficiaries. In addition, the enhanced awareness highlighted the need for the adaptation to maintain and/or improve economic growth under the predicted conditions of climate change. This increased level of awareness on the potential challenges to be posed by climate change catalyzed the need for adaptation interventions to be implemented to increase the adaptive capacity of the vulnerable local communities.

2.7.5. Local

At the local level, the main stakeholders included farmers, women's groups and associations as well as cooperatives. The size of the women's groups and associations varied largely as indicated in the table below:

Table 5: Associations, groups and cooperatives that benefitted from the project

Communes	Number of beneficiary pilot farmers	Women's associations or groups who were beneficiaries of the LDCF-financed project		Cooperatives who were beneficiaries of the LDCF-financed project	
		Name	No. of members	Name	No. of members
Sandaré	149, of which 38 women	Diekafo Association from Assa Tiemala	24	Djama djigu Cooperative from Sandaré	50
		Kotognogotala Association from Wassamagateré	65	Benkadji Cooperative from Diabé	140
		Sabougnouma Association from Seredji	45	Nieta Cooperative from Diallara	150
		Badenya Association from Allahina-Bankassy	63	Dougoujigui Cooperative from Samatara	150
				Kotognogotala Cooperative from Monzombougou	50
Massantola	140, of which 10 women	Sabugnuma Association from Manta	96	Kotognogotala Cooperative from Massantola	120
		Koria Women's Group	45	Djekabara Cooperative from Massantola	171
Cinzana	143, of which 16 women	Women's Association of Dona	124		
		Women's Association of Kondogola	106		
		Women's Association of Cinzana-gare	96		
M'Pessoba	91, of which 12 women	Demerdé Association from Dentiola II	66	Diguifa Cooperative from Pala	21
		Sabaliton Association from Dentiola I Sobala	70	Pewo Cooperative from M'Pessoba	46
				Benkadi Cooperative from Dozola	82

				Djiguiseme Cooperative from Bana	34
				Gnesiguiton Cooperative from Dazana	60
				M'Pessoba Cooperative	14
Taboye	210, of which 10 women	Annèma Association from Dengha	38		
		Alkarama Association from Ouani	31		
		Annoura Association from Bia	40		
		Irgoundia Nafera Association	20		
Mondoro	64, of which 18 women				
Total	797, of which 104 women		929		1088

The total number of direct beneficiaries is 797. However, there are benefits that extend beyond the information provided in the table above.

Table 6: Number of beneficiaries per technique demonstrated

Technique demonstrated	Sandaré	Massantola	Cinzana	M'Pessoba	Mondoro	Taboye	Total
Number of demonstration plots established using climate-resilient seed varieties	149	140	143	91	210	64	**797**
Number of farmers who have received crops for their orchards	1	1	1	1			**4**
Number of women who have received crops for market gardens	737	432	326	393		129	**2017**
Number of women who practice compost-making and its use on cereal plants	20	7	15	13	-	-	**55**
Number of women who produce organic manure	737	432	326	393		129	**2017**
Number of beneficiaries who practice alternative income-generating activities	737	432	326	393	18	129	**2035**

2.8. Expected Results

The LDCF-financed project was formulated to increase resilience to climate change within the agricultural sector to foster food security and secure lives and livelihoods of vulnerable communities that are dependent on agriculture in Mali. Changes in rainfall regime and temperature increases across different agro-ecological zones have already been noted and are predicted to result in significant losses in yield for various cash and subsistence crops. The project was therefore designed to strengthen the technical capacities of key stakeholders to understand the effects of climate change and develop corresponding adaptation interventions within specific agro-ecological zones. In addition to raising awareness and training of key stakeholders on adaptation measures within the agricultural sector, on-the-ground demonstration activities were implemented.

The expected results of the LDCF-financed project as stated in the ProDoc were to:

- Enhance climate risk management capacities of decision and policy-makers, technical staff within selected municipalities as well as agricultural research institutions to address the threats of climate change on food production and security.
- Enhance awareness and technical capacity to contribute towards creating an enabling policy, institutional and legal framework that systematically addresses climate change in Mali.
- Develop and implement on-the-ground integrated adaptation intervention strategies in the targeted municipalities. This integrated approach refers to the use of climate information services concurrently with climate-resilient agricultural practices and alternative livelihoods.
- Disseminate lessons learned from capacity development and on-the-ground demonstration as part of knowledge exchange as well as to facilitate the replication and upscaling of activities implemented to date.

2.9. Budget Breakdown

The project implementation budget was $ 2,340,000 (also known as the GEF grant). The table below shows the allocation of the budget compared to the actual amount disbursed per component.

Table 7: ProDoc budget breakdown per component

Component	Budget allocated in the ProDoc	% of total budget
Component 1 Capacities to prevent and manage the impacts of climate change on agricultural production and food security are improved	$ 337,000	14.4
Component 2 Climate resilience of agricultural production systems and the most vulnerable agro-pastoral communities strengthened	$ 1,658,290	70.9
Component 3 Best practices generated by the project capitalized on and disseminated at the national level	$ 260,890	11.1
Project Management	$83,820	3.6
Total	**$2,340,000**	**100**

As evident from the above table, a large share of the project was spent on the demonstration activities to showcase resilience to climate change in cash and subsistence farming. This component comprised the hard interventions that absorbed most of the budget. Component 1 comprised largely soft interventions such as awareness raising workshops, training to enhance the technical capacities of government structures, and the compilation of guidelines to integrate adaptation in local development plans and practices. Component 3 relates to the dissemination of information on lessons learnt and success stories and therefore does not absorb a large proportion of the budget. However, it needs to be ensured that the small budget allocation to Component 3 is used efficiently to promote the adoption of the interventions promoted under the LDCF-financed project within agro-ecological zones across the country.

3. Methodology Applied in Terminal Evaluation

3.1. Data Collection

The methodology applied in this TE is consistent with principles for conducting an independent evaluation of a project. Several methods were used to collect data on the formulation and implementation of the LDCF-financed project. A mix of methods was used to collect quantitative and qualitative data. These include: i) desk review of project-related documents; ii) in-depth interviews; iii) focus group meetings; and iv) site visits. Through these methods, the Evaluation Team was intent on understanding different aspects of the project included *inter alia*: i) the involvement and input of different stakeholder groups in the project's design and implementation phases; ii) feedback mechanisms; iii) coordination with other ongoing projects in the country; iv) the level of support or ownership from beneficiary communities; v) the level of satisfaction of the on-the-ground implementation of the project from the beneficiaries' point of view; vi) the level to which the needs of marginalized groups have been considered; vii) the level of gender sensitivity and responsiveness factored into the design and implementation of the project; and viii) the perceived change in vulnerability to climate change as a result of the activities implemented.

3.1.1. Desk Review

A comprehensive desk review was undertaken prior to the in-country mission. Supplementary information was requested from the PMU following consultations with key stakeholders during the in-country mission. The documents consulted include *inter alia*: i) Project Identification Form (PIF); ii) ProDoc; iii) Project Implementation Reviews (PIRs); iii) midterm review; and iv) minutes of Project Board's meetings. A full list of the documentation consulted in this evaluation is attached to this report as Annex B.

3.1.2. Stakeholder Consultations

Stakeholder consultations were conducted with different groups. These groups include the PMU, members of the Project Board, the local implementation team (such as agricultural extension officers on-the-ground) and beneficiaries. Consultation was undertaken in the form of in-depth open-ended interviews and/or focus groups. The nature and scope of the consultations was guided by the desk review and interactions with in-country partners. The list of stakeholders and beneficiaries consulted during the course of the 10-day mission are available in Annex F.

Stakeholder consultations – be it with the PMU, members of the Project Board, the local implementation team or the beneficiaries – were guided by the questions and discussion points contained in the table below. These questions fall under the different criteria used in this evaluation. The questions were customized to the different stakeholder groups consulted and did not follow any specific order. Open-ended interviews and focus groups were undertaken to follow the thread of conversation and allow for new information to emerge. The guiding questions used in consultations are available in Annex G.

3.1.3. Field Mission

As part of this TE, a mission was undertaken to Mali to collect the necessary information for the criteria mentioned above. The 10-day mission started on Monday 10 October and ended on 19 October 2016. The first part of the mission consisted of meetings with key stakeholders who were involved in the formulation and the implementation of the project, including the PMU at the *DNA*. The second part consisted of 'ground-truthing' of the information collected from the stakeholders consulted as well as the quality of the interventions financed by the LDCF. During the second part of the mission, the Evaluation Team engaged with the beneficiaries and project teams in three out of the six communes selected for the project. The communes visited during the mission were Sandaré, Massantola and Cinzana.

The Evaluation Team had the opportunity to visit some of the hard interventions financed by the project. Site visits were preceded by courtesy visits to the political appointees in each commune and a focus group discussion with the beneficiaries and the CCC. The discussions held with the beneficiaries and the CCC during the focus groups were continued with a smaller subsection of the group during the site visits. The Evaluation Team visited fields whereby farmers have adopted climate-resilient cereal crops, women-led market gardens, orchards, solar-

powered wells, water basins in market gardens and organic compost production. The visit to a site whereby agro-forestry is practiced in Cinzana was cancelled as a result of the passing of a member of the community.

A Mission Report has been compiled and is attached as Annex A. The Mission Report provides a breakdown of the activities undertaken during the mission to inform the evaluation of the project, the stakeholders consulted as well as the data collected while in-country. The main points discussed with the different stakeholders – either in meetings or in a focus group setting – are also included in the report.

3.2. Data Analysis

The quality of the data collected was assessed and a diverse mix of techniques was used to analyse the data. For example, we conducted a comparative analysis by developing a matrix to evaluate the targets reached at project completion compared to those initially set at the onset of the project. This comparative analysis is particularly useful to understand the success and shortcomings in the implementation phase and enable us to explore the underlying causes. The lessons learnt from the success and shortcomings of the programmes and projects are intended to inform the design of similar project in the future.

Qualitative and quantitative data was collected simultaneously. In the data analysis, the Parallel Analytical Method illustrated in Figure 2 below, was used. The use of this method is justified by the fact that the TE seeks to collect primary and secondary data for different questions and from different sources that will require more than one method to satisfactorily gather the information. Comparison of both qualitative and quantitative data sets improves the results of the TE and is more likely to identify unanticipated results that will assist the UNDP in future development planning and decision-making. Quantitative and qualitative data was analyzed independently and the findings compared and combined or integrated then synthesized to arrive at a final triangulation of findings. This approach is best used for triangulation designs that look at convergence of findings when the strengths of a project and conclusions are critical and for comparing qualitative data with quantitative information. Data analysis will incorporate before-and-after comparisons, based, where available, on baseline data.

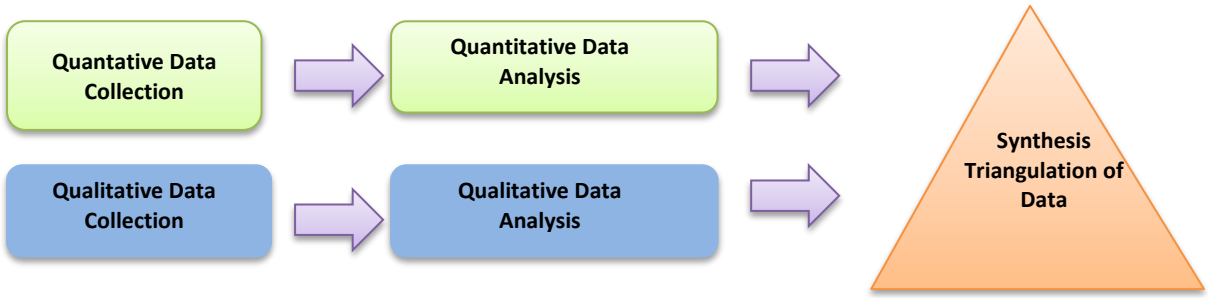


Figure 2: Data analysis

4. Findings

4.1 Project Design / Formulation

4.1.1. Analysis of the Results Framework

The Results Framework is a monitoring tool that is used to define a project's objectives in a clear and quantified manner. The monitoring tool provides accountability for the achievement of objectives throughout the lifespan of a project. The Results Framework aims to identify and demonstrate the impacts of project activities through the use of indicators to which targets are assigned at various stages of the project lifespan. For the LDCF-financed project, the Results Framework was developed following the structure of the logframe. The Results Framework consists of fifteen indicators, out of which three indicators relate to the overall objective, and twelve indicators for monitoring the progress of the three components.

A common approach at the outset of the project implementation phase is to undertake a systematic review of the logframe and the Results Framework. This is considered as an important exercise for the following reasons:

- To revise the performance indicators (if need be) in relation to the specific activities under each each component
- To update the targets to be achieved according to the prevailing socio-political and economic conditions.
- To eliminate any errors (if any) made during the formulation of the ProDoc.

It became apparent to the Evaluation Team during the in-country mission that a revision of the logframe and in particular the Results Framework had not been undertaken. The analysis of the Results Framework showed that there was a weakness in the formulation of certain performance indicators (especially for the assessment of the overall objectives). The weakness relates largely to the use of indicators that are not measurable and therefore cannot be used to monitor progress.

For example, the target for the third overall objective of the LDCF-financed project is stated as "projected food production and income generation have increased in the pilot municipalities for available climate scenarios" in the Results Framework in the ProDoc. The indicator used is "percentage in projected: i) food production; and ii) income generation in the pilot municipalities for available climate scenarios." The target – i.e increase in food production – has not been quantified within specific periods of time. It was formulated without considering the SMART criteria, as it is not specific and measurable. The increase in food production can therefore be approximately 5% or of a higher order of magnitude, that is 50%.

We note the following points relating to the indicator used to measure and determine the if the target has been achieved:

- The seed variety to be monitored and evaluated has not been specified, given that 15 different climate-resilient seed varieties were disseminated under the LDCF-financed project.
- It is not specified whether the increase in food production is linked to an increase in productivity (yield) or overall production due to an increase in land under agriculture. Yield is a key aspect of intensive agriculture, which has been promoted under this project. An increase in food production as a result of expansion of agricultural activities does not correlate to increased yield as a result of the performance of climate-resilient seed varieties. The indicator is therefore vague, not specifying whether to attribute increase in food production to yield or overall production.
- The indicator was formulated under the assumption that an increase in resilience in the agricultural sector is linked to improved household income. However, several other income-generating activities were promoted under Component 2 of the LDCF-financed project including micro-credit activities. Collectively, the interventions of the project have sought to increase the adaptive capacity of vulnerable communities through income-generating activities, other than agriculture, which all contribute to increase household income. Therefore the increase in household income does not necessarily correlate to an increased in yield as a result of improved climate-resilient seed varieties distributed to pilot farmers in the selected communes.
- No baseline information on household income has been collected at the outset of the project, which means that this is challenging to provide rigorous data to support the argument relating to increased income.

However, some indicators used in the Results Framework are precise and concise, therefore enabling the measurement of progress in achieving certain objectives. For instance, the first indicator used under Outcome 1 is "number of municipalities having integrated adaptation considerations within their local development plans." This indicator is precise enough to be monitored and measured and it is therefore possible to state whether the target has been achieved or not by the end of the project.

The Results Framework does not contain targets to be achieved by mid-term. Consequently, there were no targets against which the progress of the interventions could be measured against to determine whether they were on track or not. Because the progress was not measured at mid-term, no corrective measures were recommended and implemented to ensure that the expected results are achieved by project completion.

4.1.2. Stakeholder Participation

The success of the LDCF-financed project was highly dependent on the involvement of stakeholders in the implementation phase, as highlighted in the risks and assumptions in the ProDoc. The involvement of government authorities at the commune-level sparked significant interest from the local communities in the LDCF-financed project. Representatives of technical services – including agriculture, livestock, water and forestry – at the commune-level and beneficiaries worked together in the CCCs under the leadership of the respective mayors. The CCC worked in a collaborative and participatory manner to formulate intervention strategies. The implementation of the project has sparked a dynamic collaboration between different technical services at the commune- and local-level on addressing the effects of climate change.

Despite the involvement of technical services at the commune and local levels, the regional directorates of agriculture at the circle level were not involved in the implementation of the project. In their role as regional technical agricultural officers, their involvement could have further strengthened the sustainability and upscaling of the project's achievements.

The beneficiaries were involved in the implementation of the project. They participated in the implementation of many activities, and especially in generating and ranking adaptation options for their respective agro-ecological zones to improve their resilience to climate change. They demonstrated a good understanding of the challenges presented by climate change. The beneficiaries have adopted new agro-pastoral technologies promoted under the LDCF-financed project, and have abandoned old practices.

4.1.3. Assumptions and Risks

Five main risks that were likely to have an impact on the objective of the project were identified in the ProDoc. One of these risks - relating to the socio-political situation in the northern region of the country - materialised. As a result of unstable political situation in the northern parts of Mali, the implementation of the project in the communes of Mondoro (Mopti) and Taboye (Gao) was hampered. The materialisation of this risk had an impact on the overall effectiveness of the implementation of the project as well as on the achievement of the results. The other risks identified at PPG phase relating to the objectives and components did not have any bearing on the implementation of the project.

4.1.4. Management Arrangements

The PMU within the *DNA* was responsible for the implementation and management of the LDCF-financed project. The PMU was responsible for planning, reporting, monitoring and providing technical support to deliver demonstration and capacity building activities. The PMU consists of a Project Coordinator, an administrative and logistical project assistant and a Monitoring and Evaluation Officer. The project benefited from a good institutional memory in terms of technical information as Mrs Niambele (Project Coordinator) and Mr Bengaly (M&E Officer) were involved from the outset of the project. However, there were three different project administrators appointed throughout the lifespan of the project. The *modus operandi* has been such that PMU does not implement the project interventions, but rather contracts with consultants or research institutions to carry out the activities. According to the PMU, the contracted consultants and/or research institutions have successfully delivered the expected outputs.

A CCC was established in each beneficiary commune. The CCCs were composed of the agents of technical services' agents, local authorities and representatives of the beneficiaries' groups. The CCCs have coordinated the project interventions within their respective communes. The local agricultural extension officers represented the PMU at the local level.

4.1.5. Sustainability and Upscaling

In this particular context, sustainability can be expressed as maintaining the benefits achieved by the beneficiaries – after the project ends – in terms of increasing resilience in their agricultural practices under future conditions of climate change. Sustainability is: i) the mainstreaming of climate change adaptation in the prioritized programme of action by authorities at commune and local levels; and ii) the implementation of climate-resilient techniques and technologies promoted under the LDCF-financed project. The sustainability of the benefits achieved by the LDCF-financed project has been well thought-through as characterized by the following:

- Stakeholders and beneficiaries were actively involved in the formulation of adaptation interventions and the implementation of such activities.
- There was a high level of ownership among beneficiaries consulted during the field mission of the interventions implemented under the LDCF-financed project.
- The organizational structure and level of independence of CCCs in making decision relating to the climate-resilient practices in their respective communes.
- Climate-resilient interventions and measures to restore degraded natural ecosystems were developed and implemented according to the prevailing conditions and the effects of climate change specific to each beneficiary communes.
- There is a high likelihood that the interventions promoted under the LDCF-financed project will continue to be implemented after project closure as the beneficiaries correlate their increased resilience to the effects of climate change and improved food security directly to the project.
- Many of the beneficiaries consulted during the field mission train their family members on techniques they have learned and received training on under the LDCF-financed project. This means that there is a transfer of techniques learned during the training sessions.

Despite the above-mentioned conditions that are likely to secure the sustainability of the benefits achieved by the LDCF-financed project, there are certain risks that can potentially compromise the sustainability of the project. These risks are discussed below.

4.1.5.1. Support provided by communal authorities

One of the activities of the project (Act 1.2.1 in the logframe) was to analyze the *PDSECs* of the targeted communes to support the mainstreaming of adaptation to climate change in these planning documents. Out the six communes, only Cinzana's *PDSEC* had aspects of climate change adaptation included and implemented activities to increase the resilience of the vulnerable communities to the effects of climate change. Three PDSECs – Massantola, Sandaré and M'Pessoba – were revised to mainstream climate change adaptation into their prioritized programme of actions for the coming years. However, while communities have incorporated adaptation considerations into their *PDSEC*s, no funding strategy has been established to fund the adaptation interventions. As a result of awareness raising undertaken under the LCDF-financed project, government officials recognize the need for adaptation interventions to increase the resilience of the farming community to the adverse effects of climate change and to improve food security. Despite this increase of awareness, the lack of financial commitment to implementing adaptation interventions remains largely due to the municipalities' budget constraints. The lack of financial commitment in the *PDSEC*s can potentially compromise the results achieved to date and the replication and/or upscaling of best practices to increase the resilience of the agricultural sector.

4.1.5.2. Availability of climate-resilient seed varieties

Throughout the implementation of the project, municipalities were provided with first-generation climate-resilient seeds for various crops specific to the prevailing climatic conditions in each commune. The sourcing and purchasing of climate-resilient seeds was enabled through the partnerships created between the PMU and agricultural research institutions as well the financial support provided. To ensure the availability of seeds after project closure, the beneficiaries intend to produce their own seeds or to obtain supplies from seed producers

in the communes. Seed multiplication from basic seeds need to apply techniques that require specific training or supervision to meet standards. In addition, the multiplication of first-generation seeds or subsequent generations generally results in seeds with less yield than the parent seeds. The seed multiplication activities at the project intervention sites are undertaken from first-generation seeds. Although the beneficiaries are intent on producing their own seeds after project closure, the risk remains that in the future farmers may struggle to access quality seeds of high yield for the new varieties that have been disseminated under the LDCF-financed project.

There is an Agronomic Research Station in Cinzana that produces basic seeds and first generation seeds. In Cinzana and the wider area, there are seed shops that sell seeds of the different varieties of cereals, vegetables and fodder crops that have been demonstrated under the LDCF-financed project.

4.1.5.3. Availability of meteorological information for decision-making

A strong emphasis was placed on the importance of the availability of meteorological information in decision-making in the formulation and implementation of the LDCF-financed project. As such, the use of climate-resilient seed varieties is based on rainfall trends in the agricultural season. To support decision-making among beneficiaries in terms of the climate-resilient seeds best adapted to the prevailing climatic conditions, a Meteorological Assistance Group (*GCAM*) was established in each commune. The objective of the *GCAM* was to serve as an interface between the meteorological service and farmers in the beneficiary communes. The *GCAM*s were mandated to provide farmers with the necessary climate information – which were to be obtained from Mali-Météo – to enable them to make informed decisions about which crops to plant and when the planting season should be begin.

Unfortunately, the *GCAM*s have not operated as intended. This is largely because of the lack of support for the travel expenses and communication costs of its members. At present, to a lesser degree, the agricultural extension officer in each commune has assumed the role of the *GCAM*s. The *GCAM*s were not operational during the lifespan of the project and will remain as such, unless financial assistance is provided by the commune authorities or by the beneficiaries themselves. No mechanism has been devised for implementation after the project closure to ensure the communication of meteorological information to farmers, who rely heavily on such information to make informed decision relating to the upcoming agricultural season. In the absence of climate information, farmers will no longer be able to make informed decisions about when to plant and which seed varieties are best suited to the prevailing and forecasted climatic conditions. Nevertheless, farmers will still be able to make some informed decisions based on the recorded rainfall data in conjunction with the guidelines developed.

Currently, the PMU is the intermediary between Mali-Météo and the beneficiaries. After project closure, there will be no intermediary and the commune authorities will have to take ownership of sourcing climate information such as seasonal forecasts. However, if the *GCAM*s had operated as intended, there would already have been existing relationships between the beneficiaries and Mali-Météo. These established relationships would have provided access to climate information to enable informed decision-making after project completion. In addition, the *GCAM*s would have contributed to a feedback mechanism to Mali-Météo to create a database of localised rainfall data. This type of scientific information is valuable in understanding local climate trends, which form the basis of downscaled climate models.

The LDCF-financed project funded low-tech rain gauges for each village in the beneficiary communes. In total, 287 rain gauges were distributed across six communes. Recognising the value of rainfall data, beneficiary groups requested additional low-tech rain gauges from the PMU. The PMU also replaced rain gauges that were damaged in several villages as a result of wear-and-tear. As these rain gauges are not readily available in rural areas, and the PMU being dissolved after project completion, the beneficiaries may not be able to replace the rain gauges that get damaged or procure additional ones to improve the coverage of rainfall monitoring in their specific villages. This has the potential of compromising the results of the LDCF-financed project in the future.

Based on the above-mentioned points, the sustainability of the LDCF-financed project is considered to be moderately likely (ML) with a rating of 3.

Table 8: Sustainability rating allocated to the project

Sustainability rating		
Rating score	**Rating**	**Corresponding description**
4	Likely (L)	Negligible risks to sustainability
3	Moderately Likely (ML)	Moderate risks
2	Moderately Unlikely (MU)	Significant risks
1	Unlikely (U)	Severe risks

4.2. Project Implementation

4.2.1. Implementation Timeframes

Implementation of the project was planned for a four-year period from March 2010 to March 2014. However, there was considerable delay in the implementation of the project, which led to an extension of two years until December 2016. The delay is due in large part to political instability in the northern part of the country, which began in 2012. As two of the beneficiary communes of the project, Taboye and Mondoro, are located in the politically unstable area of the country, the project as a whole was delayed. The activities of the project had already begun in the said communes before the beginning of the political crisis. After January 2012, a limited number of interventions were implemented in the communes of Taboye and Mondoro.

However, it seems unlikely that the project will be completed by December 2016. Most of the activities under Component 3 – save for two information dissemination workshops – have not yet been undertaken. These activities require the participation of a communication specialist whose services are being procured at the time of writing this report. In addition, certain activities relating to climate-resilient income-generating activities must be completed in Cinzana. In addition, preliminary consultations have been undertaken relating to the micro-finance, but the activity is yet to be implemented. This implementation of this particular activity (Act 2.3.4. in the logframe) requires a rigorous process to developed and a solid contract to be established due to the nature of the activity.

4.2.2 Project Finance

According to the latest PIR available, a total of $ 2,148,179.44 had been disbursed as of 30 June 2016. At the time of writing of this report, there was no clear breakdown of the amount of funds disbursed per component of the LDCF-financed project. The Evaluation Team was therefore not in a position to assess the management of LDCF funds. However, based on the latest PIR, approximately $ 190,000 is yet to be spent by the end of the project. This amount is likely to be spent on the Component 3, that is the sharing of lessons learnt and best-practices that have emerged from the LDCF-financed project.

Based on the information contained in the ProDoc in terms of the budget allocated to the different elements of the project (as discussed in Section 2.9), only 3.6% of the total funds were earmarked for project management. This amount is too low for project management, especially for a full-size project. The budget for project management should have been increased. The largest share of the budget (close to 75%) was spent on Component 2, especially on the demonstration activities.

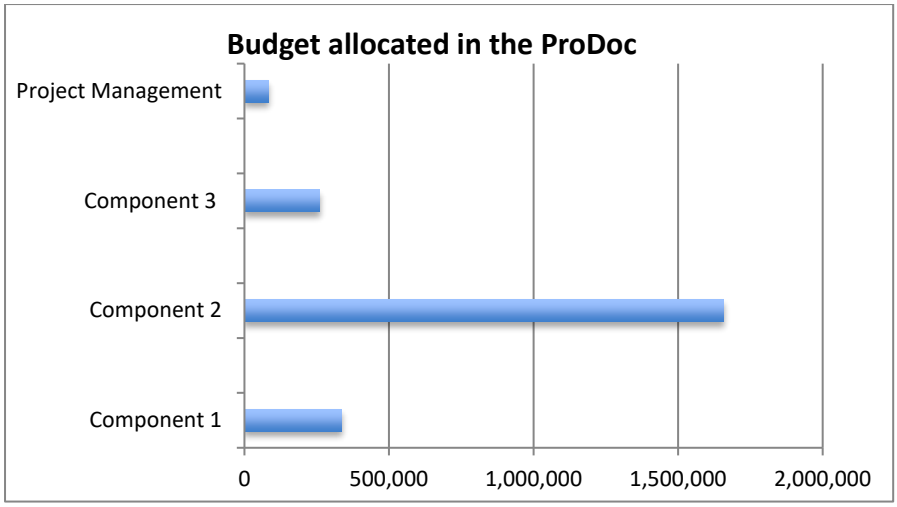


Figure 3: Budget allocation in the ProDoc

Where the confusion stems with regards to finance is that the two funds, i.e. LDCF and *ACDI* were managed simultaneously for activities implemented in the same beneficiary communes. Financial transactions of such nature are beyond the capacity of the PMU and should have necessitated a qualified and trained financial officer to manage the LDCF and *ACDI* funds.

4.2.3. Implementation Partners

The *DNA* is the executing partner for the LDCF-financed project. The project implementation is undertaken with the contribution of the decentralized structures of the *DNA*. To implement the activities of the project, the PMU has collaborated with several public and private actors who operate in the fields of climate change and agriculture. These partners are further described below.

4.2.3.1. AEDD

For the implementation of the interventions listed under Component 1, the PMU collaborated with the *AEDD*. The AEDD undertook the following studies:

- Refining the formulation of adaptation measures identified in each beneficiary commune (March 2012) (Activity 1.1.3).
- Analysis of the *PDESC*s with of the beneficiary communes (Activity 1.2.1) (March 2012).
- The preparation and dissemination of succinct guidelines to regional and local decision-makers for the consideration of adaptation measures to climate change in the *PDESC* (Act 1.2.2.) (June-July 2012).
- The review of national laws, policies, and plans related to agriculture
- The review of *PDESC*s of Sandaré, Massantola and M'Pessoba to mainstream adaptation interventions in their prioritized action of programmes (Act 1.2.3).

The *AEDD* undertook the above-mentioned studies, which were crucial for the implementation of Component 1 of the LDCF-financed project. Some of the activities undertaken by the *AEDD* contributed to raising awareness on the effects of climate change on the lives and livelihoods of vulnerable communities. The *AEDD* promoted the involvement of the stakeholders in the implementation of the project. In addition, a tool entitled "Climate Proofing", which was developed by the *AEDD* was used in this project to identify the best-suited adaptation interventions specific to each commune to adapt to the effects of climate change on agricultural production and the livelihoods of vulnerable communities.

4.2.3.2. Mali-Météo

The PMU collaborated with Mali-Météo through several support missions, which made it possible to analyze the agro-meteorological assistance system available in each of the six beneficiary communes. For example, Mali-Météo supported the establishment of the *GCAM* and facilitated meetings held every 10 days with the *GCAM*s to support decision-making in the agricultural season.

Mali-Météo assisted in procuring low-tech rain gauges for 187 villages across the six beneficiary communes and the training of two village members in each village – a total of 374 village members trained – to record rainfall data on a log. They facilitated the sharing of meteorological information and its use in decision-making by farmers.

4.2.3.3. OXFAM

According to the ProDoc, the PMU was intended to collaborate with OXFAM – a co-financier of the LDCF-financed project – to implement the activity relating to the micro-insurance system (Act 2.4) in order to reduce farmers' vulnerability to climate change. No budgetary provision was made for this activity under the LDCF-financed project and was dependent solely on OXFAM for its implementation. Despite multiple attempts from the PMU to engage and collaborate with the OXFAM team, the latter did not respond to collaboration requests and therefore this activity was not undertaken.

4.2.3.4. Other Stakeholders

In accordance with the UNDP procurement, administrative and financial procedures, several service contracts were established with individual consultants. These include:

- The study on the analysis of the future impact of climate change on agricultural production and food security in the six beneficiary communes (January-March 2011).
- The study on the detailed analysis of the costs of the projected impacts of climate change on food production and other vulnerable income-generating activities (September 2011).
- The study on the analysis of the agro-meteorological assistance system in the target communes (May-August 2011).
- The study on the assessment of the costs and expected benefits of the adaptation interventions selected in four of the beneficiary communes
- The study on the socio-economic evaluation of current income-generating activities and the identification/prioritization of climate-resilient alternative livelihoods activities in four target municipalities, namely Sandaré, Masantola, Cinzana and M'Pessoba.

4.2.4. M&E Feedback Mechanism

According to the ProDoc, feedback from the M&E mechanism is meant to be undertaken on a quarterly and annual basis. An annual project report is prepared to monitor the progress of implementation since the beginning in 2010. This annual report should include *inter alia* the following points according to the monitoring and evaluation system:

- Background information, progress towards the achievement of the overall objectives of the project and results achieved to date specific to each indicators, and the targets by project completion.
- The outputs realized in relation to the Components of the project.

Unfortunately, one of the shortcomings noted in the implementation of the project was the inadequacy of the M&E system applied. The ProDoc specified the basis for the M&E system through the Results Framework, which is composed of indicators and targets with the corresponding means of verification. It was foreseen on the basis of the information given in the ProDoc that an M&E plan needed to be formulated. This plan should have included detailed information of the indicators, the roles and responsibilities of the stakeholders in the M&E system, the data to be collected, the frequency at which data needed to be collected, data verification methods.

The reporting focused mainly on the implementation of the activities and not the results achieved as defined in the Result Framework. To monitor the performance of the interventions financed by the LDCF project, demonstration plots were set up in each beneficiary commune. The demonstration plots for climate-resilient seed varieties for cereals were 0.5-1 hectare in size. To monitor the performance of the climate-resilient cereal seed varieties disseminated under the LDCF-financed project – which served as the basis for M&E system implemented in this project – information was regularly collected by the agricultural extension officer from the farmers who benefitted from demonstration plots. The beneficiaries of the demonstration plots regularly filled out the monitoring forms developed by M&E officer of the PMU to monitor the performance of specific seed varieties disseminated under this project. The information recorded on these forms pertained to yield, pests and average yield for non climate-resilient seed varieties recorded in the commune.

Local agricultural extension officers were responsible for collecting information on the performance of crops disseminated under the LCDF-financed project for market gardens. To monitor market gardens, the officer was asked to follow a series of guiding questions with the beneficiaries of the demonstration market gardens to complete the monitoring form. These forms control the performance of crops in demonstration market gardens and the use of the techniques on which they have received training. The monitoring forms also track the amount of crops used for subsistence and the amount that was sold as well as the corresponding financial gains.

4.2.5. Adaptive Management

The PMU strictly followed the logframe in the implementation of the project and did not revise any elements pertaining to the Results Framework. There was no revision or change made to the logic of intervention. Adaptive management, to some extent, was implemented by the PMU. For example, the mid-term evaluation suggested that the M&E process should be strengthened. To this end, it was recommended that an M&E plan be developed. The PMU hired a consultant to assist in strengthening the M&E process. An M&E manual was therefore developed.

4.3. Project Results

4.3.1 Overall Results

Table 9: Rating of project objective

Project objective: The adaptive capacities of vulnerable rural populations to the additional risks posed by climate change on agricultural production and food security in Mali are strengthened	**Rating**
	Satisfactory (S)

The assessment of the overall objective of the project is satisfactory based on the in-country mission, field visits, the testimonies of beneficiaries and implementing partners. The beneficiaries consulted during the in-country mission demonstrated that they are better able to understand the future impacts of climate change thanks to the dissemination of the results of the studies carried out on this topic. The solutions to address the impacts of climate change on the agricultural sector were identified in a participatory way with the beneficiaries and are deemed effective in terms of the results collected from the beneficiary communes.

Three performance indicators were defined in the Results Framework to monitor the overall objective of the project. Unfortunately, as a result of a lack of information on these indicators, the Evaluation Team was not able to assess the level of achievement of the objective. No information was collected on indicators 1 and 3 to enable an assessment of the overall objective according to the details of the Results Framework. However, the pilot farmers consulted during the in-country mission testified to their understanding of the impacts of climate change and the positive impact of adaptation techniques on agricultural productivity and food security.

Indicators for the objective of the LDCF-funded project were:
Indicator 1: Percentage of stakeholders of pilot municipalities implementing the technologies and techniques demonstrated through the pilot project activities at project closure
Indicative target at the end of the project: 50%

Indicator 2: Existence of tools available to Malian actors (NGOs, associations, decision-maker, research institutes and technical services) to support climate change adaptation activities in agriculture and food security sectors
Indicative target at the end of the project: Toolkits available for each of the four agro-ecological zone in Mali

Indicator 3: Percentage of stakeholders of pilot municipalities implementing the technologies and techniques demonstrated through the pilot project activities at project closure
Indicative target at the end of the project: 50%

Explanatory notes:

- Indicator 1 is vague and does not provide specific details on the stakeholders to be considered or the technologies and techniques applied. The stakeholders referred to can be interpreted as state officials who were received training on awareness raising to climate change or beneficiaries who received and used climate-resilient seeds or those who received training on climate-resilient alternative income-generating techniques, or those who benefitted from improved land management practices. Table 13 provides information on the number of beneficiaries of the LDCF-financed project.
- Indicator 2 does not specify the nature of the tools or their content. Several technological packages were disseminated under the project. Component 3 of the project related to the compilation and dissemination of lessons learned, which are also considered as tools.
- Indicator 3 does not specify the nature of the crops to be monitored for increased food production. This indicator does not specify whether income generation is to be monitored from agricultural activities or alternative climate-resilient livelihoods. In addition, at the time of writing of this report, several income-generating activities including micro-finance, alternative activities had not yet started.

Table 10: Number of beneficiaries per techniques demonstrated

	Sandaré	Massantola	Cinzana	M'Pessoba	Mondoro	Taboye	Total
Number of demonstration plots established using climate-resilient seed varieties	149	140	143	91	210	64	**797**
Number of farmers who have received crops for their orchards	1	1	1	1			**4**
Number of women who have received crops for market gardens	737	432	326	393		129	**2017**
Number of women who practice compost-making and its use on cereal plants	20	7	15	13	-	-	**55**
Number of women who produce organic manure	737	432	326	393		129	**2017**
Number of beneficiaries who practice alternative income-generating activities	737	432	326	393	18	129	**2035**

Outcome 1: Capacities to prevent and manage the impacts of climate change on agricultural production and food security are improved

Table 11: Rating of Indicator 1

Indicator 1: Number of municipalities having integrated adaptation considerations within their local development plans	**Rating**
	Satisfactory

The *PDSEC* analysis, conducted in collaboration with the *AEDD* was focused on the communes of Cinzana, Mansatola, M'Pessoba and Sandaré. The communes of Taboye and Mondoro were excluded from this exercise because of political instability in the northern part of Mali. Although only four out of six of the PDSEC were analysed, this result was deemed satisfactory. Of the four municipalities, only Cinzana's *PDSEC* already included activities on climate change adaptation, and the authorities at the commune-level had even initiated and financed reforestation activities. As a result, there was no revision of Cinzana's *PDSEC*. The *PDSEC*s of the three other municipalities were revised to include climate change adaptation considerations into their prioritized programme of action. However, as mentioned previously in Section 4.1.5, none of the municipalities have made any financial commitments to implementing adaptation interventions and to replicate and/or upscale those demonstrated under the LCDF-financed project. For such interventions, the communes rely on the financial resources from development agencies that are actively engaged within their particular area.

Table 12: Rating of Indicator 2

Indicator 2: Existence of knowledge and tools within technical structures supporting rural development regarding needed adaptation measures in order to manage climate risks at the local level	**Rating**
	Satisfactory (S)

Awareness raising activities were undertaken among representatives of the state technical services at local and regional levels on the effects of climate change in the agricultural sector. This awareness raising exercise was undertaken as part of the participatory studies on climate change impacts on the agricultural sector in Mali and the identification of appropriate and relevant adaptation interventions. A total of eight regional workshops were organized in collaboration with the *AEDD*, with an emphasis on raising awareness among agricultural research institutions. In addition, with the participatory approach to the identification of adaptation measures undertaken, technical guidelines were developed on the new climate-resilient seed varieties promoted under the LDCF-financed project. These guidelines were disseminated to the agricultural extension officers who in turn provided training to farmers in the classroom and around the demonstration plots.

During the field mission, it became apparent that there was a heightened awareness among government officials at the commune level on climate change, the impacts on vulnerable communities and the corresponding adaptation strategies to limit these impacts. This is largely because of the awareness raising activities and training workshops undertaken under this LCDF-financed project. In addition, these officials observed the positive results of the adaptation interventions demonstrated under Component 2. These included *inter alia*: i) the use of climate-resilient cereal seed varieties; ii) varieties of climate-resilient plants for market gardens; iii) and the use of compost and organic manure to improve soil quality for improved yields; and iv) reforestation and agroforestry over an area of approximately 15 hectares with fruit trees.

Table 13: Rating of Indicator 3

Indicator 3: Number of national level agriculture – or food security – related laws, codes, policies and strategies having integrated climate change and adaptation concerns	**Rating**
	Moderately Satisfactory (MS)

In collaboration with the *AEDD*, a study was undertaken to analyze the main policy documents of the agricultural sector and the extent to which adaptation to climate change is taken into account in these documents. The process involved a dozen important documents that were thoroughly reviewed. Recommendations for improvement of these documents in relation to the mainstreaming to climate change considerations were made but no revision has been undertaken to date. It is to be noted that the revision of these documents is a complex political matter that goes beyond the scope of the project, as the PMU does not have any influence on law making in Mali.

Table 14: Rating of Indicator 4

Indicator 4: Budget / resources allocated to national and local strategies for adaptation	**Rating**
	Unsatisfactory (U)

The analysis of the *PDSECs* also consisted of the analysis of municipal budgets to determine the share of the budget of each municipality allocated to address the effects of climate change adaptation. Recommendations were made for budgets to be revised to include the financing of adaptation interventions. However, it is noted that no municipality has formulated any strategies to finance adaptation interventions. In addition, the analysis of agricultural laws, policies, and plans to incorporate adaptation interventions has not resulted in concrete revisions. Subsequently, no financial commitments have been made at the national level to address the effects of climate change on the agricultural sector.

Outcome 2: Climate resilience of agricultural production systems and the most vulnerable agro-pastoral communities strengthened

Table 15: Rating of Indicator 5

	Rating

Indicator 5: Percentage of targeted farmers and local technical personnel trained for collecting agro-meteorological and using of agro-meteorological information	Satisfactory (S)

A study was undertaken by consultants in collaboration with Mali-Météo to assess the needs of agro-meteorological information of farmers and to provide them with high-quality services. Consultations were undertaken at the commune level to determine the following:

- test the knowledge of the local communities in the beneficiary communes on their perceptions of climate change.
- measure the current level of satisfaction of their needs in terms of agro-meteorological assistance.
- assess their needs and provide recommendations to bridge the gaps in agro-meteorological information.

This study was undertaken through consultations with regional and local level state authorities, farmers and extension officers in each commune. Following the study, a select group of farmers and extension officers were trained in agro-meteorological data collection and the use thereof. This activity was implemented in all 187 villages across the six beneficiary communes and they were all equipped with low-tech rain gauges. A total of 374 village members were trained to the different methods of data collection and use of agro-meteorological information and six *GCAM*s were set up and the members were introduced to the same training module. However, the *GCAM*s were not functional due to the lack of financial support from the LDCF-financed project to finance their transportation and communication costs.

During the in-country mission, it was noted that government officials, CCCs and beneficiaries recognized the value of rainfall data for informed decision-making, especially to decide on the most suitable seed varieties to plant according to the amount of rainfall received. This aspect of the project was a success because it enabled beneficiaries to make informed decisions about their farming practices. Because of climate change, traditional forecasting methods have become increasingly unreliable and beneficiaries have recognized the value of scientific information. By providing agro-meteorological information to beneficiaries, they were enabled to decide which seed varieties to plant according to the amount of rainfall recorded in their specific village and the best sowing and harvesting times according to the guidelines compiled and disseminated under the LDCF-financed project. Recognising the value of such information, there was an additional demand for the low-tech rain gauges, which the beneficiaries funded themselves. To obtain information on the amount of rain recorded on rainy days, the community members usually communicate with the designated village member who is responsible for rainfall data collection.

Although this result has been successfully achieved, the rating awarded is "satisfactory" and not "very satisfactory". The reason for this is that the *GCAMs* were not functional and did not achieve the desired objective. As financial resources become a limitation on their operations, the CCCs and/or the beneficiaries should have devised an alternative way of financing the costs associated with the *GCAM*s. This would have been a means of demonstrating ownership of the interventions of the project.

Table 16: Rating of Indicator 6

Indicator 6: Number of resilient agro-pastoral technologies or techniques demonstrated at the local level upon project closure	**Rating**
	Highly Satisfactory (HS)

In terms of cereals and fodder crops, a total of 15 technologies have been demonstrated on the demonstration plots (See datasheet attached as Annex E). The target for this output was reached. The crops used for demonstrated consist of 10 cereal seed varieties and five different fodder crops. The different technologies used were for maize, sorghum, black-eyed peas, cowpea, millet and peanut. Technical sheets served as training materials and were prepared for all seed varieties. In addition, two techniques were disseminated and applied for erosion control. These include the techniques of low-level stonewalls and fascines. The techniques of riparian area protection and reforestation with *Acacia senegal* were disseminated and implemented in some of the beneficiary communes.

A total of 797 demonstration plots were established across six beneficiary communes throughout the four agricultural seasons during the lifespan of the LDCF-financed project. The following table provides a breakdown per commune.

Table 17: Number of demonstration plots per commune

Commune	No. of demonstration plots
Sandaré	149
Massantola	140
Cinzana	143
M'Pessoba	91
Mondoro	64
Taboye	210

The objectives of the demonstration plots with new crop varieties were to:

- identify varieties that are more resilient to climate variability and change in localised agro-meteorological conditions.
- introduce new crops with high yield potential that are adapted to the prevailing climatic conditions.

Several new varieties of cereals, legumes and fodder crops were demonstrated as well as agroforestry techniques. Most of the varieties tested were either already being used in Mali or in another Sahelian country with similar agro-ecological conditions. These climate-resilient seed varieties for different crops were measured against varieties that are widely used by farmers under the same climatic conditions. In addition to new climate-resilient seeds for crops that are widely grown by farmers in specific communes, crop diversification was promoted under the LDCF-financed project.

The use of climate-resilient seed varieties for numerous crops on demonstration plots has shown mixed results, but in general is significantly satisfactory. Farmers have witnessed the increase in production from the pilot farmer's demonstration plot, which has increased the adoption of climate-resilient seeds. The adoption of these new climate-resilient seeds had a positive impact on food production, self-sufficiency of farmers and food security in the beneficiary communes.

It is considered that the project has obtained significant results. In terms of the resilience of their production systems to the impacts of climate change, farmers argue that the LDCF-financed project has resulted in the following:

- farmers now have access to higher yield varieties that are adapted to the rather harsh agro-climatic conditions of their respective communes.
- Agroforestry is a practice that allows farmers to combine food and timber production while ensuring an improved management of the quality of the soil.
- the new crops introduced – such as sesame and crops in the market gardens – as part of the diversification scheme created new opportunities for additional income and a more diverse and balanced diet.

In terms of food security, the following was noted during the in-country mission:

- improved yield of food crops.
- improved food availability for livestock through the increased production of fodder as a result of agroforestry and the use of fodder crops. This has contributed to the development of small-scale farming and strengthened their economic and financial conditions.

The widespread adoption of climate-resilient seed varieties promoted under the LDCF-financed project has the potential to:

- directly strengthen the production capacity of farmers in the six beneficiary communes.
- improve the availability of agricultural products throughout the year and diversify the diet as well as increase a balanced diet.
- support local trade of agricultural products.
- diversify the source of income of the beneficiaries.

Table 18: Rating of Indicator 7

Indicator 7: Percentage increase in current and projected production (for available climate scenarios) on parcels testing the resilient technologies or techniques	**Rating**
	Highly Satisfactory (HS)

A major focus of the LDCF-funded project was the dissemination of climate-resilient seed and crop varieties to improve food security through increased food production. The performance of the crops disseminated under the project in the communes of Masantola, Cinzana, M'Pessoba and Sandaré are as follows:

Massantola

Demonstration of technologies was undertaken for all cereals cultivated in the commune, peanuts, black-eyed peas and agro-forestry. They were generally well conducted and yielded the following results,

Peanut. Two different varieties were demonstrated, and they performed as follows:

- Variety 47-10 showed little resilience
- Variety Flower 11 was performed better than the other local varieties.

Corn. Six varieties were demonstrated.

- All six varieties performed better and were more resilient than the conventional seeds, save for the Zanguereni varierty whose yield was roughly equivalent.
- The Dembagnouman, Brico, Jorobana, Niéléni and Hybride SNK varieties performed well and should be included in technological packages for dissemination.

Millet. Only one variety Toroniou C 1 was demonstrated over the course of four agricultural seasons.

- This particular variety did not perform well in the first agricultural season, whereby slightly lower performance was recorded. However, the same variety was more productive than all local seed varieties – with a performance of 21-26% higher yield.

Black-eyed peas. Two varieties were demonstrated.

- The Korobalén seed was tested over the course of four agricultural seasons and performed modestly compared to the local seeds varieties. However, the plant provides fodder, which justified its adoption in the commune.
- The Sankaranka variety was demonstrated within one agricultural season, however due to its poor performance, it is no longer used.

Rice. Two varieties, Nerica 4 and Nerica Wassa, were demonstrated.

- Both varieties performed poorly, partly due to a difficult agricultural season, and the poor selection of the location of demonstration plots.
- Given the potential of rain-fed rice cultivation, the demonstration should have been undertaken in parallel with the development of water-related infrastructure. The dissemination should have also covered a wider area.

Sorghum. Two varieties were demonstrated, namely CSM 63 E and Seguifa.

- Both recorded higher yields than the conventional seeds used in the commune. These climate-resilient seed varieties can be used to substitute the other conventional seeds to increase production of sorghum in the commune.

Cinzana

Overall, the seed varieties demonstrated in the commune of Cinzana performed well. A breakdown is provided below.

Peanut. Two varieties were demonstrated.

- The 47-10 seed variety was demonstrated over the course of three agricultural seasons. Save for the first agricultural season, this variety showed better resilience than the local ones, with an increase in yield ranging from 29% to 142%.
- The Flower 11 variety was tested during the 2015/16 agricultural season and a low yield was recorded.

Corn. Four varieties were demonstrated and they all performed well.
- The Sotubaka variety recorded yields of 187-205% higher than the local varieties used in the commune.
- The Jorobana variety recorded slightly higher yields, ranging from 127% to 132%, than the local varieties.
- The Niéléni variety's performance was equivalent to the local varieties.
- The NKXTC variety recorded slightly higher yields ranging from 120% to 124% than the local seeds.
- The Brico variety underperformed, with a decrease of 73-76% than the local varieties used in Cinzana .

Millet. Two varieties were demonstrated, namely Toroniou and Synthetic 2, and both performed better than the local varieties
- The Synthetic variety recorded an increase in yield of 108-208%.
- The Toroniou variety performed better than the local seed varieties but not better than the Synthetic one. An increase of 122-216% was noted.

Black-eyed peas. Only one variety, the Korobalén, was demonstrated over the course of three agricultural seasons.
- Higher yields were recorded during the 2013/14 and 2014/15 agricultural seasons compared to the local seed varieties used in Cinzana.
- As the 2015/16 agricultural season was rather difficult in the commune of Cinzana, lower yields were recorded than the baseline levels and outside of demonstration plots.

Sesame. It was introduced as a cash crop and as means to diversify the plant base. Given the financial revenues derived from sesame, this crop should be further exploited.

Sorghum. Three varieties were demonstrated.
- The CSM 63 E and Malisor 92-1 varieties were found to be almost equivalent to local varieties in terms of yield. The CSM 63 E variety performed slightly better than the Malisor 92-1.
- The Séguifa variety underperformed, as it was not adapted to the agro-ecological conditions of the commune of Cinzana.

M'Pessoba

Aligned with the interventions in the other beneficiary communes, the introduction of new seed varieties pertained to peanuts, maize, millet, black-eyed peas, rice and sorghum.

Peanut. Two varieties were demonstrated, namely 47-10 and Flower 11.
- The 47-10 variety was tested during the 2014/15 agricultural season. This particular variety performed well. Peanuts were historically grown in the commune of M'Pessoba, but it has been largely abandoned and has been replaced by cotton. However, the result of the demonstration activity indicated that peanuts have the potential could be considered as another cash crop in M'Pessoba.
- The Flower 11 variety was demonstrated during the 2015/16 agricultural season and recorded higher yield than the baseline level, but slightly lower than outside of demonstration plots.

Corn. Four varieties were demonstrated, namely Brico, Jorobana, Tiéba and Sotubaka.
- The Brico seed variety produced poor results in the 2015/16 agricultural season which reflected the general performance of crops under harsh conditions of the season.
- All four varieties were more productive than indigenous varieties. They recorded yields ranging from 19-42% higher than outside of demonstration plots and 38-52% higher than the baseline.

Millet. The only variety tested was the Toroniou C 1 and recorded 118% higher yield than local varieties.

Black-eyed peas. Three varieties were demonstrated, namely Korobalén, Yèrèwolo and Sankaranka.

- All of the varieties demonstrated under the LDCF-financed project performed well with high yields. The Korobalén, Sankaranka, Yèrèwolo varieties recorded yields ranging from 82-105%, 305-356%, and 157-304%, respectively higher than the local seed varities in the commune.
- The Sankaranka variety provided a significant amount of fodder.
- Based on the results presented above, these varieties need to be promoted amongst the farming community in the commune.

Rice. Two varieties were demonstrated, namely Nerica 4 and Nerica L-2.

- The Nerica 4 was demonstrated over two agricultural seasons, i.e. 2014/15 and 2015/16. Its performed well over the first year, but did poorly in the second year. The second year coincided with the harsh conditions experienced in the 2015/16 season, with little rainfall. During the first year, the average yield for this particular variety was 110-162% higher than that recorded outside of demonstration plots.
- The Nerica L-2 was tested in 2015/16 agricultural season and proved to be very productive, with a yield of 168-409% higher than the local seed varieties in the commune.

The dissemination of these varieties are likely to have a positive impact on cereal production and contribute to food security in the commune.

Sorghum. Four varieties were demonstrated, namely CSM 63 E, Séguifa, Tiandougou and Grinkan. All of the varieties tested have proved to produce higher yield that the local seed varieities as described below: ,

- CSM 63 E: -25-306%
- Tiandougou: 28-92%
- Séguifa: 36-126%
- Grinkan: 17-112%

Fodder crops. The cultivation of fodder crops have also been demonstrated and the results are as follows:

Table 19: Yield of fodder crop recorded in M'Pessoba

Crop	Yield (kg)
Sorghum Grinkan fodder	3 927
Black-eyed peas Sankaranga fodder	2186

Sandaré

Peanut. Two varieties were demonstrated.

- The Fleur 11 variety recorded higher yield than the local varieties (200% higher than the baseline level and 141% higher outside of demonstration plots) during the 2012/13 agricultural season. However, lower yields were recorded in the 2015/16 agricultural season.
- Contrary to Fleur 11, the 47-10 variety recorded low productivity in the 2012/13 agricultural season but high yields were noted in 2015/16. The yield was 169% and 109% higher than the baseline and outside of demonstration plots, respectively.

Corn. Two varieties were demonstrated:

- The TZEEF-Y variety was tested in the 2012/13 agricultural season. Yields of 286% and 250% higher than the areas outside of the demonstration plots and the local varieties, respectively were recorded.
- The Brico variety, tested only during the 2015/16 agricultural season underperformed.

Millet. The Toroniou C 1 variety was demonstrated during two agricultural seasons. In 2012/13, this particular variety performed well, while in 2015/16, it proved to be less resilient than the local varieties.

Black-eyed peas. Two varieties were demonstrated:

- The Korobalén variety recorded high yields with a total of approximately 700 kg/ha in the first year compared to a baseline level of 425 kg/ha. In 2014/15 agricultural season which was rather difficult in the commune, the average yield within the demonstration plots dropped to 135 kg/ha. Nevertheless, the

variety should be further considered as it performed better than the local varieties – which did not produce – under harsh conditions.
- Yèrèwolo was rather used for fodder and to produce seeds. This particular variety is well suited to the conditions of the commune.

Rice. Three varieties were demonstrated:
- The Gambiaka variety underperformed with virtually no yield. This is largely because the crop could not complete its cycle due to the early removal of water as a result of poor management of the dam.
- The Wassa variety produced 2,272 kg/ha which is considered to be satisfactory.
- The Nerica 4 produced high yields. With an average yield of 2,700 kg/ha, this particular variety is suitable for rain-fed cultivation.

Sorghum. Only on variety, the CSM 63 E, was demonstrated.
- The yield was significantly higher for the first demonstration period with 990 kg/ha on average. A decrease in yield was noted in 2014/15 and 432 kg/ha was recorded. Nevertheless, this particular variety has recorded higher yield than all local seed varieties in the commune.

On the basis of the breakdown of the results achieved by the climate-resilient varieties above, positive results were recorded with a trend towards increased yield for most of the varieties demonstrated. A high adoption rate of climate-resilient seeds was noted amongst the farming community in each beneficiary commune.

Table 20: Rating of Indicator 8

Indicator 8: Number of resilient alternative livelihood strategies demonstrated at the local level upon project closure	**Rating**
	Unsatisfactory (U)

Alternative livelihoods that have been demonstrated to date include soap-making, dying, sewing, etc. However, at the time of writing of this report, some of the activities relating to creating resilient alternative livelihoods were still being initiated through a survey to determine the type of activities to be financed, the microfinance structure that will manage funds and a clear financing structure. Since most of these activities have not yet been implemented, a partial assessment of the indicator was undertaken. A poor rating of 'Unsatisfactory' is given because these activities should have been concluded at this stage in the project. The PMU intends to finalize the process of setting up the fund and funding system before the end of the project.

Component 3: Best practices generated by the program capitalised on and disseminated at the national level

The implementation of Component 3 of the project was under preparation at the time this report was being written. Results for this component are therefore not available and cannot be assessed as part of this report. During the debriefing session at the end of the in-country mission, the Evaluation Team recommended that a communication specialist be recruited for undertaking Component 3. The objective is to ensure that the information is communicated in a professional and effective manner to the various stakeholder groups. Component 3 is crucial to the success of the project as it is a pilot project on adaptation to climate change in the agricultural sector in Mali. If the information generated throughout the implementation of the LDCF-financed project is collected and communicated in the appropriate format and targeted to the right stakeholder groups, it is more likely that lessons learned and best-practices will inform future practices in the agricultural sector in Mali.

4.3.2. Capacity Building

One of the main lines of action of the LDCF-financed project is capacity building through awareness raising and training. Components 1 and 2 relate to the strengthening of individual and institutional capacity on addressing the effects of climate change on the agricultural sector in Mali. As such, the following capacity building activities were undertaken:

Table 21: Capacity building activities undertaken

Activity	Date	No. of participants	Profile of participants

Awareness raising			
1. Awareness raising and information dissemination on the LDCF-financed project	Dec 2010 – Feb 2011	180	• Elected officials (mayors, secretary general, advisors) • Village chiefs • Representatives of regional and local technical structures • NGOs
2. Awareness raising on the importance of using agro-meteorological information	April – May 2 011	200	• Elected officials (mayors, secretary general, advisors) • Pilot farmers • Representatives of regional and local technical structures
3. Awareness raising on the significance of climate-resilient income-generating activities	June 2012	300, of which 100 women	• Elected officials (mayors, secretary general, advisors) • Village chiefs • Representatives of regional and local technical structures • NGOs
4. Awareness raising of local decision-makers on the importance of the integration of climate change considerations in the *PDSEC*s	August 2012	600, of which 150 women	• Elected officials (mayors, secretary general, advisors) • Village chiefs • Representatives of regional and local technical structures • NGOs
5. Awareness raising of agricultural research and training institutes on climate change, the effects and the need to mainstream the above in the education curriculum	2013-2014	572	• Researchers • Teachers/trainers • Students
Training			
1. Training on data collection methods and the use of agro-meteorological information	Feb 2012	20	• Pilot farmers • Members of GCAMs from Sandaré, Massantola, Cinzana et M'Pessoba
	Material presented again in 2013	314	• Pilot farmers • Members of GCAMs from Sandaré, Massantola, Cinzana et M'Pessoba
2. Training in market gardening techniques (managing nurseries and transplanting techniques)	2011 and 2012	120, of which all were women	• Women practising market gardening
	2012	130, of which all were women	• Women practising market gardening
3. Training on the use of improved cookstoves "Sininyèssigui"	2013	160, of which 120 women	• Village representative
4. Training of farmers on the demonstration plot	2012 - 2014	70	• Farmers
5. Training of trainers on the economics of adaptation to climate change in Addis Ababa	2013	3	• National officials
	2014	2	• National officials
6. Training on the financial management of GEF-funded projects in Addis Ababa	5-7 May 2014	2	• Project coordinator • Administrative and financial assistant
7. Regional workshops on the dissemination of best-practices and lessons learnt	October 2016	60, of which 10 women	• Elected officials (mayors, secretary general, advisors) • Representatives of regional and local technical structures • NGOs

4.3.3. Knowledge Management

The awareness raising activities consisted of workshops bringing together all relevant technical services and research institutions involved in rural development to disseminate the results of studies on the future impacts of climate change and the identified adaptation interventions. Some of the awareness raising workshops recorded over 500 representatives of the technical services. These workshops were aimed at making the participants understand the challenges of climate change and the need to take adaptation in consideration. Additional workshops were held for the implementation of the project, as shown below:

Table 22: Knowledge sharing workshops

Activity	Date	No. of participants	Profile of participants
Regional workshops on best-practices ad lessons learnt (currently in progress)		Approximately a hundred to date	• Elected officials (• Representatives of regional and local technical structures • NGOs
Workshops (national, regional and communal) -Participatory identification of adaptation measures - National identification workshop - Regional workshop (held in Ségou) - Four workshops held at the commune-level for the prioritisation of adaptation measures (through the use of the climate-proofing tool and undertaken simultaneously with analysis of *PDSEC*s)	2012	600	• Elected officials (mayors, secretary general, advisors) • Village chiefs • Representatives of regional and local technical structures • NGOs
Workshops held at different levels of the DNA - Formulation and dissemination of succinct guidelines for decision-makers at the commune, local and regional level to mainstream climate change adaptation in *PDSEC*s.	2014	572	

4.3.4. Relevance

The LDCF-financed project is considered to be relevant to the prevailing socio-economic conditions in Mali. It is relevant with regard to the present challenges posed by climate change on vulnerable communities. The project is strongly aligned with the priorities listed in NAPA. Mali is experiencing climate change which is largely reflected by a decrease in average rain and an increased variability in the spatial-temporal distribution of rain. Mali's primary economic sectors including agriculture, livestock and forestry are highly vulnerable to the effects of climate change. Given that the agricultural sector is heavily dependent on climatic factors, it is widely accepted that climate change will have a significant impact on the resilience of communities whose lives and livelihoods depend on agriculture. The LDCF-financed project was therefore developed to address these concerns by bridging the needs of vulnerable communities in terms of building adaptive capacity to climate change.

The project was formulated to address food insecurity, which is widepsread in Mali. Agriculture is significantly impacted by increased intensity and frequency of extreme weather events, changes in the rainfall regime, decreased water availability, decrease in the quality of the soil, and decrease in land covered by pastures. The loss in crops and animals is currently impacting and will continue to do so on Mali's food security. The LDCF-financed project was therefore formulated to implement adaptation interventions to promote food security in the face of the threat posed by the effects of climate change on the agricultural sector. This project contributed to building resilience to climate change in agricultural production systems in the country and eventually to the food security of the beneficiaries.

The relevance of the project is assessed according to the coherence of the intervention logic and the consistency of the organizational logic for the implementation of the project, as discussed below.

4.3.4.1. Coherence of the logic of intervention

The analysis of the logframe showed that there is coherence between the various elements, namely resources, activities, results and impact. The Components of the logframe create an enabling environment for increasing resilience to the effects of climate change. The coherent nature of the intervention logic is as follows:

- If the adaptive capacities of decision-makers and vulnerable communities are strengthened, they will be more likely to adapt to and manage the impacts of climate change on agricultural production and food security (relating to Component 1).
- Through demonstration activities, an improvement in the lives and livelihoods of vulnerable communities in the beneficiary communes were realised (through the interventions of Component 2).
- The implementation of awareness raising activities, training workshops and demonstration activities to increase resilience to climate change has resulted in best-practices and lessons learnt. When disseminated at a national scale, the above has the potential to upscale the best-practices and increase the resilience of the agriculture sector on the national scale (Component 3).

Through the implementation of the complementary components listed above, the project has achieved its goal of increasing resilience of the agricultural sector within beneficiary communes to the effects of climate change.

4.3.4.2. Coherence of organizational logic

The implementation strategy of the LDCF-financed project is based on a set of existing relationships with key partners. This has created an enabling environment for the implementation of effective and efficient interventions throughout the project's lifespan. The organizational framework showed that the system put in place for monitoring and implementing the project consisted of various stakeholders (including *inter alia* technical services, NGOs, commune-level authorities).

The organizational scheme/management arrangement set up for project management and implementation is well adapted to the local context of the project. The roles and responsibilities of each actor are well defined and there is no overlapping of responsibilities. Each stakeholder played his/her part in order to achieve the objectives of the project in an effective manner.

However, we noted the absence of the Permanent Assembly of Chambers of Agriculture of Mali (*APCAM*) at the level of the steering committee. This would have had the advantage of enhancing sustainability through the continuation of project activities by branches of *APCAM* and bringing climate change to the forefront of their agenda relating to the formulation of projects supported by *APCAM*. Nevertheless the regional agricultural chambers of Koulikoro, Sikasso, Ségou, Mopti and Gao had representatives on the Project Board and have actively been involved since 2011.

Based on the above, the LDCF-financed project is rated 2.

Table 23: Relevance rating

Relevance rating	
Rating score	**Rating**
2	Relevant (R)
1	Not Relevant (NR)

4.3.5. Efficiency

The LDCF-financed project is considered to be efficient for the following reasons:

- Despite the lack of quantitative data on several outputs, there were visible results on-the-ground that were geared towards improving the lives and livelihoods of vulnerable communities through the implementation of adaptation interventions.
- The mobilization of co-financing from the Government of Mali and ACDI to complement the interventions financed by the LDCF to further increase the resilience of vulnerable communities.
- The recruitment of national consultants who delivered quality products at low costs.
- Mainstreaming of climate change adaptation considerations in the prioritised programme of action in *PDSEC*s.

The objective of the LDCF-financed project is to improve the adaptive capacity and resilience of vulnerable communities whose lives and livelihoods depend on the agricultural sector. Through the documentation review undertaken, stakeholders consulted, and site visits, it is clear that the project has succeeded in improving the adaptive capacities of stakeholders at various levels. Decision-makers at the commune level have been trained on taking climate change considerations into account in their policy documents while farmers have been empowered to make informed decisions about what to plant and when to do so. Climate-resilient seed varieties for various crops have been disseminated under the LDCF-financed project, which has resulted in increased productivity, thus positively impacting on the food security of the beneficiaries.

4.3.6. Country Ownership

There is a high level of ownership of the project. This is reflected by the underlying political will and co-financing provided by the Government of Mali for the implementation of the project. Generally, there is little room for beneficiary populations to participate in projects at different stages of design, identification and prioritization of challenges, identification of potential solutions and the planning of actions to be implemented. However, the PMU has promoted the participation of the beneficiaries to foster ownership of the project. The beneficiaries were involved in activities including *inter alia*:

- the identification and prioritization of adaptation needs.
- The selection of sites where the demonstration activities were to be implemented and the actors to be involved in the implementation of these activities.

The establishment of the CCCs and their efficient functioning, is an example of a new management approach adopted by the PMU. The CCCs garnered enthusiasm in all the villages within their respective communes. According to the beneficiaries, the CCCs were heavily involved during the implementation phase, they were concerned by the challenges faced by the vulnerable local communities and were available to assist and facilitate the implementation process. As the CCCs are composed of members of the council, and representatives of all technical services, they played a key role in the identification of adaptation interventions, the development of annual activity programs and the analysis of results of agricultural seasons. An effective form of accountability was created through the CCCs to the beneficiary populations and constitutes a guarantee of ownership of the results of the project by the beneficiaries.

Country ownership of the project was partly fostered by the fact that food insecurity has been identified as a major obstacle to socio-economic development in Mali. Climate change has been and will continue to have an impact on Mali's agricultural sector, food security and well-being. The above has led to the agricultural sector being identified as the top priority in Mali's NAPA. In addition, agriculture employs about 80% of the working population and is an important economic pillar, underlining the need to adapt to climate change to maintain the welfare of the majority of the population.

4.3.7. Impact of the Project

To evaluate the long-term impact of the project – based on the results noted so far – one needs to study the effects of the LDCF-financed interventions in a wider environment (institutional, economic, social, environmental). The climate-resilient seeds for various crops used by the beneficiaries are now generating improved yields, which translates into improved lives and livelihoods of the beneficiaries. The beneficiary communes were selected because of their high vulnerability to food security, as they are located in the Sahel-Sahelian belt. This belt is in itself characterized by arid lands with conditions not favourable to agriculture. However, new technologies and techniques were promoted under the LDCF-financed project to bridge the adaptation deficit and address the negative effects caused by climate change. The above conditions have promoted the adoption of the technologies and techniques promoted under the LDCF-financed project.

The project has resulted in beneficiaries who are better informed about the future impacts of climate change and who understand their role in implementing adaptation measures. New agricultural practices were promoted under the LDCF-financed project through the dissemination of new climate-resilient seed varieties as well as theoretical and practical training sessions. According to beneficiaries, these new practices have positively impacted their food consumption patterns and increased their food security:

- Beneficiaries consume fresh produce from market gardens throughout the year.
- Beneficiaries have a surplus of cereal and oilseed crops which can be sold for additional income.

- Improved child nutrition through the availability of market garden products. This has resulted in a more diversified diet that helps fight vitamin and mineral deficiencies in children and adults.

As a result of the interventions implemented under the LDCF-financed project, there has been an increase in household income through the sale of surplus production. In addition, as many of the beneficiaries have become self-sufficient in the production of fresh produce, they spend less money purchasing fresh produce from the market. With additional disposable income within the household, parents are more likely to send their children to school. Supporting children's education is likely to have long-term positive impacts, as younger generations will be more equipped to break the cycle of poverty. In addition, there has been an overall improvement in children's health in beneficiary communes. With increased food availability and a more diverse diet, the frequency of childhood malnutrition has declined.

The LDCF-funded project has contributed to the empowerment of women. Since Mali is a predominantly a patriarchal society, this means that men have priority over the use of agricultural equipment. Therefore, prior to support provided under this project, women were expected to wait until the equipment is available – i.e. after being used by men – to carry out their agricultural activities. Since they received equipment financed by the LDCF project, women were able to use them on time, i.e. according to the sowing and planting schedules. This has enabled them to improve the level of household income. In addition, with the use of climate-resilient seed varieties and other techniques such as compost to improve soil quality, higher yields have been recorded. Climate-resilient seeds require less effort than conventional seeds. As a result, women have more disposable income at hand and have more time to invest in other income-generating activities.

The project has had significant impacts at multiple levels. At the institutional level, the LCDF-financed project contributed to raising awareness among decision-makers to the effects of climate change on the agricultural sector. At this particular level, emphasis was placed on raising awareness of agricultural research institutes to the impacts of climate change so that they can integrate adaptation strategies into their existing programs and/or projects. The project contributed to the establishment of local implementation structures - the CCCs - within each intervention site. The CCCs are made up of local representatives from several technical structures including agriculture, livestock and rural development. As a result of the implementation of the activities of the project, the beneficiaries of the LCDF-funded project have experienced improved food security through: i) increased yield using climate-resilient cereal seed varieties; ii) production of fresh produce from market gardens; iii) equipping women with tools and local varieties suitable for market gardens; iv) training of beneficiaries in low-tech practices to improve soil quality; and v) training beneficiaries in water retention techniques.

To illustrate the points above, here are a few testimonials from a select group of beneficiaries:

A communal councillor from the Municipality of Massantola and member of the CCC highlighted that prior to the project, the total amount spent by members of his village on tomatoes was approximately CFA Francs 1 million. Since market gardening activities have been promoted in their village, they have become self-sufficient in terms of tomato production, resulting in a reduction in food expenditure.

A farmer in the commune of Sandaré mentioned that through training and demonstrations undertaken under this project, members of her association have reduced the size of their area under agriculture (intensive agriculture). Thanks to intensive agriculture practices promoted under the project, they have experienced increased productivity with a decrease in time spent in agricultural activities and a considerable reduction in production costs. They therefore have more time to dedicate to market gardening activities.

A farmer from the commune of Sandaré has noted that the quality of their diet has improved significantly through the availability of fresh products during the dry period. The improved diets have led to a reduction in childhood diseases related to nutrition. The production of market garden products has been a significant income-generating activity in the commune. The farmer noted that thanks to the project, the children in the village are able to have three meals per day.

On the whole, it can be concluded that the complementary interventions implemented under this project have produced positive results. Therefore, the project is considered to have achieved a significant impact (S).

Table 24: Impact rating

Impact rating	
Rating score	**Rating**
3	Significant (S)
2	Minimal (M)
1	Negligible (N)

5. Lessons Learnt

5.1. Lessons Learnt Derived from this Project

The implementation of the project has fostered interest by stakeholders involved in addressing the effects of climate change at both national and local levels. The lessons learned from the implementation of the LDCF-financed project can be summarized as follows:

- There was a high level of ownership of the project interventions. This was achieved through the participatory approach used to help beneficiaries recognize and analyze the future impacts of climate change on their own lives and livelihoods. They therefore identified adaptation interventions to increase their own resilience.

- The strengthening the capacities of decision-makers at the commune level through the establishment of CCCs enabled the mobilization of both elected officials and decentralized technical services for better planning and implementation of various demonstration adaptation interventions.

- The mainstreaming of climate change considerations in the *PDESC*s of municipalities has placed this challenge at the forefront of the political agenda. Councillors within communal authorities have increased capacity of the adaptation actions that need to be undertaken and the financial implications.

- The gender aspect was well defined and permeated through the interventions implemented on the ground. The challenges of rural women were given due consideration as evidenced by the interventions implemented such as the support provided to establish market gardens. This included the training of women, tools and equipment as well as agricultural input. In addition, women's groups and associations are targeted as beneficiaries for income-generating activities.

- The development of a system for the collection and dissemination of meteorological information to farmers and using this information to make informed decision on the timing of sowing, planting and harvesting as well as the choice of crops to be planted.

- A thorough baseline assessment should be undertaken at the outset of every full-sized project. Without an understanding of the prevailing socio-economic conditions prior to the implementation of a project, it is challenging to determine the real impacts achieved. The evaluation of the project becomes based on anecdotes, rather than hard data. Sufficient funds need to be allocated at PPG stage to undertake a rigorous baseline assessment. A baseline assessment should not be based on secondary data, but should include a mix of primary and secondary data.

- In terms of the M&E system implemented, the Results Framework needed to be well thought through, coherent and aligned with SMART criteria. As the Results Framework contained in the ProDoc was not well articulated, the PMU should have revised and justified these revisions with the UNDP and the Project Board. The indicators used need to be specific to each target which in turn need to be aligned with the SMART guidelines developed by the GEF. If the indicators are vague and not measurable, the evaluation of the project will consequently reflect poor performance. An analysis of the Results Framework should be undertaken as a priority at the outset of the project.

- A robust M&E plan needs to be developed from the outset of the project and validated with the Project Board. If need be, a consultant can be hired to fully develop the Results Framework and compile a plan that is aligned with the various aspects of the project. Ideally, the M&E plan should detail the different indicators, means of measurement, means of verification, methodology to be used and reporting requirements. Identify early on, a resource who is responsible for implementing the M&E plan.

- Along the same line, the budget should have been revised from the outset. The budget was not well defined in the ProDoc, which made it challenging for the PMU to follow it in the implementation of the

project. A revision of the budget at the outset of the project would have facilitated the tracking of funds. If need be, a consultant with significant experience in project management could have been hired for this purpose.

- The concept of CCC as used in this project is highly recommended as it supports capacity building among local structures, promotes ownership of the project and ensures sustainability after the project is completed.

- Even when using a CCC approach in the implementation of a project, there needs to be an M&E mechanism in place to ensure that the information received is accurate. The M&E mechanism would have also ensured that the information communicated to the CCC is filtered to the beneficiaries.

- It is crucial to have a Communication Specialist appointed for full-sized projects, especially pilot projects. The dissemination of information is a crucial element of this LDCF-project as it is the first adaptation project in the agricultural sector to be undertaken. The quality of the information communicated and the frequency and type of communication to stakeholders, will have a direct bearing on the success of the project and the adoption of information and lessons that emerge from the project.

- The budget contained in the ProDoc made provisions for international consultants. However, none were contracted throughout the lifespan of the LDCF-financed project. Given that this is a pilot project and there are no other known examples of adaption interventions implemented in the agricultural sector in Mali, the LDCF-financed project could have benefitted from international adaptation expertise. An international consultant with experience in climate change adaptation could have strengthened the interventions of the project. In addition, this would have led to a transfer of knowledge from the international consultant to the national, regional, communal and local stakeholders.

- According to the ProDoc, the Project Board was meant to meet twice a year. However, they only met once a year. It is important that the Project Board meets frequently, or at least as intended in the ProDoc, to make high-level decisions. The Project Board serves a well-defined purpose and should have met the requirements specified in the ProDoc to provide support to the PMU and ensure the smooth undertaking of the project.

- Should additional funds be sourced to complement the ongoing activities, these should be managed carefully and in separate accounts. If not undertaken as such, confusion ensues. A qualified and experienced financial officer should be appointed as part of the PMU to manage these funds.

6. Conclusions and Recommendations

6.1. Conclusions

Based on the information discussed in the previous chapters, the performance of the project has been satisfactory. There was a real sense of satisfaction and ownership of the interventions of the project on-the-ground and demonstration activities have increased food production through the use of climate-resilient seeds and other technologies and techniques.

Table 25: Summary of project rating

Criteria	Rating
Project Results (project objective)	Satisfactory (S)
Sustainability	Moderately Likely (ML)
Relevance	Relevant (R)
Impact	Significant (S)

The evaluation of the LDCF-financed project has led to the identification of several major achievements/strengths as well as shortcomings. As the project performed in a satisfactory manner, more achievements/strengths are noted than weaknesses. The table below summarises the achievements/strengths and shortcomings, which are individually discussed in the following sections.

Table 26: Summary of strengths and shortcomings

Achievements/strengths	Shortcomings
CCCs	Baseline information
Participation of beneficiaries	Results Framework
Partnerships created	M&E system
Capacity building	*GCAM*s
Gender sensitivity and responsiveness	Support from Implementing Entity
Easily replicable adaptation interventions	Budget and finance
Climate information to strengthen agricultural practices	Implementation of Component 3
Additional finance from *ACDI*	
Food security	

6.1.1. Major Achievements/Strengths

6.1.1.1. CCCs

The implementation of the project led to the establishment of CCCs in each beneficiary commune. In general, the CCC contains 12-15 members and is composed of representatives from different technical services – including *inter alia* agriculture, livestock, forestry, and water – at the commune and local level as well as elected members of the council. The mayor of each beneficiary commune chaired the respective CCCs. The CCCs have been pivotal in the successful implementation of the LDCF-financed project. Under monitoring from the PMU, the CCCs were largely responsible for the implementation of activities on the ground. By gathering representatives of different technical services and elected officials, this has promoted an integrated approach to climate change adaptation that cuts across different sectors.

The CCCs have coordinated the procurement and use of climate-resilient seeds for crops including *inter alia* millet, sorghum and peanuts. In the commune of Cinzana, the CCC has coordinated interventions to counteract deforestation, promote the use of improved cookstoves, and the dissemination of market gardening practices to increase food production. The CCC was a platform *via* which information flowed from the PMU and other partners to beneficiaries and *vice versa*. For example, the CCC disseminated the guidelines received from the *AEDD* to the local communities. Climate information is communicated from the PMU to the CCC who is

thereafter responsible for the disseminating of the information to local communities. The CCCs were also instrumental in identifying and prioritizing adaptation interventions that are best-suited to the local context. The CCC acted as a point of contact between the beneficiaries and the PMU. For example, additional requests for low-tech rain gauges were communicated to the CCC who then passed on the information to the PMU.

The CCCs have coordinated several activities on the ground. The mode of implementation of the project has been such as different groups of people benefit from the climate-resilient cereal seeds every year to ensure a wide coverage of beneficiaries. The CCCs implemented a system whereby a portion of the harvest goes through them for seed multiplication and distribution to another group of beneficiaries in their respective commune. They have therefore played an instrumental role in ensuring a fair distribution of seeds to a wide range of stakeholders to upscale the results of the LDCF-financed project.

Through the establishment of the CCCs, the PMU has ensure that the technical knowledge acquired through the LDCF-financed project and the structure put in place to further the agenda of climate change adaptation remains within the beneficiary communes after the completion of the project. The CCCs are committed to fulfilling their role beyond the project's lifespan as they have recognised the benefits that have been derived thus far. Based on the above, the CCCs are therefore instrumental in promoting the sustainability of the LDCF-financed project after the completion of the project.

6.1.1.2. Participation of beneficiaries

Instead of using a top-down approach – which is often used in the implementation of projects – a bottom-up, participatory approach was undertaken by the PMU for several activities implemented under the LDCF-financed project. The participation of beneficiaries was encouraged to identify their main challenges posed by climate change and the corresponding adaptation interventions that would address their adaptation needs. The beneficiaries were empowered by promoting their participation in key decision-making processes relating to the interventions on the ground. Such a participatory approach created a platform for beneficiaries to discuss the localized effects of climate change and to learn from each other. Their participation has secured ownership of the project at the beneficiary levels.

6.1.1.3. Partnerships created

The PMU has fostered relationships with key agencies and research institutions in the country including *AEDD*, Mali-Météo and *IER*. These stakeholders have been instrumental in providing technical advice and/or carrying out activities. The AEDD has facilitated many of the participatory workshops undertaken with the local communities and has undertaken the capacity building activities with decision-makers at different levels of governance and other key stakeholders. Mali-Météo played an important role in training members of *GCAM*s and selected members of local communities to read and record rainfall data. Mali-Météo has reinforced the need for climate information to be used by farmers for informed decision-making and to manage the risks to agriculture posed by climate change. Farmers were empowered through this exercise as it allows them to make their own decisions when it comes to sowing, planting and harvesting schedules based on climate information. *IER* has been instrumental in determining and providing climate-resilient seeds for various crops, which are adapted to specific agro-ecological zones and corresponding climatic conditions. Their input was instrumental in the implementation of Component 2 of the LDCF-financed project. These partnerships have ensured that the demonstration interventions developed are rooted in the local context.

6.1.1.4. Capacity building

As this project is the very first to be formulated and implemented within the field of climate change adaptation in agricultural sector in Mali, there was a need to build the capacity of decision- and policy-makers and other key stakeholders. Therefore, capacity building was a key focus of the project. As a result of decentralization of government structures in Mali, there is limited capacity at the commune and local levels. The capacity building activities were therefore largely geared towards commune and local level stakeholders, however they were not restricted to them. Several capacity building workshops were held at the national and regional levels which helped to raise awareness about the effects of climate change on the agricultural sector. Awareness raising was complemented by training on the mainstreaming of climate change adaptation into planning activities such as the *PDSEC*s.

Through capacity building, the project leaves technical government structures at various levels and other stakeholders with an increased knowledge on the potential effects of climate change on agriculture and the corresponding impacts on the lives and livelihoods of vulnerable local communities. Under this project, stakeholders were also trained on the adaptation interventions implemented to limit the negative effects of climate change. Capacity building coupled with the demonstration activities has increased the technical capacity of representatives of technical structures to upscale and replicate and/or formulate new interventions.

6.1.1.5. Gender sensitivity and responsiveness

The LDCF-financed project was formulated and implemented with a strong emphasis on gender sensitivity and responsiveness. As it is widely accepted in the literature that women are disproportionately affected by climate change, certain activities were designed specifically to increase their resilience. For example, market gardening activities were solely geared towards women. Under this particular activity, they received climate-resilient seeds for crops that are adapted to the local climatic conditions for their market gardens. In addition, they received training on: i) low-tech practices to improve soil quality; ii) water retention techniques; iii) compost-making; and iv) the use of organic manure. In addition, several women's groups/associations were equipped with tools such as ploughs, oxen, wheelbarrows, shovels, and picks to support their agricultural practices. Instead of men having priority over the use of tools for agricultural activities, women beneficiaries were able to proceed with their agricultural activities. As such, they managed to remain in keeping with the sowing and harvesting schedules.

The above has resulted in the empowerment of women. Intensive agriculture with climate-resilient seeds, as promoted under the LDCF-financed project, has resulted in women spending less time on agricultural activities and they therefore have more time to dedicate to alternative income-generating activities. In addition, as market gardening activities have been successful, women have contributed an increasing amount to the household income. The women consulted during the in-country mission have demonstrated a good understanding of climate change and the impacts on their lives and livelihoods. Also, they have demonstrated a high-level of ownership of the LDCF-financed project.

6.1.1.6. Easily replicable adaptation interventions

The adaptation interventions implemented under the LDCF-financed project were developed in collaboration with the beneficiaries. As such, the interventions were simple in nature and proved to be effective. This relates largely to the practices to improve soil quality, water retention techniques, compost-making, and the use of organic manure. The more complex interventions such as the use of climate-resilient seeds are more complex in nature and were recommended by the *IER*. Farmers were trained on the use of these climate-resilient seeds and they were provided with technical guidelines explaining the best climatic conditions for the best yield. Training combined with the technical guidelines made simplified the use of climate-resilient seeds for farmers. As this was a pilot project, all of the above interventions can be easily replicated and upscaled in other parts of the country to increase the resilience of the agricultural sector as a whole and promote food security. The best-practices and lessons learnt from the LDCF-financed project should inform future iterations of the project and/or if it is replicated or upscaled to other communes that are vulnerable to food insecurity.

6.1.1.7. Climate information to strengthen agricultural practices

The LDCF-financed project has created an appetite for agro-meteorological information within the beneficiary communes. Mali-Météo designed a low-tech rain gauge in collaboration with local manufacturers and undertook quality assurance of the product. A total of 187 low-tech rain gauges were distributed in each village across the beneficiary communes. The members of *GCAM*s and a selected group of farmers from each beneficiary village across the six communes – a total of 374 farmers – were trained on reading and recording rainfall data. Recognizing the value of rainfall data in determining the type of climate-resilient seeds to sow, plant and harvest (according to details of the technical guidelines), farmers requested additional rain gauges which they paid for themselves. During the in-country mission, it became clear that members of the community communicate on a regular basis with the selected member of the village appointed to record rainfall data to obtain the information they need to make informed decisions.

6.1.1.8. Additional finance from ACDI

A Canadian Fund, *ACDI*, expressed interest in supporting the ongoing work and contributed towards increasing the resilience of the vulnerable local communities in the beneficiary communes, except in Taboye and Mondoro. ACDI provided $2,145,000, compared to the funding provided by the LDCF for the implementation of the project

i.e. $2,340,000. The additional finance has enabled the development of several hard interventions that complement the activities financed by the LDCF. For example, *ACDI* financed the construction of a small dam in Massantola with the capacity to irrigate a total area of 22 hectares. See Annex D for the list of activities financed by *ACDI*.

The interventions of *ACDI* also focused on improving the resilience of women. For instance, solar-powered multi-functional platforms and solar-powered pumps linked to water towers were constructed using *ACDI* funds. These hard interventions were complementary to the soft interventions implemented by the LDCF and contributed significantly to increasing the resilience of vulnerable local communities in four beneficiary communes.

6.1.1.9. Food Security

The objective of the project was to increase the adaptive capacity of the agricultural sector to promote food security in Mali. Through the documentation review and stakeholder consultations undertaken, it was undeniable that the LDCF-financed project has led to an increase in food security in the beneficiary communes. Intensive agriculture with climate-resilient seeds has led to a higher yield to be recorded amongst the pilot farmers. Market gardening activities have proved to be successful and have enabled certain communities to become self-sufficient with regards to certain fresh produce. Beneficiaries consulted during the in-country mission have confirmed that there has been a notable increase in food security in their respective villages.

Food security is characterized as not only an increase in food availability but also a diverse diet. Many of the beneficiaries have noted that there has been an increase in types of food available. For example, potatoes which were not widely available prior to the LDCF-financed project, were available in great quantities at the time of the in-country mission in Cinzana. The crops and climate-resilient seeds promoted under the LDCF-financed project have led to a diverse diet.

According to beneficiaries, there has been an increase in the public health, especially relating to children. They used to suffer from many diseases as a result of malnutrition. However, it seemed that children were in better health than before and the beneficiaries linked this improvement to the results of the LDCF-financed project. Children are provided with the opportunity to have three meals a day thanks to an increase in food production in the beneficiary communes.

6.1.2. Major Shortcomings

6.1.2.1. Baseline Information

One of the major shortcomings of the LDCF-financed project is the lack of rigorous baseline information collected at the outset of the project, providing an in-depth understanding of the socio-economic conditions of the beneficiaries. A study was undertaken to document certain aspects of the baseline conditions, however, this was largely based on secondary data and was undertaken after the project was well underway. This lack of information makes it challenging to provide a realistic comparison between the prevailing conditions after the implementation of the project and prior to it. For instance, it would have been useful to compare household income of pilot farmers with that recorded at the outset of the project in 2010. Baseline information would have been used to revise the Results Framework to update the baseline column.

6.1.2.2. Results Framework

The Results Framework, as contained in the ProDoc, was not articulated in a way that is conducive with the evaluation of the indicators to determine whether the project was on track to meet the targets by the end of the project. The indicators used were vague and did not include detailed information as to the specific information that needed to be collected. The sources of verification identified for each target were not accurate. For example, when referring to increased food production in Indicator 3 under the project objective, there was no mention of whether this increase was linked to higher yield or an increase in area under agriculture. Many indicators were not aligned with the SMART criteria. Although all of them were time-bound, relevant and achievable, many of them were not specific enough and measurable. The fact that the indicators were not measurable made it challenging to assess the performance of the project according to the details contained in the Results Framework.

6.1.2.3. M&E System

The M&E system is an important aspect of the programme design, and it is used to monitor programme implementation against the plan. The lack of an M&E system is one of the major shortcomings of the LDCF-financed project and this project would have greatly benefitted from a robust and rigorous M&E system. From 2010 to 2014, the project was implemented without an M&E plan. Based on a recommendation in the midterm review, an M&E manual was developed but this lacks information contained in an M&E plan.

The M&E undertaken was limited to the yield of climate-resilient seeds and fresh produce from market gardens. This was done using secondary data collected by local agricultural extension officers and there were no mechanisms put in place to verify the information collected. This was done through the use of M&E forms, which were completed by the local agricultural extension officers following a set of questions with the farmers and women practicing market gardening. Demonstration plots were used to showcase the results obtained from climate-resilient seeds. However, no control plots were established to compare the yield from climate-resilient and traditional seeds. Instead, the yield was compared to the average in the commune. This is considered to be an inaccurate way of comparing yields as the average includes the yield from the pilot farmers.

6.1.2.4. GCAMs

The *GCAM*s were intended to play an important role in relaying climate information to and from Mali-Météo. However, they were not functional as a result of a lack of financial support to cover their transport and communication costs. No financial support was considered to that end from the LDCF-financed project as this would create expectations and would result in the GCAMs becoming defunct after the end of the project. However, no alternative solutions were sought out to cover these costs and therefore the *GCAM*s were not operational. The *GCAM*s would have filled in the vacuum created by the withdrawing of the support of the PMU after the project closure in terms of accessing climate information from Mali-Météo. If they had operated as intended, relationships would have been established and there would be no risks of insufficient climate information to make informed decisions after the end of the project.

6.1.2.5. Support from the Implementing Entity

The Implementing Entity has supported the Executing Entity in the implementation of this project in terms of contracting, management of funds, as well as technical and institutional support. However, there were shortcomings that hindered on the implementation of the project. For instance, there were significant delays that were noted in the disbursement of funds to the PMU. These delays have affected their operations as late disbursements have resulted in delays in contracting for services or other payments. With careful planning and monitoring, late disbursements could have been prevented to ensure the smooth undertaking of activities.

6.1.2.6. Budget and Finance

The budget for the LDCF-financed project was not properly articulated in the ProDoc. The budget was compiled according to products and not per activity. This has led to confusion in the management of funds and the reporting of it during implementation. Other than the cumulative amount of funds disbursed to date, there is currently no good track record of the spend per outcome or per activity. This has hindered an in-depth analysis of the management of the finances in this project to determine the execution rate and whether the activities were implemented in a cost-effective manner. A detailed budget per activity would have facilitated the management and the reporting of this aspect of the LDCF-financed project.

Based on the information provided in the ProDoc, it is noted that a very small share of the total budget was allocated to project management – i.e. 3.6%. This is amount is too low to cover the costs of managing a full-sized project. This is considered as a major shortcoming in the project. Additional funds allocated to project management could have ensured that the PMU is bolstered in terms of the number of people in the core team to provide assistance to the Project Coordinator. o

6.1.2.7. Implementation of Component 3

At the time of writing of this report, most of the activities of Component 3 had not yet started, save for two regional dissemination workshops. This component was focused on the dissemination of lessons learnt and best-practices to replicate and upscale them in other vulnerable communities in Mali. At this stage in the implementation of the project, these activities should have been well underway and close to completion. This is a crucial component of the project as it is a pilot project and hence there is limited knowledge and expertise on

climate change adaptation in the agricultural sector in Mali. The communication of this information was likely to contribute to enhancing the knowledge of decision-makers at various levels of governance on locally-appropriate technologies and techniques to improve food security in the country. However, at the time the in-country mission was undertaken, no communications specialist had been contracted to develop the necessary communication material. At present, the PMU is in the process of obtaining the services of a communication specialist and remains committed to due consideration to the implementation of Component 3.

6.2. Recommendations

The following is recommended to ensure the successful completion of the project:

- The interventions of Component 3 need to be implemented as soon as possible to communicate the lessons learnt to key stakeholders.
- It would be beneficial if the *GCAM*s are revived before the end of the project. This would ensure that the climate information aspect of the project does not fall apart after its completion.
- The project team should as soon as possible define the modalities for setting up and operating the micro-credit fund. The Project Team should request the expertise of reputable consultants in the field to ensure the financing of the alternative climate-resilient income-generating activities.