Terminal Evaluation Report

PIMS 4091 Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde

José Antonio Cabo Buján

Project title	*Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde*
Implementing agency	United Nations Development Programme
GEF project ID	3581
UNDP PIMS ID	4091
Region and countries included in the project	Cabo Verde, Africa
Executing agency	National Institute for Water Resources Management (INGRH)
Implementing partners (in alphabetical order)	National Institute for Agricultural Research (INIDA), National Institute for Meteorology and Geophysics (INMG), Ministry of Environment, Housing and Territorial Planning (MAHOT), Ministry of Rural Development (MDR), Municipalities of Porto Novo, Ribeira Grande, Santa Cruz, São Lourenço dos Orgãos, and Tarrafal; LEC (Civil Engineering Lab); Radio Nacional Educativa (Educative Radio)
Evaluation timeframe	June-July 2014
Date of evaluation report	December 2014

Contents

Acronyms and Abbreviations

ALM	Adaptation Learning Mechanism
AMAT	Adaptation Monitoring and Assessment Tool
ANAS	National Water and Sanitation Agency (*Agência Nacional de Agua e Saneamento*)
ANMCV	National Association of Municipalities of Cabo Verde (*Associação Nacional de Municipios de Cabo Verde*)
DERP	Poverty Reduction Strategy Paper (*Documento de Estratégia de Redução da Pobreça*)
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
INGRH	National Institute for Integrated Water Management (*Instituto Nacional de Gestão Integrada dos Recursos Hídricos*)
INIDA	National Institute for Agricultural Research (*Instituto Nacional de Desenvolvimento Agrícola*)
INMG	National Institute for Meteorology and Geophysics (*Instituto Nacional de Meteorología y Geofísica*)
LDCF	Least Developed Country Fund
LEC	Civil Engineering Laboratory *(Laboratório de Engenhería Civil*)
MADRRM	Ministry of the Environment, Rural Development and Marine Resources *(Ministério do Ambiente, Desenvolvimento Rural e dos Recursos Marinhos*)
MAHOT	Ministry of Environment, Land-use Planning and Housing (*Ministério de Ambiente, Habitação e Ordenamento do Território*)
MDR	Ministry for Rural Development (*Ministério de Desenvolvimento Rural*)
MTR	Midterm Review
NAPA	National Adaptation Plan of Action
NIM	National Implementation Modality
PAGIRH	Integrated Water Resource Management Action Plan *(Plano de Ação para a Gestão Integrada dos Recursos Hídricos*)
PANA	National Environmental Action Plan (*Plano Nacional de Ação Ambiental*)
PDM	Muncipal Director Plan (*Plano Director Municipal*)
PEDA	Strategic Program for Agricultural Development (*Programa Estratégico de Desenvolvimento Agrícola*)
PENAS	National Water and Sanitation Plan *(Plano Nacional de Agua e Saneamento*)
PIR	Project Implementation Review
PMU	Project Management Unit
PNIA	National Program for Agricultural Investment (*Programa Nacional de Investimento Agrícola*)
SAAS	Municipal Water and Sanitation Services (*Servício Autónomo de Agua e Saneamento*)
SGP	Small Grant Program

SMART	Specific, Measurable, Achievable, Relevant, Time-bound
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Program
USDA	United States Department of Agriculture
VRA	Vulnerability Reduction Assessment
WMO	World Meteorological Organization

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Project Summary Table

Project Summary Table				
Project title	Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde			
GEF project ID	3581		**At endorsement (million USD)**	**At completion (million USD)**
Country	Cabo Verde	**GEF financing**	3.1	3
Region	Africa	**IA/ EA own**	0.2	0.2
Focal area	Climate change	**Government**	9.2	30.3
Operational program	LDCF	**Other**	54.5	59.7
Executing agency	INGRH	**Total co-financing**	63.7	90.0
Other partners involved	INIDA, INMG, MAHOT, MDR, Municipal governments	**Total project cost**	66.7	93.0

Project Description (brief)

PIMS 4091, *Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cabo Verde* was implemented between 2009 and 2014 with a GEF grant amounting to 3,1 million US$. It aimed to increase resilience of rural populations in Cabo Verde by developing capacities on adaptation measures at field level, as well as mainstreaming climate change into the national and local policy and regulatory framework.

The project strategy is articulated in three outcomes:

1. Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management
2. Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins
3. Lessons learned and best practices from pilot activities are disseminated and integrated in national plans and policies

Evaluation Rating Table

Evaluation rating table		
Monitoring and evaluation		
Overall quality of M&E	(rate 6 point scale)[4]	S
M&E design at project start up	(rate 6 point scale)	S
M&E plan implementation	(rate 6 point scale)	S
IA&EA Execution		
Overall quality of project execution/implementation	(rate 6 point scale)	S
Implementing agency execution	(rate 6 point scale)	S
Executing agency execution	(rate 6 point scale)	S
Outcomes		
Overall quality of project outcomes	(rate 6 point scale)	MS
Relevance	(rate 2 point scale)[5]	R
Effectiveness	(rate 6 point scale)	MS
Efficiency	(rate 6 point scale)	S
Sustainability		
Overall sustainability	(rate 4 point scale)[6]	ML
Financial resources	(rate 4 point scale)	ML
Socio-economic	(rate 4 point scale)	L
Institutional framework and governance	(rate 4 point scale)	ML
Environmental	(rate 4 point scale)	ML
Impact		
Progress towards reduction of vulnerability	(rate 3 point scale)[7]	M
Overall project results	**(rate 6 point scale)**	**MS**

(1) 6 point scale: Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HS)
(2) 2 point scale: Relevant (R); Non-relevant (NR)
(3) 4 point scale: Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U)
(4) 3 point scale: Significant (S); Minimal (M); negligible (N)

Summary of conclusions, recommendations and lessons

The project design is coherent, with three well-formulated outcomes logically linked to the project objective (figure 2 and table 2). The project design included a well-devised risk analysis, including relevant risks and risk mitigation strategies. However, the inclusion of specific activity targets for hectares of plantation and cubic meters of check dams imposed constraints on the execution of the activities and the attainment of the outcomes, as these targets were based on a budget that was unrealistic by the time of project implementation.

Therefore, it is recommended that future project design avoid imposing such restrictive targets, and better favors setting more flexible targets that establish the minimum amount of the target variable needed to attain the intended specific impact. For instance, minimum reservoir capacity per hectare of drip irrigation, number of cubic meters of check dam in a watershed needed to attain a given reduction in erosion per hectare, or minimum number of hectares needing afforestation on upper sub-basins to achieve a significant reduction in peak flow. Such targets could be downscaled to fit a project budget in the case were the price assumptions for the budget are no longer valid.

The project had appropriate management structures that included a high-level national steering committee, a midlevel technical advisory committee, a project implementation unit and, at municipal level, local coordination committees.

However, the institutional reforms underwent by the executing agency during project implementation weakened attention on project implementation and hampered some its achievements, namely at the level of mainstreaming climate change into the national policy framework. The proactive engagement of a midlevel technical committee is deemed crucial for the success of project implementation as such bodies combined both agility to support adaptive management and political leverage and access to other institutions.

The project established strong partnerships with the municipal councils and delegations of centralized institutions present at project sites, and entered co-finance agreements with the small grant program (SGP) of GEF. The low-cost delivery modality of this program may offer crucial advantage to convey big local impacts with little investment. Therefore, the feasibility of entering agreements with the SGP should be considered when starting the implementation of a project.

The indicator framework was generally well formulated and responding to SMART quality criteria. However, there were also significant weaknesses, at both impact and outcome indicators (table 5). The second impact indicator on percentage of state budget dedicated to climate change (table 14) lacked proper definition of criteria and methodology, hence its monitoring yielded a value that cannot be compared with its baseline. Also, the collection of data for the third impact indicator, the vulnerability reduction assessment index proved to be time-consuming and costly without necessarily reflecting the work done by the project. Moreover, the two indicators of the third outcome bore no relevance to the outcome strategy.

The project management did indeed monitor and report progress towards the project objectives, outcomes and outputs, with a clear focus on the latter. However, weak definition of responsibilities in terms of data collection led to unsystematic collection of data, not only related to the project's indicator framework but also to important data related to the use of water and agricultural output. Therefore it is recommended to always leave the ultimate responsibility of collection and reporting of monitoring data with the project coordinator, who should supervise that the staff of the project implementation unit keep orderly data logs that can be shared and consulted. The availability of such data, including geo-referred and specific financial data would be crucial to avoid halts in project implementation in the case of staff turnover or delays in the process of evaluation.

The steering committee and the project management unit, particularly the project coordinator, must understand the importance of monitoring for adaptive management in a results-based management context. This understanding must lead to give high priority to monitoring as means

of understanding the progress towards the project objective. Failure to do so would result in missing opportunities for effective and efficient investment and ultimately missing opportunities to support national and local government to combat poverty and increase resilience of the populations.

The project strategy was based on the NAPA priority projects that were also linked to national development objectives. Sustainable agriculture and enhanced water supply and efficient use constitute also priorities at municipal and community level. Thus, the project strategy is highly relevant to both national, municipal and communities development strategies, policies and objectives.

Regarding attainment of the project objective, there are undeniable local impacts at community/ farm level in terms of water savings and increased yields. However, the general objective of contributing to systematizing the national response to climate change, and specifically, to strengthen the resilience of the water sector at national level has been only partially achieved (table 9).

The project has indeed contributed to the development of capacities and raising of awareness of officials of centralized and decentralized institutions and contributed proposals to mainstream climate change risks into local and sector plans and strategies. In addition, the project has contributed to execute government policies on watershed protection and expansion of water-efficient agriculture at several locations in two islands, as well as increased the meteorological observation network.

However, these interventions have lacked enough detail, in the case of the proposals to mainstream climate change, or have been too scattered in their localities of implementation to obtain a decisive impact.

This fact notwithstanding, the information and knowledge products either already generated by the project or that could be still generated through a systematization of data from project activities e.g. costs involved in the construction/ maintenance of infrastructures, irrigations systems, as well as environmental effects e.g. on water balance, peak flows and erosion, can still be used by the institutions involved in the implementation of the project to increase awareness and to introduce more specific policy instruments and measures to enable continued adaptation actions.

The target of the first outcome, mainstreaming climate change into the poverty reduction strategy paper and into key sector policies was not achieved due to the lack of leverage by the project management unit, and the project executing agency itself, to affect any influence on the formulation process that was led by the national Directorate for Planning of the Ministry of Finances and Planning.

However, efforts have been made to work with the sector clusters that develop specific policies based on the main document.

Furthermore, a key weakness of the mainstreaming process led by the project was the general character of the proposals submitted to integrate climate risks into national and local policy objectives. It is therefore recommended to systematize and publish more data generated by the project, i.e. the costs of adaptation measures and their environmental effects to provide the basis

for an effective integration of climate risks into the policy framework. Special attention must be given to the risk assessment for infrastructure developed by Civil Engineering Laboratory (LEC). This information should be packaged and addressed to specific target audiences within key institutions, particularly the Ministry of Rural Development, Ministry of Environment, Spatial Planning and Housing, and Ministry of Finance and Planning.

For the second outcome, pilot adaptation activities, (figures 5, 6 and 7), the targets have been generally accomplished (table 7). However, in spite of having achieved crucial impacts at farm level, the project activities were too scattered (figure 4) and did not register downstream effects on the water balance, i.e., peak and average flows, or effects on erosion, to enable a quantification of the actual overall impact.

One key limitation was the selection of relatively wide area, which extended over five watersheds in two islands on a budget of 1.6 million USD (outcome 2). A more limited geographical scope could have produced more important impacts. For instance, 5.4 million USD were invested by the Millennium Challenge Corporation in activities very similar to those implemented by the project under outcome 2, but in just one watershed in the Municipality of Paul, Santo Antão Island.

In view of the unsufficient documentation of project impacts, it is recommended that future project implementation takes the learning dimension to its core and thus it designs activities and outputs with a scientific approach that allows the extraction of firm conclusions and lessons learned.

One important issue in the implementation of the pilot activities was the selection of beneficiaries. Although for the last year of implementation objective criteria were formulated and applied to systematize selection, the total set of beneficiaries was a very heterogeneous group, including relatively affluent farmers working their own land, as well as poor communities practicing subsistence farming in marginal lands. While this heterogeneity represents the social reality of the localities where the project was implemented, it is recommended that future projects specifically define the target beneficiaries of the intervention. For instance, should the intervention focus on poor farmers (defined based on locally tested criteria) to secure sufficient agricultural production for food security? Should the intervention rather support more affluent farmers to foster resilient commercial agriculture and employment? Or should the strategy even consciously include both groups to establish which intervention would be the most cost-efficient?

The third outcome was intended to produce the necessary systematization and dissemination of specific lessons learned by the implementation of the project mainstreaming and pilot activities. However, activities under this outcome were limited to raise the awareness of the general public on climate change issues.

The project suffered significant delays at the beginning of its implementation timeframe. These delays were due to the electoral process in Cabo Verde that culminated in the February 2011 elections and the consequent ministerial reorganization after the new government took office. Other factor that determined the late start of the project was the lengthy recruitment process of the two key figures of the project implementation unit, the national project coordinator and the chief technical advisor. The high expectations for the latter position could not be realized, as the position suffered from shortcomings in terms of communication skills and capacity to provide expertise for the two different projects (water sector and protected areas) the advisor position was intended for.

The project inception workshop in April 2011 set the real begin of implementation. From that point onwards, project delivery ran generally smoothly and at good pace until 2014 (figure 9), suffering only a major setback with the resignation, for personal motives of the national project coordinator in 2012. Although project implementation continued during ca. one year without project coordinator, it kept a slower rhythm till the new coordinator took office in June 2013.

Project expenditure corresponded to budget with minor divergences (figure 10, table 10 and 11). In addition, the project management costs were kept close to the 10% benchmark for project costs foreseen in the project document. Most expenditures were accounted as *Contractual services-companies,* reflecting the investment made on watershed infrastructure and water efficiency measures, as was foreseen in the project document (figure 11).

Most of the parallel funding identified in the project document has been accounted for; in fact, 41% more than the parallel funding identified in the project document has been accounted for (table 12 and 13).

Disbursement and administration of the project did not suffer any significant setbacks besides some delays in procurement process due to either misunderstandings on particular administration requirements between the implementation units, the executing agency and the supervision of the implementing agency or to lengthy timeframes inherent to some procurement processes.

The financial sustainability of the farm investments in water efficiency measures would depend on sustained economic profits surpassing the costs of operation and the costs involved in less efficient/ productive cultivation methods, such as rain fed agriculture and/ or flood irrigation. Profits would depend on market dynamics and market access issues, factors that are largely beyond the scope of the project and the capacities of the farmers themselves.

However, public policy interventions can create an enabling environment by implementing policy instruments that provide incentives to water-efficient agriculture. Policy instruments could include subsidies or differentiated water tariffs according to water efficiency or regulatory measures that deter or prohibit the use of techniques deemed resource wasteful or damaging natural resources. In addition, facilitation of credit and risk transfer services to farmers would greatly facilitate investments in sustainable water-efficient agriculture, if other policy incentives were in place.

Since public commitment in terms of strategies and investment to improved and more productive agriculture through enhanced mobilization of water resources is guaranteed in the midterm, public policy would also be crucial to limit the expansion of agriculture and settlement within the carrying capacity of the ecosystem, taking impacts of climate change into account. Failing to do this could incur the risk of maladaptation.

Introduction

Purpose of the evaluation

The UNDP guidelines for terminal evaluation of GEF funded projects and the Least Developed Country Fund strategy and objectives, define five complementary purposes for terminal evaluations:

- To promote accountability and transparency, and to assess and the extent of project accomplishments
- To synthesize lessons that can help improving selection, design and implementation of future activities
- To provide feedback on issues that are recurrent across the UNDP portfolio and need attention, and on improvements regarding previously identified issues
- To contribute to the overall assessment of results in achieving the LDCF strategic objectives aimed at increasing resilience by integrating both immediate and longer-term adaptation measures in development policies, plans, programs, project and actions
- To gauge the extent of project convergence with other UN and UNDP priorities, including harmonization with other UN Development Assistance Framework (UNDAF) and Country Program Document outputs and outcomes

Scope & Methodology

The scope of the terminal evaluation is the project *Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cabo Verde*, including its inputs, activities, outputs, outcomes and impacts, its target beneficiaries, implementing and executing agencies, as well as its development and environmental context.

The terminal evaluation has taken into account the views of all implementing partners and relevant stakeholders, particularly the intended beneficiaries of the project, i.e., local governments, as well as farmers and community associations.

To ensure the independence and impartiality of the terminal evaluation, a team of external evaluators was contracted by the UNDP to conduct the terminal evaluation following UNDP guidelines and ethical standards. The evaluation team was composed of an international consultant, with expertise in GEF project management and evaluation and a national expert on rural development and agriculture. The terminal evaluation was conducted in June and July 2014 and the field mission took place between the 9th and 20th of June 2014. Figure 1 shows the itinerary of the evaluation team.

Figure 1 *Itinerary of the field mission for the terminal evaluation in the Island of Santiago (left) and Santo Antão (right).*

The evaluation team assessed the project formulation, implementation and results against the evaluation criteria of relevance, effectiveness, efficiency, impact and sustainability. For that purpose, a set of evaluation questions were defined by the evaluation team, the UNDP country office and the Cabo Verde National Institute for Water Resources Management (national executing agency).

The evaluation questions were organized in a matrix that included success indicators, sources of information and the methods used to collect it. The evaluation matrix is attached to this report as annex I.

The evaluation questions were answered using both documental (secondary) and primary data.

Secondary data consisted of project reports, national strategies and plans, municipal plans and strategies, the United Nations Development Assistance Framework (UNDAF), the One Programme and other context papers and planning instruments, as well as relevant project documents such as consultancy reports, technical documents, general information and awareness materials. A complete list of the documents consulted can be found in annex III. The project coordination and implementing agency facilitated all the documentation required, including very detailed lists of project interventions with information on surface covered, number of beneficiaries, location, etc.

Primary data was collected by the evaluation team by means of field visits to project sites and individual or group interviews with project stakeholders, beneficiaries and other key informants. People interviewed for the terminal evaluation included officials of the UNDP Cabo Verde and the National Institute for the Management of Water Resources (INGRH), the Ministry of Rural Development, Department of Agriculture, the Ministry of Environment, Department of Environment, the National Institute for Agriculture Research, the National Institute for Meteorology and Geophysics, farmer beneficiaries, local government officials and local delegates of national institutions involved in project implementation, as well as representative of civil society. A complete list of people interviewed can be found in annex II. The interviews and field visits were determined in a dialogue process between the evaluation team and the implementing and executing agency.

Following GEF guidelines, outcomes, monitoring and evaluation system and implementing agency execution were rated by the evaluation team following quantitative criteria that can be found in annex IV.

The evaluation team assigned the ratings guided by the project monitoring data against the targets of the indicator framework and data on development changes at the project sites against the project theory of change. The evaluation report includes a conceptual model of the theory of change including intermediate stages to the final impact and assumptions and impact drivers[1]. The impact rating was based on a three point scale: negligible, minimal, and significant.

Rating of efficiency was based on the cost-effectiveness, degree of adaptive management and easiness and transparency of disbursements and fund transfers. The sustainability of the project's benefits was rated as the likelihood of sustainable against financial, socio-political, institutional and governance, and environmental risks and rated on a four point scale from likely to unlikely. Finally, the project's relevance was rated according to a two point scale as relevant/ non relevant.

Structure of the evaluation report

The first section describes the project and the problems it sought to address, as well as its objectives and intended results and the development context. The second section lists the findings of the evaluation in terms of project formulation, implementation and achievements. The third and last section contains conclusions linked and based on the findings and recommendations, or recommended actions for future interventions and lessons learned or general knowledge and principles generated by the project.

Project description and development context

Project description and development context

Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde was a full-size project funded by the Least Developed Country Fund with a grant totaling 3,100,000 US$ and had co-financing and parallel funding commitments amounting to 63.7 million USD. The project was approved in 2009 but implementation effectively started in 2011. At the time of the terminal evaluation in July 2014, the implementation of the project was nearly completed while a "second phase" of the project, funded by the Canadian International Development Agency, was being prepared for implementation.

The project was implemented by UNDP as GEF agency (responsibilities) under the national implementation modality (NIM) and executed by the National Institute for the Management of Water Resources (INGRH). The INGRH was a semi-autonomous institution with the responsibility of allocating and monitoring use of water resources associated with the Ministry of Environment, Rural Development and Marine Resources at the time of the formulation and start of the implementation of the project.

[1] For details refer to GEF, 2009, ROTI Handbook

However, during the implementation of the project, rural development, including agriculture, were separated from the ministry of environment that was transformed into the Ministry of Environment, Housing and Spatial Planning (MAHOT), while agriculture, livestock (without fisheries) and rural development reverted to the reestablished Ministry of Rural Development (MDR). Moreover, the INGRH assumed responsibilities on waste water and sanitation and thus it was recast as the Agency for Water and Sanitation (ANAS).

Problems and barriers that the project sought to address as described in the project document

- Climate change driven increase in temperature and spatial and temporal variability, as well as net reduction of precipitation will lead to reduced availability of water resources by mid-century
- Inefficient use of water resources due to governance's weaknesses (monitoring, enforcement) and inadequate infrastructures and agricultural techniques (flood irrigation)
- Insufficient coverage of environmental and climate data leading to uncertain projections of climate change impact on water resources
- Weak capacities for integrated water resource management and climate change adaptation, particularly at municipal level

Project strategy

The project intends to increase resilience and enhance adaptive capacity to address the additional risks posed by climate change to the water sector by:

1. Mainstreaming climate change adaptation into key national policies and plans, specifically the Strategic Poverty Reduction and Growth Paper 2012–2016, the Integrated Water Resource Management Action Plan (PAGIRH 2009-2013) the Strategic Program for Agricultural Development (PEDA) and the National Environmental Action Plan (PANA)

2. Implementing small-scale climate adaptation practices for water resource, consisting in watershed protection measures, soil conservation measures, water storage and efficient irrigation techniques in three municipalities in two islands.

3. Drawing lessons learned from the project experience to upscale and replicate the intervention in similar settings, as well as to inform policy making at national and local level.

Each of the three outcomes outlined above is structured in several outputs, which, if assumptions are valid, would lead to the short term development changes (outcomes) and in turn, eventually to the intended objective of reducing the vulnerability of the water sector to climate driven impacts in Cabo Verde.

Table 1 shows the outputs and their connection to the outcomes. Figure 2 shows the project problem tree, the project strategy and the barriers it needs to overcome as outlined in the project document.

Findings

Project Design / Formulation

Analysis of project logic and strategy, assumptions and Risks

The project strategy included the three outcomes (figure 1) articulated in 12 outputs. The three outcomes are formulated as changes in development in the short term while each output creates conditions that should lead to the achievement of the outcomes. Thus, the project assumes that the awareness raised and the capacities developed under outcome 1 will trigger changes at institutional, technical and political level that will allow replication of successful adaptation measures implemented under outcome 2. Moreover, the project explicitly assumes that similar ecological and climatological conditions in Cabo Verde will permit replication of adaptation actions, assuming the successful implementation and demonstration of pilot measures (outcome 2) and documentation of adaptation benefits (outcome 3).

The project design identifies the following risks: political resistance to adjust the current policy framework to include climate change risks and adaptation measures, economic recession curbing public expenditure on agriculture and environment, cultural resistance to adopt improved agricultural techniques and conflicts on water use would arise if droughts would set off in the course of project implementation.

Lessons from other relevant projects incorporated into project design

The project strategy builds upon initiatives to enhance watershed management, increase rural water supply and improve water efficiency in agriculture implemented by the National Institute for Water Resource Management and the Ministry of Environment, Rural Development and Marine Resources, including construction of structures to enhance run-off water storage and infiltration, such as dams and check dams, efficient irrigation, such as drip irrigation techniques, as well as terraces and increasing vegetal cover to increase captation of water and slope stabilization. The government's undertakings were and are supported by several cooperation projects at different funding and geographical scales.

The National Institute for Agricultural Research (INIDA), an implementation partner of the project, had been conducting research on horticulture and efficient water use, including use of greenhouses and drip irrigation that was later implemented under outcome 2 of this project.

Planned stakeholder participation

The project's main national stakeholders were the National Institute for Water Resource Management (INGRH), as the executive agency and the Ministry of Environment, Rural Development and Marine Resources (MADRRM) in its role of supporting agricultural development and rural extension. However, at the beginning of the implementation of the project, rural development responsibilities, including agriculture, were separated from the Ministry of Environment and devolved to the reestablished Ministry of Rural Development (MDR) while the

Ministry of Environment acquired responsibilities on spatial planning and housing, changing denomination to Ministry of Environment, Housing and Territorial Planning (MAHOT). The reorganization of ministers left the INGRH linked to the MAHOT and not to the MDR. Yet, the implementation of the project was rather linked to rural development responsibilities and indeed strongly involved the MDR delegations at the project sites.

The INGRH itself is currently in the process of assuming capacities on sanitation to allow better support for the municipal water and sanitation services and has officially changed its name to National Agency for Water and Sanitation (ANAS).

Figure 2 *problem tree and project strategy*

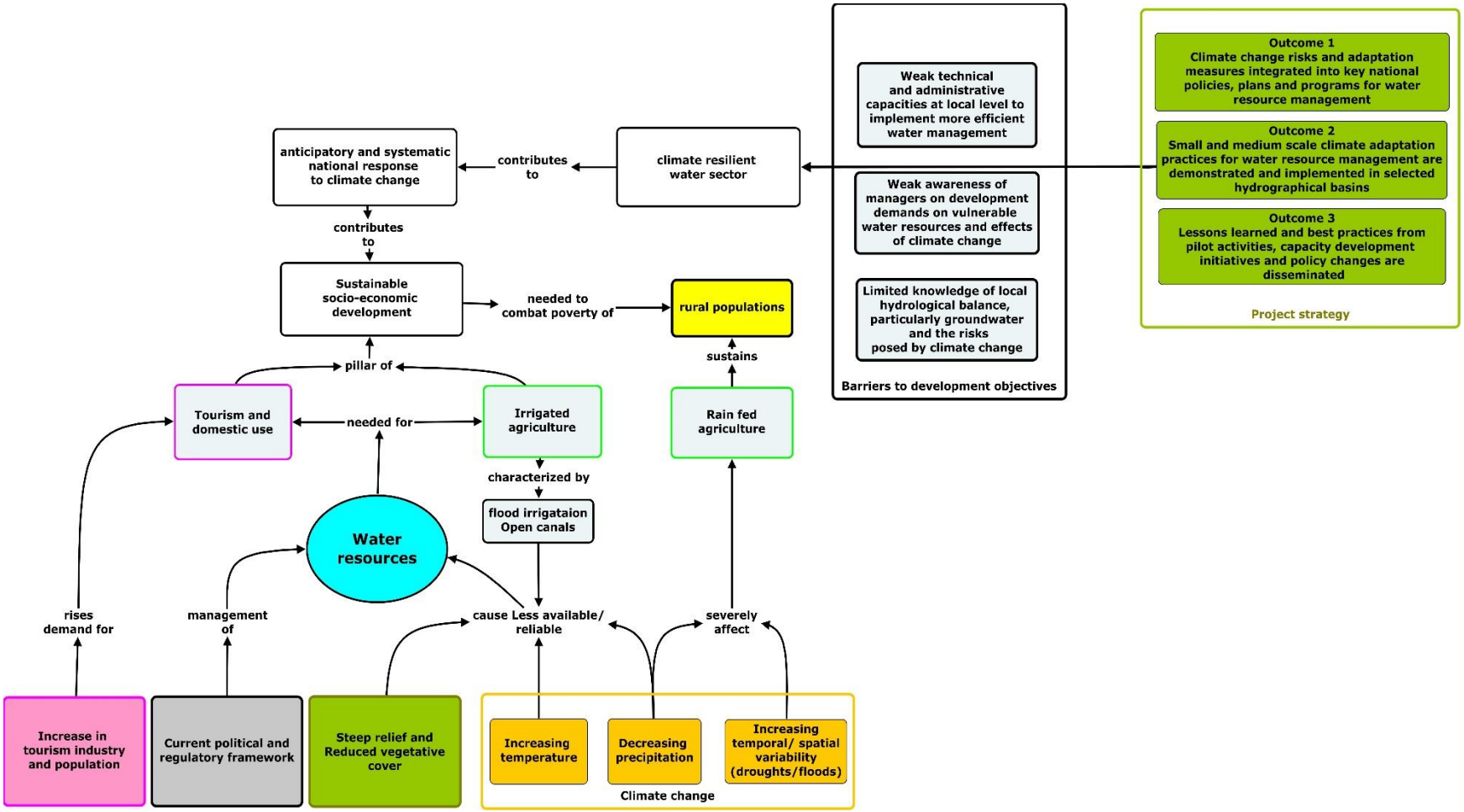


Table 2 *Project results and issues related to formulation and strategy*

Expected outcomes	Expected outputs	Issues related to output formulation and project strategy
1. Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management	1.1 Capacity of relevant agencies to identify and manage climate risks and vulnerability and to plan and implement adaptation measures within the water sector increased	No issues
	1.2 Climate change resilient water management plans (including PAGIRH) revised and adopted.	No issues
	1.3 Awareness of 'climate risk, vulnerability & adaptation' in the water sector among decision-makers and technical officers, NGO players, the private sector and the media farmers and community associations raised	No issues
	1.4 Establishment of climate change early warning system for the water sector to support national and municipal development planning and implementation	This output is not logically connected to the outcome but rather describes and outcome of national scope i.e. the situation where Cabo Verde would count with an early warning system that includes a meteorological observation network and capacities for data process, dissemination and modeling. As such, it would indeed constitute a good basis for a sound modification of current plans based on more accurate future climate projections. This situation had been realized already in 2012, when the project proposed to reformulate this output as "establishment of a meteorological network", which fits better with actual implementation

Expected outcomes	Expected outputs	Issues related to output formulation and project strategy
2. Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins	2.1 Drip-irrigation techniques introduced and demonstrated as a climate change adaptation measure for water resource management in five hydrographical basins	The output constraints water efficient techniques to drip irrigation. The project modified the scope of this output to include netting structures (screen houses)
	2.2 Water recycling, infiltration and conservation techniques (i.e. nature-based and physical) demonstrated and implemented as climate change adaptation measures for agricultural and human use in five hydrographical basins	No issues
	2.3 Rehabilitation and monitoring of selected existing water structures (reservoirs, terraces, boreholes and dykes) demonstrated as climate change adaptation measures in 5 hydrographical basins	No issues
	2.4 Climate change risk management measures adopted by representative water distribution facilities in selected areas	The output assumed the existence of water management plans and planned the establishment of water management committees. This output was not implemented
	2.5 The basis for the replication of all site level activities is established	The success of this output is crucial for the whole project strategy as it would establish costs and benefits (in terms of water budget) of the adaptation options implemented
3. Lessons learned and best practices from pilot activities are disseminated and integrated in national plans and policies	3.1 National multi-stakeholder forum on climate change resilient best practices in IWRM established and operational	No issues
	3.2 Project lessons learnt widely shared	The output lacks definition as to target groups and how the lessons shared would then feedback the policy-making cycle
	3.3 Learning, feedback and adaptive management are ensured	The output lacks definition as to target groups and how the lessons shared would then feedback the policy making cycle and in this sense is identical with output 3.2

Planned and actual roles of main stakeholders are described in table three.

Table 3 *Planned and actual stakeholder role*

Institution/ stakeholder	Planned role (as described in the project document)	Actual role
National Institute for Water Resource Management	Executing agency, responsible for recruitment, procurement, coordination and implementation of activities	As planned
Ministry for Rural Development, Department of Agriculture	Technical support for implementation of activities	Pivotal role in the implementation of all field activities due to its presence at municipal level and extension teams
National Institute for Agricultural Research	Research on water management and technical support	Conduct of research and production of technical packages for use by extension teams to support farmers on vegetable production on greenhouse with drip irrigation
National Institute for Meteorology and Geophysics	Project to support capacity building in terms of data gathering and management capacities for use in vulnerability analysis and forecast as part of an early warning system	Installation and management of automatic meteorological stations
Municipal Water and Sanitation Services	Beneficiaries of capacity development activities including mainstreaming of climate change risks into municipal plans and strategies; cooperation in the implementation of concrete adaptation measures	Capacity build-up activities on climate change and implementation of activities on use of treated water for agriculture
Municipalities	Beneficiaries of capacity development activities including mainstreaming of climate change risks into municipal plans and strategies; cooperation in the implementation of concrete adaptation measures	As planned

Linkages between project and other interventions within the sector

Table four describes the project's planned and actual linkages with other projects and interventions within the water sector. Not included in the table are the regular implementation of government's agricultural extension and water and sanitation programs that were in strong congruence with this project. Also not contemplated in the table are other programs and projects not identified in the project document, that did implement complementary actions to this project, including a FAO supported project on greenhouse vegetable culture and several small NGO water supply projects. In all cases, these projects did not have any direct link with the one evaluated in this report but constituted parallel funding.

Table 4 *Planned and actual cooperation*

Project	Planned cooperation	Actual cooperation
Development of water treatment facility at Santa Cruz (SAAS Santa Cruz)	None	Strong cooperation including installment of pumping system at sewage treatment facility
National Network for Climatic and Meteorological Observation (INMG)	Expansion & densification of meteorological network	Strong cooperation for the installment of five new automatic stations
Integrating climate change risks into national development processes and UN country programming for the achievement of the Millennium Development Goals (UNDP/ Government of Spain)	The project institutional analysis and knowledge products would guide mainstreaming of climate change into water management instruments	Project provided a baseline on current level of mainstreaming of climate change into the national poverty reduction strategy paper
Small Grant Program (UNDP/GEF)	None (SGP started implementation in 2010, one year after start of project implementation)	Strong cooperation at one field activities on water supply and parallel implementation of drip irrigation in one watershed
METAGRI project (WMO)	None	Technical assistance for workshops on use of meteorological data for agriculture

Project Implementation

Adaptive management (changes to the project design and project outputs during implementation)

The project team suggested and applied minor modifications in the formulation and scope of some of the outputs and indicators of the original logical framework. Thus, output 1.4 on establishing an early warning system was "downgraded" to establishing a meteorological observation network, acknowledging the gap between the project budget and the investment needed to setup an early warning system, including an expanded network of meteorological stations, build-up of capacities for data gathering and interpretation at the National Meteorological Institute and a system to effectively transmit this information to water users and farmers, as well as capacity development to interpret meteorological data for agricultural and water management by user groups.

Also, output 2.1 on installing drip irrigation was expanded in its scope to include other water efficiency measures in agriculture, specifically, netting structures or screen houses. The screen houses also constitute a measure to control pests and diseases, with prevalence and recurrence also related to raising temperatures associated with climate change.

Changes to the impact indicators of public expenditure on climate change and policy mainstreaming will be discussed on the following section on monitoring and evaluation.

Management and partnership arrangements (with relevant stakeholders involved in the country/region)

Steering committee

The main project management structure is the Project Steering Committee (PSC), chaired by the Ministry of Environment, Rural Development and Marine Resources and the UNDP. The Project steering committee had the function of overall supervision of project implementation and approval of annual work plans and budget.

The steering committee was constituted as planned in the project document. However, the separation of responsibilities on agriculture and rural development from the Ministry of Environment (chair of the committee) to the reestablished Ministry of Rural Development (MDR) in March 2011[2] meant that the chairmanship of the PSC was kept by the now renamed Ministry of Environment Habitation and Territorial Planning (MAHOT) and that the MDR became an additional member of the steering committee.

To support project implementation and provide advice to both the project management unit (PMU) and the PSC, the project design also foresaw the creation of a technical advisory committee (TAC) formed by technical and midlevel officials of the same institutions represented in the PSC. The technical committee did not manage to meet on a quarterly basis as foreseen in the project document but played a critical role in the detail revision of the annual work plan (prepared by the PMU) prior to its submission to the PSC, as well as constituting an agile technical forum to solve implementation challenges and impasses that could not be tackled in detail by the high- level, yearly-meeting PSC.

[2] www.mdr.gov.cv, Historial, consulted on 01/09/2014

Project management unit[3]

The project management/ coordination unit (PMU) was set-up at a rented satellite office of the Praia headquarters of the INGRH. The project document planned the PMU to be composed of a national project coordinator (NPC), an administrative/finance official, support staff and three full-time national specialists with expertise in climate change policy, water management, monitoring and evaluation respectively, as well as part-time international consultants to provide additional expertise on climate change, water management and communication and advocacy. The PMU and the PSC/ TAC would also count with the support of an international chief technical advisor (CTA). The CTA's role would have been to provide technical support to project management and ensure technical quality of implementation.

During the actual implementation of the project, the PMU was formed as designed, being headed by a NPC with the support of two full-time experts on climate change policy and water management, as well as a communication specialist who joined the PMU at a later stage (February 2013). This expertise was recruited locally, per decision of the PSC. However, the position of the monitoring and evaluation specialist remained vacant. Administrative services were provided by the INGRH through their financial director and a financial and administrative assistant hired by the project.

The position of project coordinator was vacated for almost a year (July 2012-June 2013) during the project implementation. Although the coordination of the project activities was assumed by the project water management specialist, the absence of an actual project coordinator did have some impact on the implementation and project delivery slowed down during this period.

The position of chief technical adviser was deemed critical at project inception. However, the dual role of advisor for this project and PIMS 4176, *Consolidation of Cape Verde's Protected Areas System* turned out to be a source of tension. Originally thought to increase efficiencies by sharing technical advisor and even to share project facilities and coordination to some degree, the different nature and area of intervention of both projects did not allow for the creation of synergies. Moreover, the CTA could not deliver the wide expertise required to serve both projects what, together with communication challenges, related to language barriers, attitude and degree of commitment to the project, led to the discontinuation of this position in 2012.

Site management

At local (municipal level), the project document foresaw the installation of two local teams composed of a site manager, a project assistant and a driver. At the implementation stage this structure was kept, merely changing the name of the site manager to regional coordinator since they covered several municipalities. The regional coordinator would be assisted by the local delegation of line agencies, particularly INGRH and MDR as well as by community facilitators.

The project document proposed formal structures called local coordination committees (comités de concertação locais, CCL) that included representatives of the local communities, municipality,

[3] The Project Management Unit is referred to either as project management or project coordination unit (PCU). In documents in Portuguese, the PMU is referred to as *Célula de Coordenação do Projecto*

municipal water and sanitation services, municipal delegations of the MDR and the INGRH, as well as representatives from the municipal delegation of the ministries of health and education. These committees were actually set up during project implementation. Meeting on a monthly basis the CCL proved to be crucial in providing a link between the project outputs and local realities.

Monitoring and evaluation: design at entry and implementation

The project counted with three types of monitoring instruments: indicator log-frame, mid-term evaluation and project reports.

Project indicators

The degree to which the project would have achieved its objective was indicated by 3 impact indicators: explicit inclusion of climate change into water management plans, increase in the percentage of state budget dedicated to climate change up to 1%, and reduction of vulnerability at community level measured by scores of the UNDP developed Vulnerability Reduction Assessment tool.

The achievement of the project outcomes would have been indicated by six performance indicators ranging from inclusion of climate change risks in the water policy framework to publication and dissemination of lessons learned by the project in the Adaptation Learning Mechanism site.

Table five shows strengths and weaknesses related to the indicator framework

Table 5 *issues, strengths and weaknesses of the project impact and performance indicators*

Project objective/ outcome	Indicator	Issues
to increase resilience and enhance key adaptive capacity to address the additional risks posed by climate change to the water sector in Cape Verde	Water Management Plans for municipalities on Santiago and Santo Antão Islands where the project is active, explicitly consider climate change risks and opportunities	SMART indicator for an outcome but hardly an impact indicator. The indicator would have needed definitions or benchmarks for the mainstreaming process. It was later modified (2011) to include a comprehensive list of plans to be climate proofed/ mainstreamed that included both national water, environmental and agricultural plans, as well as the municipal development plans since the indicator's water management plans did not exist
	Percentage of the Ministry of Environment, Rural Development and Marine Resources' (MADDRM) non-external budget allocated to managing climate change risks	The baseline was calculated to be 0.1% in 2009. The indicator was modified (2012) as ***% of state budget dedicated to climate change*** to account for the separation of agricultural and rural development responsibilities from the Ministry of Environment. However, this change did not involve a recalculation of the baseline or a definition of the methodology and criteria to be applied to determine which investments would be considered "dedicated to climate change". Also, attribution to project without exhaustive analysis of context would not be possible. Attention on this situation was called by the UNDP regional technical advisor at least in the 2013 PIR
	Scores of UNDP's Vulnerability Reduction Assessment (VRA)	VRA index reflects perception of vulnerability. It implies comprehensive surveys and good knowledge of the methodology. Reduction in **vulnerability perception** would be difficult to attribute to the project without taking control sites. Also, the project design did not consider the high costs incurred by the project for this activity
Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management	Key national policy frameworks relevant for the water sector effectively incorporate climate risk consideration and adaptation measures: Focus on PRSP II (2008-2011), chapter 5.9 on Integrated Water Resources Management	Same indicator as first impact indicator albeit focusing on an additional policy document: the poverty reduction strategy paper

Project objective/ outcome	Indicator	Issues
Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins	50% increase in cropland surface area where water saving measures are adopted	SMART indicators. No issues
	30% increase in the number of families involved in water conservation measures	
Lessons learned and best practices from pilot activities are disseminated, and integrated in national plans and policies	Number of hits on project website from Cape Verdean visitors	Minimal relevance, since hits on a project website hardly reflect integration of lessons learned into national policy
	Number of contributions to the UN's Adaptation Learning Mechanism (ALM)	No relevance for the outcome of dissemination and integration of lessons learned

Monitoring and reporting

The project produced quarterly and annual progress reports together with the Project Implementation Reviews (PIR) submitted to the GEF. Quarterly and annual progress reports consisted in narrative reports on activities conducted under each of the project outputs that included some quantitative data on number of trainings, participants, as well as hectares under irrigation, and other quantitative data on constructions and infrastructure.

The Project Implementation Reviews (PIR) included data according to the project indicator framework, but also include extensive narrative parts on future actions not implemented in the reporting period.

Progress reports and interviews held during this evaluation mission confirm that the PMU and project partners intended to recruit a monitoring and evaluation specialist who would have been expected to collect, process and report the data. In the absence of the specialist, responsibility on data collection and process remained vague.

Field visits by the PMU and UNDP country office were held twice a year, and at least during the last semester of implementation quasi-monthly monitoring meetings were held with the presence of the PMU and the implementing and executing agency.

Midterm review

An independent midterm review of the project was conducted between July and September 2013. The midterm review concluded the project to be relevant to the national context and policy framework and to have had a sound strategy at design. The implementation was assessed as moderately satisfactory with main positive issues in the adaptive value of the field interventions and the impulse given to the mainstreaming of climate change risks into the national and local policy framework and with main issues on communication strategy and general efficiency of the strategy. A management response was prepared that accepted most of the recommendations of the midterm review. However, a timelier midterm review (MTR) would have allowed a more comprehensive implementation of the management response. The late timing of the MTR was related to the late start of project implementation, as well as to the absence of a national project coordinator till June 2013.

Project results

Relevance

Cabo Verde developed its national adaptation plan of action (NAPA) in 2007. The NAPA identified water resources as a key national vulnerability. According to NAPA, climate change will very likely cause an increase in temperatures that will have negative effects on the water resources available for agriculture.

Hence, two priority projects were identified in the NAPA: *Integrated Management of Water Resources* and *Improved* and *Diversified Agriculture for Food Production*. The former project included capacity development on climate change, and investment in the construction of water storage and infiltration infrastructure, rainwater collection, improved efficiency by diminishing evaporative losses through pipes and drip irrigation, as well as enhanced and applied research on water resources. The latter project included development of technical capacities on efficient agriculture, intensification of agricultural production through efficient irrigation, watershed protection through vegetal cover, as well as applied research and systematization of successful experiences.

Since Pursuing the sustainable growth of agriculture and ensuring food security is one of the main pillars of Cabo Verde's development policies, both projects are explicitly linked to the objectives of said development policies of Cabo Verde, including the Poverty Reduction Strategy Paper, the Millennium Development Goals, the National Environment Action Plan and the Agricultural Development Plan.

Graduation of Cabo Verde to middle income status in 2008 and hence risking not having access to funding from the Least Developed Countries Fund, turned the development of the project document an urgent priority. Thus, the project was formulated by an external consultant well informed on the national and local context. However, there is a consistent perception among stakeholders that participation in project design was incomplete.

As a nationally implemented project with strong local links through its management structures as described in section *Project Implementation*, the project intensely involved national and local stakeholders in its implementation.

The municipal development priority objectives in the area of intervention of the project included development and improvement of commercial agriculture to ensure food security and poverty eradication. These objectives were explicit both in their municipal development plans, as well as strongly expressed in the course of the interviews held with council representatives for this evaluation. Field interviews with farmer beneficiaries leave no doubts about how water resources constitute the limiting factor in their production.

Overall results: attainment of objectives

As described in section Monitoring and Evaluation, the achievement of the project objective was to be measured by the degree to which climate change has been mainstreamed in key policies

related to water resources, the increase in state budget related to climate change adaptation and the reduction of the scores of the vulnerability perception index VRA. The following section describe progress towards the impact indicators and the project outcomes. At the end of the section table 9 summarizes the achievements of the projects against the indicator framework.

Impact indicator 1, Water management strategies and plans, as well as other plans related to water explicitly consider climate change risks and opportunities as well as the need to integrate adaptation

This indicator is very similar with the performance indicator for outcome 1, on integration of climate change into the policy framework that had mainstreaming of climate change risks into the national poverty reduction strategy as a target. The indicator is indeed rather fit for an outcome, as mainstreaming would be part of a process that would lead to the impact of *having a systematic, planned response to climate risks*.

The original policies to be mainstreamed included in the project document were the municipal water management plans. This was later changed to mainstreaming of climate risks into key policies, strategies and plans on water resources and agriculture, including the Action Plan for the Integrated Management of Water Resources (PAGIRH), the National Environment Action Plan (PANA), the Strategic Program for Agricultural Development (PEDA), and the Municipal Director Plans (PDM). Other policy documents included in the project document, the Cross-Sector Environment Plan (PAIS) and the Municipal Environmental Plans (PAM) are part of the National Environment Action Plan.

Action Plan for the Integrated Management of Water Resources (PAGIRH) is the main legal instrument for the management of water resources in Cabo Verde and it was published in 2008 by the National Institute for Integrated Water Management (INGRH). It acknowledges the negative impact of climate change on the water sector and mandates the conduct of studies to monitor its impacts, as well as listing adaptation actions such as reforestation and drip irrigation.

Starting in 2012, the INGRH has been reformed to assume sanitation responsibilities, having been already nominally transformed into the new Water and Sanitation Agency (ANAS) in 2013. Thus, the PAGIRH has been substituted by the National Water and Sanitation Plan (PENAS) that is being developed with the support of the Millennium Challenge Corporation. The 2012 version of the PENAS identifies climate change as a threat to water supply and suggests increasing drinking water and sanitation access as means to increase resilience.

The project team conducted an analysis of climate vulnerabilities and adaptation gaps on the developing PENAS and submitted a proposal of measures to reduce the vulnerability of the water sector.

National Environment Action Plan (PANA) 2004-2014. The PANA was developed in 2004 with the participation of the civil society and government institutions with the objective of guiding the rational use of natural resources and sustainable economic development. Specifically, it aims to achieve an effective and efficient management of water resources, including improved waste water treatment, biodiversity conservation and development of sustainable tourism. It was

reviewed and updated in 2012 to account for new developments and changes in the national priorities and context.

In the 2004 version, climate change is merely identified as a *threat to the environment*. However, the project supported its revision in 2012, in which now climate change plays a central role both in the context analysis and the definition of priorities that included climate monitoring and modeling and promotion of adaptation measures, comprising afforestation, forest management and watershed and soil management measures (check dams), as well as expansion of the meteorological network.

Strategic Program for Agricultural Development (PEDA) 2005-2015. Oriented along the strategic lines of the Poverty Reduction Strategy Paper (DECRP), it has the vision of reducing rural poverty by half, as well as significantly decrease food insecurity. It is articulated in five components: sustainable management of natural resources, adding value to agricultural produce, strengthening extension services, community and farmers associations and food security. PEDA identifies population growth, prolonged droughts and low technical capacities, as well as low profits of agriculture as main constraints for the development of the agricultural sector. PEDA then envisions an improved, expanded and sustained agricultural development (including livestock) based on community involvement in natural resource management, especially water resources, with the objective of increasing water availability, and afforestation. PEDA does not address climate change risks beyond the current climatic variability.

In 2010, the National Program for Agricultural Investment (PNIA) 2011-2015 was developed to reinforce the objective of increasing agricultural yields, promote market links and reducing rural poverty. The PNIA identifies climate change as a threat, and suggests introduction of new forest species and efficient irrigation techniques as adaptation measures.

The project team reported having conducted an analysis of PEDA regarding climate risks in 2013. However, the team did not make any recommendations or proposal to better integrate climate risks in the country's main agricultural strategies.

Municipal Director Plans (PDM). With a timeframe of 12 years, the municipal director plans constitute guidelines on which specific territorial (spatial) plans would be developed.

The project proposed addenda to the PDMs of four municipalities (Ribeira Grande, Santa Cruz, São Lourenço dos Órgãos and Tarrafal). These addenda briefly discuss the sensitivity of the strategic lines of the PDM to climate change risks and list standard, i.e. not specific adaptation options, including protection of water sources, drip irrigation and rainwater collection and construction of storage facilities. In the case of the municipality of Porto Novo, the project supported the climate proofing analysis of the municipal plan being developed and submitted suggestions to integrate climate risks to the municipal council.

Impact indicator 2, percentage of state budget allocated to climate change

The original project indicator referred to the non-external budget of the Ministry of Environment, Rural Development and Marine Resources (MADRRM) allocated to management of climate change

risks. The baseline was estimated to be 15,000 US$ for 2009, thus slightly less than 0.1% of the total MADRRM budget of 16 million US$ for the same year (2009).

The separation of rural development and agriculture responsibilities from the Ministry of Environment motivated a change in the indicator to *Percentage of state budget allocated to climate change risks' management*, to ensure capturing investments not only in agriculture and water management but also in health and education. However a new baseline was not explicitly calculated.

In 2012 the project management unit undertook a calculation of state budget related to climate change risks. The results showed that a total of 182.5 million US$ out of a total state budget of 327 million US$, or 55% was dedicated to climate change risks. The project's last Project Implementation Review (PIR) reported a value of 23.5% of the state budget or 77 million US$ dedicated to climate change, a subset of the budget lines calculated in 2012.

However, the value of 55% or 23.5% does not represent an increase above the baseline, but the percentage of state budget dedicated or linked to climate change risks in 2012. If the 2009 baseline calculated in the project document is valid (15,000 US$), then the increase should have been of 1,217 % (one thousand, two hundred and seventeen)**.** Hence, it is obvious that the 2009 (baseline) and the 2010 values of "budget dedicated to climate change risks" are not comparable. A preliminary estimation of a new baseline was given in the 2011 PIR as 50% of the combined budgets of the Ministry of Environment (MAHOT) and the Ministry of Rural Development (MDR).

A calculation of the increase in state budget dedicated to climate change risks can be attempted taking as baseline the value given in the project document of 16 million US$ for the environment and rural development budget for 2009 and comparing it with the combined values for the budgets of the MDR and MAHOT in 2012, according to the analysis of the PMU. The combined value of the said ministries' budget amounted to 30 million US$ hence representing an increase of 50% over the 2009 value. This, however, does not solve the attribution gap as the analysis conducted by the PMU makes no reference to the casual link between project actions and increased budget.

Impact indicator 3, Scores of UNDP's Vulnerability Reduction Assessment (VRA)

The Vulnerability Reduction Assessment is a methodology based on questionnaires to estimate the vulnerability perception of communities developed by the UNDP. A vulnerability perception indicator together with other indicators of vulnerability and adaptive capacity is still part of the climate change adaptation monitoring and assessment tool (AMAT) to be used in LDCF and other GEF funded adaptation projects from 2012 onwards.

For this project, five communities representing each one of the five watersheds included in this project were assessed in 2011 resulting in an aggregated perception index of 79.6% that was intended to be reduced by a 25%, i.e., 59.7%.

The 2014 annual report, (reporting period: 2013 and first quarter of 2014) reports a perception index score of 69%, i.e. a reduction of ca. 13% in the perception of vulnerabilities. An additional

VRA assessment was conducted in 2013 with a different target group that included landlord in partnership with the Small Grant Program.

Effectiveness: achievement of outcomes and outputs

Outcome 1 Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management

The mainstreaming strategy of the project involved the development of capacities of officials from key institutions, such as the INGRH, MDR and MAHOT, as well as Municipal Water Services (SAAS). The capacity development activities included the generation of knowledge products on climate change, including technical reports with projections of climate variables and their effects on water resources, as well as guidelines on mainstreaming climate risks into the policy and regulatory framework. The outcome also included the development of capacities at the national meteorological institute to improve generation and interpretation of meteorological information.

The knowledge generated and the capacities developed should have resulted in the integration of climate risks and adaptation measures into national and sector policies, strategies and plans. Hence, the achievement of this outcome is indicated in the project logframe by two indicators:

1. The Poverty Reduction Strategy Paper 2012-2016 (DERP III) effectively incorporates climate risks and adaptation measures

2. The National Association of Municipalities of Cabo Verde (ANMCV), the Ministry of Tourism, Industry and Energy and Industry (MTIE) and the Ministry of Infrastructure and Marine Resources (MIRM) take explicit measures to respond to climate change.

Mainstreaming climate change into the policy framework, including sector strategies and policies

Poverty Reduction Strategy Paper (DECRP). The third and current poverty reduction strategy paper for the period 2012-2016 was developed based on the results of the evaluation of the previous poverty reduction strategy paper, the DECRP II (2008-2011). The formulation process was led by the National Planning Department of the Ministry of Finances and Planning through consultative groups in the course of the year 2012. The growth strategy proposed by the DECRP III is based on the development transportation infrastructure, tourism, financial services, fisheries and commercial agriculture. Climate change is identified as a threat to the development of commercial agriculture and environmental management is suggested as mitigation[4] strategy.

The project team intended to participate in the planning process for the poverty reduction strategy paper. However, the team was not included in the work groups that developed the strategy, and hence the strategy does not adequately internalize climate change risks.

[4] Mitigation is used here in the sense of mitigation of climate risks, not mitigation of CO_2 emissions

The project team could not affect any influence on the sector policies set as targets in the logical framework.

National Association of Municipalities of Cabo Verde (ANMCV), the Ministry of Tourism, Industry and Energy and Industry (MTIE) and the Ministry of Infrastructure and Marine Resources (MIRM). The project intended to work at with the Ministry for Tourism, Energy and Industry and the Ministry for Infrastructure and Maritime Economy and the National Association of Municipalities of Cabo Verde. However, there is not any mention in any of the project reports on any work conducted involving officials from the institutions listed above.

Yet, the project did work with individual municipalities, particularly the ones where the project was implementing field activities under its outcome 2 and thus conducted trainings and awareness actions involving municipal officials and officials from local delegations of the Ministry of Rural Development, Health and Education who were members of the project's local committees. The project also involved officials from the National Planning Directorate (Ministry of Finances), Ministry of Health and Ministry of Education and Sport in some awareness and capacity development activities. However, this involvement did not materialize in any concrete measure adopted by the said institutions to mainstream climate change into their plans or strategies.

The project also organized a national conference on climate change in 2012 with the presence of high level officials, including director generals and members of parliament.

Knowledge products

The knowledge products generated by the project, as well as their potential impacts and issues related to their utilization are discussed in table 6. The knowledge products were also used in the series of trainings for different stakeholders conducted by the project

Capacity development activities

Trainings were conducted for five target groups: technical officials of national and local institutions, members of parliament, journalists, teachers and school managers, as well as pupils and farmers. For the former group, the training was specific on mainstreaming climate risks into local development plans and strategies with the objective of supporting the project's mainstreaming effort at national and local level. The trainings, which included analysis of pertinent policy documents were led by one international consultant. The other groups, including the MPs, journalist, school teachers and pupils, as well as farmers were invited to more general lectures to raise awareness on climate change.

Meteorological network

The project funded the procurement and installation of five automatic meteorological stations, one in each of the target watersheds of the project. Of the five installed stations, one has been vandalized by locals for reasons yet unknown.

The project strategy included the use of data generated from these stations to constitute an early warning system for agricultural planning. In fact, the national meteorological observation network has suffered from budget cuts and institutional change since the creation of the National Meteorological and Geophysical Institute, resulting in a partial decay of the manual meteorological station network and the dismissal of data recording teams. Hence, expanding and automatizing the network is of uttermost importance for the country.

Figure 3 *Automated meteorological station at Ribeira da Cruz, Porto Novo, Santo Antão*

Table 6 *knowledge products*

Knowledge product	Description
Guide to mainstreaming climate change into development instruments	Produced in 2013 by the PMU, the guide is divided in four sections, of which the first three contain a general introduction to climate change and mainstreaming. The fourth section presents the mainstreaming of climate change into development instruments in four steps, current and future sensitivity analysis, identification of hazards and exposure, risk analysis and analysis of adaptation measures. The document constitutes a brief introduction to the matter, with local examples that can be used as support for further trainings and by technical officers leading planning processes that seek some orientation on the matter of climate change and climate change adaptation.
Climate characterization, vulnerability and adaptation measures in Cabo Verde	Finalized in 2013 by an international consultant. The consultancy report describes the current and likely future climate of Cabo Verde, based on standard references and then, in a separate report describes in some detail the capacity building actions led by the international consultant on mainstreaming climate change into the policy framework with municipal councils, national officers involved in planning, journalists and members of parliament. The report on capacity building actions includes the recommendations of additions to be made based on a climate risk analysis performed by the consultant on the 2012 version of the National Water and Sanitation Plan (PENAS).
Study on perceptions on climate change by high school students	Produced in 2013 by the PMU, the document deals with the perception of high school students in the five municipalities where the project has intervened. It could serve as a baseline for future interventions.
Study on the capacities of decentralized institutions in the management of climate change risks and adaptation measures in the water sector in Cabo Verde	Case study by the PMU on institutional presence and knowledge on climate change by officials of those institutions in the five project municipalities. It could serve as a baseline for future interventions.

Knowledge product	Description
Climate change data analysis and monitoring	Prepared in 2012 by an international consultant. The first part of the report produced (ca. 50%) merely transcribes the situational analysis and project interventions as described in the project document, and using data from the UNDP Cabo Verde Climate Change Profile (McSweeny & Lizcaino, 2010) for projected precipitation and temperature in 2030 and 2060, and INGRH's PAGIRH for data on water use. The second part includes a calculation of water balance (Precipitation-potential Evapotranspiration) for the project sites, PET calculated using the Hargreaves-Samani equation, with temperature data from the meteorological stations of the INMG. Then the future water balance is calculated in the same way by adding the projected temperature anomalies obtained with different climate models by McSweeney et al. The study concluded that increases of water deficits are more likely towards the end of the century (since the model data collected by McSweeney indicates increasing temperature anomalies and PET depends on temperature). The report also includes INGRH data on underground water salinity and presents two maps with a vulnerability index at municipal level for erosion/ desertification (presumably based on temperature and slope data) and salinization (presumably based on INGRH water quality monitoring). The report also presents projections of water use for sectors (2 pages) without reference to data or methodology. Finally, the report lists several tools for climatic scenarios, hydrological models and water quality kits. The study then makes general recommendations such as afforestation, conservation agriculture, water quality monitoring, develop capacities agrometeorology etc.

Knowledge product	Description
Vulnerability to climate change-associated risk of key infrastructures	Draft finalized and presented at the time of the terminal evaluation. Conducted by the Civil Engineering Laboratory (LEC), the study examines the sensitivity (based on maintenance and current status) and exposure (based on location and "importance" i.e. value and relevance to the populations they serve) of water and transportation infrastructures: wells, checkdams, dams, reservoirs, road hydraulic passages (road drainage systems) and bridges to extreme meteorological hazards: floods, droughts and sea level rise. The study then gives a score to each piece of infrastructure according to a three point vulnerability scale (three being highest vulnerability) and hazard. The study then makes recommendations to reduce vulnerability mainly based on proper maintenance and regular monitoring.
Good practices in vegetable production with drip irrigation	Produced under the memorandum of understanding with the National Institute for Agricultural Research. It is a manual for extension teams to guide and advise farmers implementing vegetable culture under drip irrigation with screen house in the case of tomatoes. It is based on INIDA's test at their own facilities, where they have been developing new models of screen houses and optimal irrigation under different soil and aspect conditions. It will be complemented and enhanced with the final report on the project's drip irrigation experiences that will systematize inputs, production and cost-benefits for a subset of the plots funded.

Outcome 2 Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins

This outcome intended to pilot field interventions to increase rain water capture and infiltration, as well as efficient use of water in the five target watersheds. The pilot character of these measures involved also detail monitoring and documentation to allow for replication and as reference for policy-making.

The targets of the project were to:

1. *Increase by 50% the area of cropland area with water conservation measures (drip irrigation*)

2. *Increase by 50% the number of agricultural producers implementing water efficiency measures*

Additionally, the project document included targets for field activities that were taken as fixed targets by the project management unit:

- Plantation of 800 hectares of land with *Aloe vera*
- Construction of 4,000 m^3 of check dams and rehabilitation of additional 1,500 m^3
- Rehabilitation of terraces (10 km)
- 56 Hectares with drip irrigation system

The budget for the outputs of this outcome were based on the aforementioned targets. However the budget calculations did not reflect the actual costs of the implementation of the activities, three to six years after the project design (2008 to 2011-14). The disagreement between budget, targets and actual costs had an impact on the targets actually achieved.

The project document envisioned a watershed approach for the site level activities based in five basins or *ribeiras.* Table 7 lists the interventions proposed against the actually implemented activities.

The watershed/catchment approach involves local interventions that take downstream effects into account. Thus, as described in the project document, upper catchments should be sites for soil conservation measures, primarily reforestation/afforestation with an appropriate mix of exotic/local species with the objective of increasing water infiltration and controlling peak discharge, hence increasing water availability and preventing floods downstream. Middle reaches of the catchment should be the site for agriculture interventions such as terracing, contour planting and efficient irrigation while drier lower reaches should be left for drought resistant fruit trees and rangeland.

The project document also suggested a scientific design of the site interventions, i.e. measuring hydrological and erosion effects of the conservation (afforestation) and protection (terraces, check dams) measures using control sub-catchments and sequencing of activities to obtain valid results that could be then fed to hydrological models, e.g. afforested/ non afforested sub-catchment, traditional/ improved terraces, sequencing in check dam construction to measure change in sedimentation rates etc.

The watershed approach was followed by this project, not least because the patterns of settlement and cultivation in the catchments does indeed follow constraints dictated by the catchment's hydrology and soil quality, i.e. soil conservation (forest) in the upper reaches, rainfed agriculture in the middle reaches and rangeland or agriculture, including irrigation (depending on water availability) in the lower reaches of the catchments.

However, the actual interventions of the project were dispersed throughout the selected catchments (figure 4) and the location of particular interventions such as construction of check dams, installation of drip irrigation, planting on slopes and contour walls responded to availability of suitable land and the presence and interest of farmer's associations or individual farmers who provided their labor, parcels or both.

Measurement of the effects of its interventions, including effects on runoff and groundwater recharge or erosion/ sedimentation rates has been conducted by INIDA, in accordance with a memorandum of understanding signed with the project. The effects of the project interventions on erosion and runoff need long term monitoring to draw firm conclusions.

However, it must be noted that the hydrological and erosion effects of different measures of soil conservation in Cabo Verde have been object of research for decades and continue to be today, mostly by researchers associated by INIDA but also including other national and international researchers[5]. Additionally, the project has indeed increased capacities of the regional delegations of the INGRH/ANAS in terms of equipment to measure water quality.

[5] E.g. Bosscher (1982), van der Zee (1983), Ferreira (1996), Querido (1999), Baptista and Querido (2001), Eklund and Kronhamn (2002), Gominho (2003), US Geological Survey (2006), Baptista et al. (2012)

Table 7 proposed and actual interventions on a watershed approach

Island	Catchment	Area (Km^2)	Population	Catchment zone	Proposed interventions	Actual interventions[6]
Santiago	Ribeira Seca	71.5[7]	41,143[7] 29,500[8]	Upper	10 Ha planting with *Lantana camara, Aloe vera, Agave spp, Cajanus cajan*, *Leucaena leucocephala*	
					5 check dam constructed	
					10 Ha terraces	
				Middle and lower	10 Ha planting of *Aloe vera* on area not used for cultivation	30 Ha planting of Aloe vera (Poilão dam) 30 Ha planting of *Cajanus cajan* (Poilão dam)
					4/ 500 m^3 check dam constructed/ rehabilitated	4 check dam constructed (Santa Cruz)
					10 Ha/ 10 km construction/rehabilitation improved terraces	8 km contour stone walls constructed
					20 Ha drip irrigation (5 Ha per year)	11 Ha drip irrigation
					200 m^3 open water reservoirs	450 m^3 closed water reservoirs
	Tarrafal (several catchments: Ribeira Grande, Cuba, Furna, Fontão)	120.8[9]	18,565[10] 23,000[11]	Whole catchment	500 Ha planting of *Aloe vera*	144.8 Ha planting of *Aloe vera* 7.14 Ha planting of *Jathropa curcas*
					18 Ha drip irrigation (4.5 Ha per year)	0.42 Ha drip irrigation
					8/ 3,000 m^3 check dam construction/ rehabilitation	5 check dam construction
						4.8 km contour stone wall constructed

[6] Not all interventions listed. Interventions not listed here, such as trainings, screen houses, and others are described in the following sections
[7] Gominho, 2011. Figure refers only to the catchment of Ribeira Seca, comprising parts of the municipalities of São Lourenço dos Orgaos and Santa Cruz
[8] PIMS 4091 Project document
[9] Surface and population figure refers to the totality of the municipality (INE, 2010)
[10] INE 2010
[11] PIMS 4091 Project document

Island	Catchment	Area (Km^2)	Population	Catchment zone	Proposed interventions	Actual interventions[12]
Santo Antão	Ribeira Grande	51[13]	10,000	Upper	300 Ha planting of *Aloe vera*	72 Ha planting of *Aloe vera*
					2,000 m3 check dam rehabilitation	7/ 973 m^3 check dam constructed
				Middle	No suggestions	50 m^3 water reservoir constructed
						0.28 Ha drip irrigation
	Ribeira das Garças	18 19.5[13]	2,000	Middle	No suggestions	0.91 Ha drip irrigation
						2.6 km contour wall constructed
						50 m^3 water reservoir constructed
	Ribeira da Cruz	11 16[13]	800	Middle	3 Ha drip irrigation	0.21 Ha drip irrigation
						1 photovoltaic pumping station for irrigation
	Ribeira das Patas	30[13]		Middle	8 Ha drip irrigation	1.9 Ha drip irrigation
						50 m^3 water reservoir constructed
						10 Ha planting of *Aloe vera*

[12] Not all interventions listed. Interventions not listed here, such as trainings, pumping systems for drinking water, meteorological stations, screen houses, and others are described in the following sections

[13] Calculated on Google Earth®. In the case of Ribeira das Garças, the coastal basin of Manuel Joelho has been included as it was in the project document.

Figure 4 Google Earth ® image showing distribution of project interventions on the three Northern Slope watersheds in Santo Antão. Contours of watersheds have been traced based on the catchment limits. Watersheds are from East to West (Left to Right) Ribeira Grande, Ribeira das Garças (Municipality of Ribeira Grande) and Ribeira da Cruz (Municipality of Porto Novo). The other watershed in Santo Antão with project interventions, Ribeira das Patas, drains to the Southen slope. Drinking water supply intervention in Planalto Leste (upper catchment of the Grande and Garças basins) not represented.

As listed above, the interventions funded under this outcome included plantation for soil conservation, installation and advise on use of drip irrigation systems, combined or not with screen houses, construction of checkdams and reservoirs, rehabilitation and installation of photovoltaic pumping systems, improved water treatment facilities for reuse of sewage for irrigation, as well as drinking water pipes to extend drinking water supply to remote areas. The project also entered a memorandum of understanding with the National Institute for Agricultural Research (INIDA) to generate knowledge on optimal irrigation and production techniques and produce technical packages for extension teams based on the interventions funded by the project.

The labor for all measures involving planting and construction was provided by community associations for a fee. Employment generation is one of the most important benefits most often cited by project beneficiaries.

The method of selection of beneficiaries led to some tensions due to perception of lack of transparency in the selection of beneficiaries. This was solved the last year of implementation by the formulation and application of specific guidelines and a criteria matrix for selection of beneficiaries.

Moreover, the initial non-systematic selection of beneficiaries led to a greatly heterogenic group that ranged from relatively affluent small holders in Santa Cruz (Santiago) and Ribeira da Cruz (Santo Antão) to farmers with limited access to land, such as a group of women in Tarrafal (Santiago) previously engaged in beach sand extraction (illegal operation) and a farmers' association in Punta Sul (Santo Antão) that started cultivation of communal land (see figure 7). The former group (affluent) constitute "champions" that can bring dynamism and growth in agriculture, while the former represent vulnerable poor population.

Plantation

The project has planted previously denuded lands with *Aloe vera*, pigeon pea (*Cajanus cajan*) and *Jatropha curcas*. All three plants have actual or potential uses for both commercial production and domestic consumption. However, the project afforested mainly in public lands, including steep slopes, as private parcels, particularly productive ones, are preferred for production of vegetables, potatoes, sugar cane or maize.

Table 8 *surface planted per location and species*

Species	Location	Surface (Ha.)
Aloe vera	Santiago Island	175
	Santo Antão Island	164
Cajanus cajan	Santiago Island	30
Jathropha curcas	Santiago Island	7
TOTAL		**376**

The project document included targets for afforestation with *A. vera* amounting to 500 Ha in the municipality of Tarrafal (Santiago) and 300 Ha in the municipality of Porto Novo (Santo Antão). The

project team strove to meet these targets and was challenged by the scarcity of available land. Land availability was the limiting and the determining factor for the location of the afforestation activities.

For the case of Tarrafal, the project document suggested the potential commercial value of *Aloe vera*. Occasional exploitation of *Aloe vera* for export in Cabo Verde is well known and the idea of studying the viability of a commercial exploitation has been discussed among the project management unit and the project beneficiaries without crystalizing in any concrete measures.

Afforestation measures have a long story in Cabo Verde, as the importance of forested upper reaches of watersheds was recognized very early. Thus, from colonial times onwards, the government has made efforts to afforest the different ecological settings of the islands, from conifers and *Eucalyptus spp.* in the sub-humid uplands of Santo Antão and Santiago to dryland species such as *Prosopis sp., Acacia pycnantha, Delonix regia and A. maernsi* for the semi-arid lowlands. The project document suggested focusing on bushes such as *Cajanus cajan* and *Lantana camara*, making a caveat on the invasive character of the second and trees such as *Leucaena leucocephala* for sub-humid areas and *Aloe vera* for semi-arid settings.

Terracing

Terracing (arretos) has been practiced extensively in Cabo Verde in production landscapes to enhance soil fertility and optimization of water, as well as by government in non-productive arid landscapes to prevent erosion and enhance infiltration of rain water.

The project funded the construction of a total of 12,800 meters in Santiago and 2,263 meters in Santo Antão.

Check dams

As with terracing, check dam construction is a well-established practice in Cabo Verde to enhance infiltration of rain water, prevent catastrophic flooding and to avoid soil erosion. The project has funded the construction of 9 check dams in Santiago and 14 in Santo Antão.

Water reservoirs

The project funded the construction of water reservoirs in volumes ranging from 50 to 100 m^3. Water reservoirs are of critical importance for both agricultural and human consumption purposes. Thus, independently from this project, individual farmers and communities engage in construction of water reservoirs on their own funds or with collaboration and funding by the national government, municipal councils, UN agencies, bilateral partners and NGOs.

The project funded the construction of nine 50 m^3 reservoirs in Santiago and additional three in Santo Antão, as well as one 75m^3 reservoir in Santo Antão and two 100 m^3 reservoirs, one in each island.

Figure 5 *Upper line, left to right,* Project actions*: Aloe vera and Jathropha curcas at* Achada Bilim*,* Tarrafal de Santiago and project sign at *the* Poilão dam, San Lorenço dos Órgãos, Island of Santiago*. Lower line, left to right, other, older, related interventions: Cajanus cajan* at a private plot; afforested dryland species (Acacia spp.) and terracing, both on the Southern drainage, municipality of Porto Novo; conifer forest afforested in the 1940s near Pico da Cruz, Porto Novo, Island of Santo Antão*.*

All photos by JACB.

Figure 6 Upper line, left to right, project actions: Checkdam built at Santa Cruz, Santiago that **has significantly contributed to decrease soil salinity and allow irrigation downstream and in previously salinized barren plots shown in the next picture**. Checkdams in Lagoa, Ribeira Grande, Santo Antão. Lower line, left to right: the checkdams of the last picture of the upper line can be seen here in a Google Earth image. Other, older interventions: Construction of checkdam and reservoirs has been encourage since the independence: old check dams in Porto Novo and 1998 water reservoir in Paul, both in Santo Antão.

All photos, except for Google Earth pic by JACB.

Drip irrigation systems and screen houses

Drip irrigation is relatively new to Cabo Verde, where most irrigated fields are still using traditional flood irrigation. However, both the national water policy (PAGIRH and PENAS), as well as the agricultural policy (PEDA, PNIDA) promote the use of drip irrigation and a number of projects, with or without external funding, as well as individual farmers, have been adopting the technique. The Ministry of Rural Development has been promoting and testing this irrigation system, including within screen houses with the support of FAO. The small grant program has also funded installation of drip irrigation at one location also covered by this project.

The project invested in drip irrigation systems covering a total surface of 4.6 Ha in Santo Antão and 12.4 Ha in Santiago, totaling 17 Ha, hence increasing the baseline value by 30%, what equates to 90% of the originally set target of increasing drip irrigation surface up to 74 Ha (50% over the baseline value of 49).

In addition, 0.34 Ha were covered with drip irrigation included in netting structures or screen houses. Screen houses were partially covered in plastic but most of the structure was covered with mosquito screen.

All of the screen houses and drip irrigation systems are meant to serve as demonstration projects, to be monitored in terms of production and water expenses under the memorandum of understanding signed between the INGRH and National Institute for Agricultural Research (INIDA). All drip irrigation systems have water counters to monitor consumption that serves as basis for water bill. However, farmers who have received screen houses and drip irrigation systems were reluctant to share information or claim not to have systematic recordings. This point was confirmed by extension teams of the MDR and researchers from INIDA.

Applied research

A memorandum of understanding between the executing agency and INIDA included both the conduct of a study on optimal irrigation methods for different soil conditions and design and establishment of a monitoring system of installed irrigation systems under the project.

Under the referred agreement, INIDA is conducting research on a subset of the parcels where the project has funded the installation of drip irrigation. According to the last report on the work of INIDA dated December 2012, the main problem encountered was some degree of miscoordination between INIDA, the delegations of the MDR and the farmers themselves. A final report by INIDA was being prepared at the time of the final evaluation. The final report should contain the results or the research conducted by INIDA on the hydrological effects of the project interventions.

INIDA also produced a technical brochure aiming to give orientation to extension teams on production of vegetables with drip irrigation, specifically carrots, tomatoes (in screen house) and onions. The technical paper is based on research conducted at INIDA's own facility.

Photovoltaic pumping systems

The project funded the installation of solar panels to produce electricity for pumping stations at the water treatment facility of Santa Cruz, in Santiago, where also the use of treated water for irrigation is being tested in situ.

A second photovoltaic pumping system for irrigation was installed at Ribeira da Cruz, in Porto Novo, Santo Antão. This second installation was funded in partnership with the Small Grant Program that provided 64% of the funds needed.

A further solar energy pumping station was foreseen but cancelled after the site selected was found not to yield enough water flow to justify the investment. The funds were re-directed to the drinking water project described below.

Other infrastructure

The following infrastructure and equipment was also funded under outcome 2:

Drinking water pipes to Lagoa in Planalto Leste, Island of Santo Antão. In cooperation with the Ministry of Rural Development (MDR), the municipal water services and the GEF's small grant program (SGP), the project funded the pipes to bring water to isolated communities where drinking water was previously delivered at great cost by truck. The pipes connect the pumping system and reservoir built by the MDR and an additional reservoir funded by the SGP to domestic reservoirs in an array of villages along the Planalto Leste.

Water treatment facility of Lajedos, Porto Novo, Santo Antão. The project is funding in cooperation with the municipal council of Porto Novo a water treatment facility to expand irrigation in the zone of Lajedos, where water use is limited by its hardness. Lajedos is an eco-tourism site and can be a catalyzer for agricultural development.

Re-construction of forest service (of the Ministry of Rural Development) facilities at Caldeiras (Paul, Santo Antão) in cooperation with PIMS 4176 *Consolidation of Cape Verde's Protected Areas System*. To serve as the project office in Santo Antão island.

Rehabilitation of culverts, at several locations (Ribeiraozinho, Chã da Igreja, Ribeira da Cruz)

Water quality testing equipment, the project provided the INGRH/ ANAS delegations in both Santo Antão and Santiago Island with equipment to monitor water quality.

Outcome 3 Lessons learned and best practices from pilot activities are disseminated, and integrated in national plans and policies

The project strategy involved the capture, documentation and dissemination of lessons learned from the project pilots into policy making through appropriate entry points, including a national multi-stakeholder forum on climate change. As discussed in the section dedicated to monitoring

and evaluation, the indicators of the project logical framework analysis were of no relevance to this outcome.

Instead, the project implementation focused on the development of a communication strategy for the general public, including public workshops and radio programs. The project management unit recruited a communication specialist for this purpose who designed the said communication strategy that included awareness raising activities and publications such as, brochures and other promotional materials, as well as publication of articles at the web forum Adaptation Learning Mechanism (ALM). At the time of project formulation the ALM had been recently developed by the UNDP. However, the high expectations for this tool have yet to be materialized.

Additionally, project materials including project reports were posted at the web page of the National Institute for Water Management.

Figure 7 Project actions. *Upper line, left to right: screen house culture at Porto Novo (first two) and Ribeira Grande. Farmers in both cases where market oriented with a high level of knowledge on agriculture and market dynamics and eager to improve their production and income.*

Lower line, left to right: first and third picture from Ribeira da Cruz, Porto Novo from individual farmer's plots. Farmers do sell part of their production to the market but vary in their connectivity (access to road infrastructure). The middle picture corresponds to plots allocated to members of a farmer's association on public land. The environment is semi-arid and conditions much harder. This particular community is also in conflict with pastoralist who have traditionally use the same land for forage. All pictures by JACB

Figure 8 *Upper line: Solar powered pumping station and irrigated fields at Ribeira da Cruz, Porto Novo, Santo Antão co-funded in partnership with the UNDP-SGP program. Lower line: solar pumping station at the water treatment facility of Santa Cruz, Santiago. Treated sewage is being tested for irrigation in experimental plots.*

All pictures by JACB

Table 9 project achievements against the indicator framework

Objective/ outcome	Main indicator	Baseline	Indicator	Target at the end of the project	Level at TE	Comments	% Accomplishment (Last level/target)
Objective; To increase resilience and enhance key adaptive capacity to address the additional risks posed by climate change to water sector in Cape Verde	Water management strategies and plans, as well as other plans related to water explicitly consider climate change risks and opportunities as well as the need to integrate adaptation	Plans and strategies do not explicitly consider climate change risks and opportunities and neither the need to adapt them in light of climate change impacts	**National Action Plan for Integrated Water Resources Management (PAGIRH)/ National Strategic Plan of Water and Sanitation (PENAS)**	**Has been climate-proofed**	**Proposal for mainstreaming submitted**	Final version of PENAS not available	**100%**
			Strategic Programme for Agricultural Development (PEDA)	**Has been climate-proofed**	**No**	PEDA horizon 2015 or PNIA were not considered relevant	**0%**
			Municipal Development Plans (PDM)	**Has been climate-proofed**	**Proposal for mainstreaming submitted**		**100%**
			Santa Cruz (Santiago)		yes		100%
			Tarrafal (Santiago)		yes		100%
			Porto Novo (Santo Antao)		yes		100%
			Ribeira Grande (Santo Antao)		yes		100%
			National Environmental Action Plan (PANA)	**Has been climate-proofed**	**yes**		**100%**

Objective/ outcome	Main indicator	Baseline	Indicator	Target at the end of the project	Level at TE	Comments	% Accomplishment (Last level/target)
Objective;To increase resilience and enhance key adaptive capacity to address the additional risks posed by climate change to water sector in Cape Verde	% of state budget allocated for investments and programs directed to address climate change risks	0.1% of non-external budget of the state	**% budget allocated to climate change**	**1%**	**25%**	Data not comparable	**no data**
	Scores of UNDP's Vulnerability Reduction Assessment (VRA) at project site communities	79.62	**VRA**	**60**	**69**		**13%**

Objective/ outcome	Main indicator	Baseline	Indicator	Target at the end of the project	Level at TE	Comments	% Accomplishment (Last level/target)
Outcome 1: Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management.	Key national policy frameworks relevant for the water sector effectively incorporate climate risk consideration and adaptation measures	The PRSP II does not directly refer to climate change	PRPS III effectively incorporates climate risks and adaptation measures	**Adaptation options and opportunities are fully incorporated in the next PRSP**	**PRSP III does not include climate change adaptation**	Project team attempted to participate in the strategy and to cooperate with its cluster groups unsuccessfully	**0%**
	Number of key agencies having taken institutional measures to respond to climate change	Currently 4 institutions (DGA, INGRH, INMG and DGASP) are taking initial measures to respond to climate change	**three additional institutions take explicit measures to respond to climate change**				**0%**
			National Association of Cape Verde Municipalities (ANMCV)	1 measure	No explicit measures	The project did not directly work with the ANMCV	0%
			Ministry of Tourism and Industry (MIE)	1 measure	No explicit measures	The project did not work with this institution	0%
			Ministry of Infrastructure and Marine Resources (MITRM)	1 measure	No explicit measures	The project did not work with this institution	0%

Objective/ outcome	Main indicator	Baseline	Indicator	Target at the end of the project	Level at TE	Comments	% Accomplishment (Last level/target)
Outcome 2: Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins	Within project target sites, increases in cropland surface with water saving measures and number of families involved in water conservation measures	49 Hectares	Increase in cropland area with water conservation measures (drip irrigation)	74	66		90%
		33,7% of farmers	Increase in number of agricultural producers implementing water efficiency measures	68%	86%		127%
Outcome 3: Lessons learned and best practices from pilot activities are disseminated, and integrated in national plans and policies		0	Number of hits on project website from Cape Verdean visitors	100/ month	no data		No data
		0	Number of contributions posted at the ALM	8	3		38%

Efficiency: project finances, co-funding, administrative procedures

Coherence between actual and planned timeframes

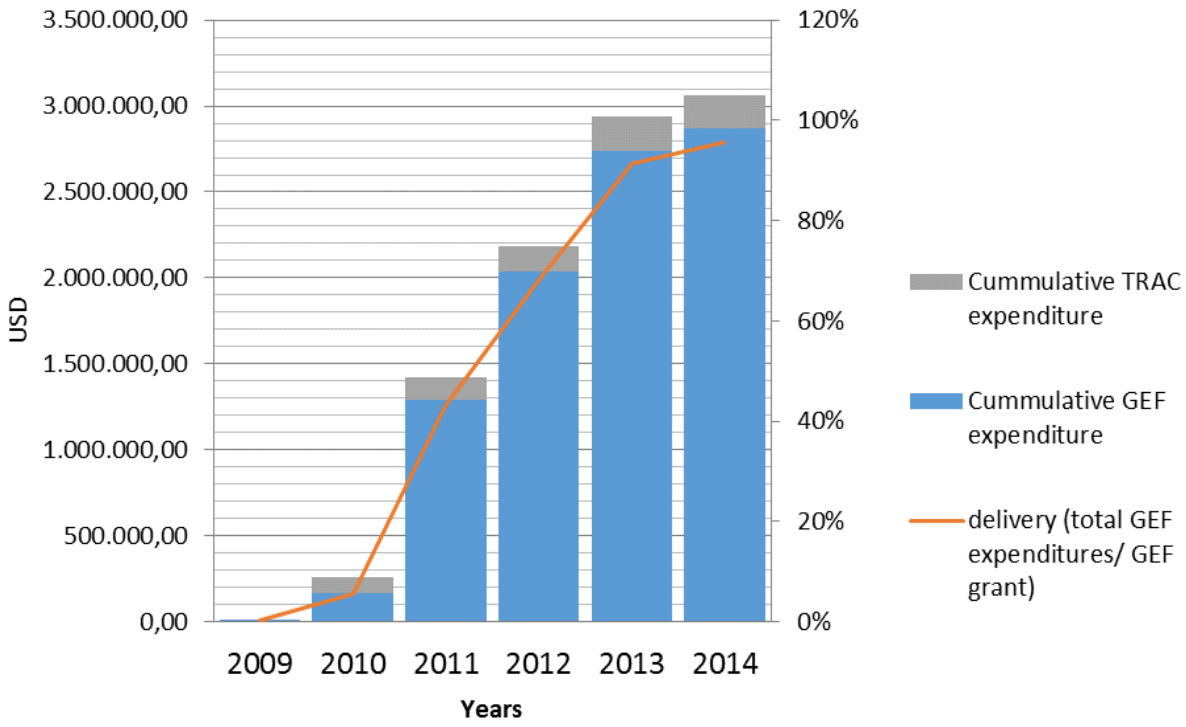
The project implementation timeframe of four years was originally set for the period 2009-2013. Thus, after approval of the project document in October 2009, the executing and implementing agencies started the recruitment process for the project coordination unit. Although the project did indeed start delivery by 2009[14], and activities and mobilization of stakeholders started in 2010, the project implementation was slow up to the official launching of the project at the inception workshop in April 2011[15]. From that point onwards implementation ran smoothly and at good pace as shown in figure 8.

The main reasons behind the slow start of project implementation where the lengthy recruitment processes for the project coordinating unit, as well as political reasons. The recruitment process of the project coordinator and the international technical specialist were only completed in June and October 2010 respectively. The political process that interfered with the initial stages of project implementation were the February 2011 elections and consequent government restructuring, including the reform of the executive agency, INGRH, as well as the ministries of the Environment and of Rural Development, concluded in March 2011[16].

Recruitment for PMU staff followed national public procedures, as required for NIM projects that have strict requirements in terms of approval procedures and vacancy publication timeframes. The fact that most PMU positions were occupied by public servants also added some degree of complexity as their temporary separation of service had to be duly authorized. The contracts signed by the project team all had a timeframe of one year renewable.

[14] Combined delivery report, 2009
[15] Relatorio de actividades de Janeiro a Outubro 2011
[16] PIR 2011

Figure 9 *total expenses in US dollars for both GEF and UNDP funds (TRAC). The delivery rate for GEF funds, i.e. the ratio of accumulative expenses to total funds is shown as a red line.*



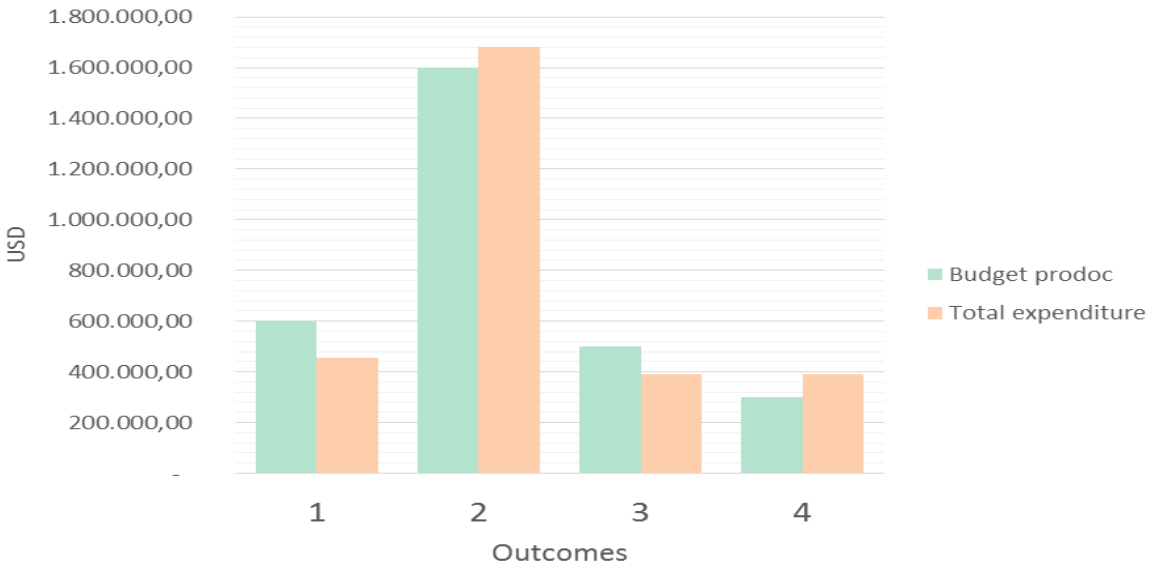
Coherence between planned and actual expenses

The actual project expenses correspond, with minor disagreements, to the preliminary budget included in the project document (Figure 9). Yearly budgets and delivery were also in general agreement in terms of total amounts and budgetary code. However, some divergence from planned expenses existed as shown in table 8 for 2013.

Table 10 *Budget and actual expenditures (USD) according to ATLAS budgetary codes 2013. 2013 was chosen as an example since it represents the project at its maximum delivery rate and all expenses are already accounted for.*

ATLAS budgetary acc. code	ATLAS budget description	Budget 2013 (USD)	Expenditures 2013 (USD)	% variation (Exp.-Budget) /Expenses
71200	International Consultants	50,000.00	50,336.33	1%
71300	Local Consultants	71,000.00	32,529.62	-118%
71400	Contractual Services – Individuals	130,000.00	174,440.89	25%
71600	Travel	46,000.00	25,186.59	55%
72100	Contractual Services-Companies	302,000.00	226,253.31	-33%
72200	Equipment and Furniture	48,000.00	160,243.47	70%
72300	Other Materials & Goods	17,000.00	1,421.47	-1096%
72400	Comm.& Audio Visual Equipment	9,000.00	8,495.91	-6%
72500	Supplies	13,000.00	1,929.02	-574%
73100	Rental & Maintenance-Premises	11,000.00	36,046.81	69%
73400	Rental & Maint. of other equipment	-	898.54	100%
74200	Audio Visual & Print Prod Costs	7,000.00	10,452.90	33%
74500	Miscellaneous Expenses	25,756.00	15,131.26	-70%
75700	Training, Workshops and Conferences	-	5,832.65	100%
76100	Foreign exchange currency loss	-	- 29.30	100%
TOTAL		**729,756.00**	**749,169.47**	**3%**

Figure 10 *Budget and total actual expenditure (ATLAS categories). Values on the vertical axis in US dollars*



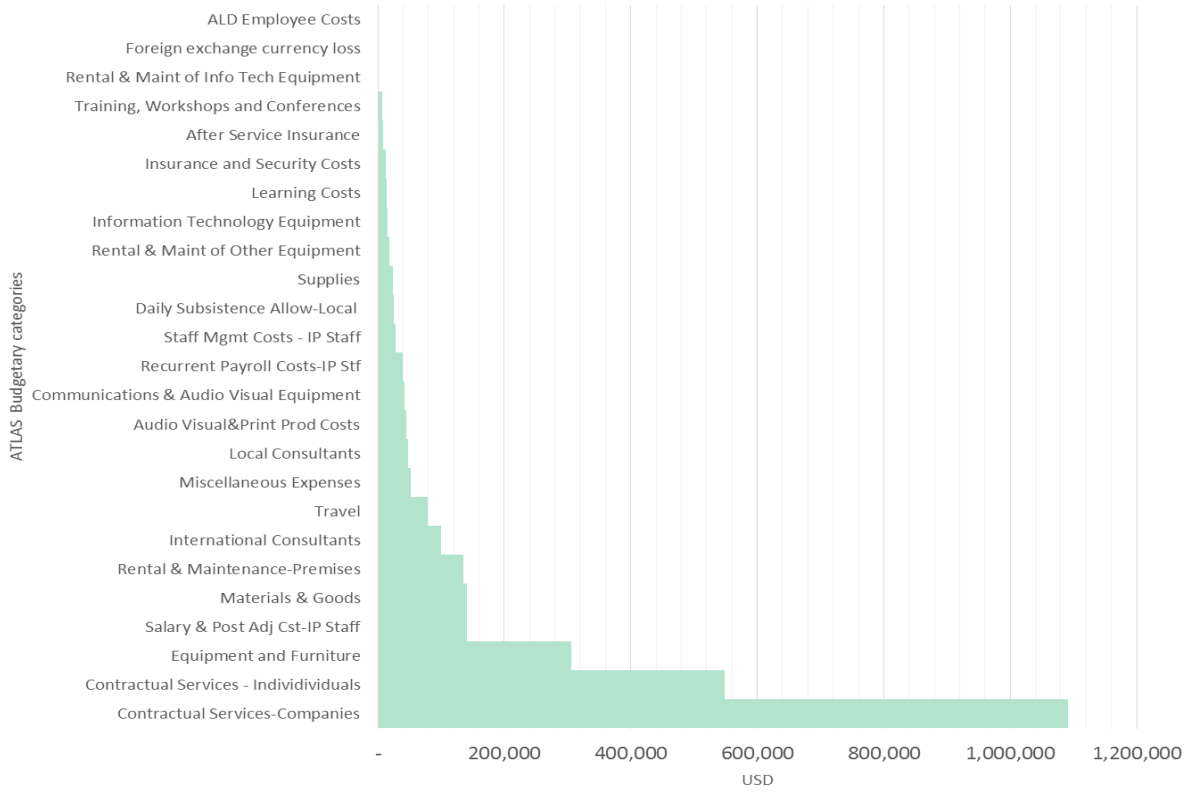
The most important expenditure account was, by far, *Contractual services with companies*, followed by *Individual contracts*, *Equipment*, and *Materials and goods*, as shown graphically in figure 10. Again this distribution by budgetary categories is consistent with the originally planned budget, albeit with some variations as is to be expected (Table 10)

The project document foresaw 10% of the total grant as management costs. These costs do not include all of the staffing costs as e.g. the individual contracts of the specialist of the project coordinating unit are linked to their respective outcomes. Actual management expenditures slightly exceeded the 10% mark by June 2014. However, this figure may come closer to 10% as the last payments linked to the activities are made. Table 9 lists budget and actually expended budget categories and proportion of management costs.

Table 11 *Total expenses of the project per budget category*

Outcomes	Budget (PRODOC)	Expenditure (CDR)	%Variation (Bud-Exp)/Bud	Management costs (PRODOC)	Management costs (CDR)
1	600,000.00	456,907.18	24%	10%	13%
2	1,600,000.00	1,683,995.49	-5%		
3	500,000.00	388,304.98	22%		
4	300,000.00	392,281.52	-31%		
TOTAL	**3,000,000.00**	**2,921,489.17**	**3%**		

Figure 11 *Total expenses of the project (USD) per ATLAS budgetary account*



Performance and delivery of administrative services and disbursements

Progress reports, minutes of committee meetings and interviews with stakeholders conducted during the field mission of this evaluation confirm that both implementing and executing agency proactively coordinated actions for the implementation of the project.

Project disbursements were made by the UNDP as direct payments for the activities based on proper requests issued by the project management unit duly authorized by the head or acting head of the project executing agency.

A Harmonized Approach to Cash Transfer (HACT) microassesment conducted in 2012 evaluated the financial management capacities of INGRH favorably. However, due to the fact that the INGRH was undergoing a process of transformation that would eventually lead to its extinction in favor of the new Agency for Water and Sanitation (ANAS), the direct payment modality was deemed as more adequate than cash advances by the UNDP management.

There were no major issues other than the usual lengthy times involved in recruitment and procurement processes, which were partially related to the complex authorization process both by the government and UNDP, involving at least five different signatures and that in few instances took up to three weeks to be completed. Moreover, the absence of petty cash meant that the procurement backlog could include even small purchases. The petty cash approach was suggested by the UNDP country office but the proposition was rejected by the executing agency.

The delays in some payments caused different perceptions between implementing and executing agencies and field teams. Although the views of implementing partners on the issue are quite varied, the main reason behind the said delays seem to be mostly related to weaknesses on the procurement planning and capacity constraints to collect and submit the required documentation for payment approval

Degree of actual mobilization of committed co-funding

The project secured parallel and co-funding commitments from different national and international partners that were funding/ implementing projects with complementary objectives. Table 12 lists the projects identified in the project document, as well as additional projects not included in the project document.

The project costs identified as co-finance amounted to 63,699,027 USD**,** of which 84% corresponded to projects funded by bilateral actors, mostly the European Commission, 2% to UN agencies and 14% to government projects.

The UNDP committed 200,000 USD out of its core funds for the implementation of the project, of which 99% had been disbursed as of June 2014. There is less information available on the rest of the projects identified. However, investments in the water sector by bilateral, multilateral and government actors amounting to ca. USD 90,000,000 could be identified for the period 2010-2014, of which 64% corresponded to bilateral donors, 2% to multilateral actors and 34% to government interventions[17]. This figure can only represent a fraction of the actual investment and can serve

[17] Of which some are also supported by bilateral cooperation through projects or budget support

only as an indicator of the relative magnitude of investments made in the water sector and agriculture, as there are important gaps in the data, e.g. government expenditure in the sector for years other than 2012.

2012 data on government expenses in the water and agriculture sectors were collected by the project (PIMS 4091) as part of the activities to establish the baseline for the indicator on government investment. The figures obtained by the project are summarized in table 13.

Table 12 Parallel and co-financing of PIMS 4091

Project	Linked to outcome	Donor/ agency	Project cost (USD)	Current status
Projects identified in PIMS 4091 project document				
Water and Sanitation improvement in Mindelo, Praia and Calheta	2	European Commission[18]	25,220,000[19]	Ongoing
Water basin management in Ribeira da Torre, Santo Antão Island	2		1,740,000	No data
Institutional support on water and sanitation infrastructures to the Ministry of Infrastructures, transport and telecommunications	2		845,000	No data
Horticulture and micro-irrigation sector support program	2		650,000	No data
Diversification of agriculture production program	2		1,300,000	No data
Water supply and sanitation system on Maio Island	2		1,105,000	No data
Small scale water supply project for rural community construction of reservoirs and traditional water harvesting	2	FSD / SCAC (France)	194,626	No data
Provision of water and sanitation services	4	France	13,300,000	Ongoing
Water resource management on Santa Catarina and in Calheta de São Miguel	2	SCAC (France)	125,020	No data
Irrigation infrastructures around Poilão Dam on Santiago Island	1	Government of Cabo Verde (GoCV)	543,210	See table 14
General provision of water on Santiago Island	1		4,666,667	See table 14
National Network for Climatic and Meteorological Observation	3		89,691	See table 14
General mobilization of water resources	3		1,604,938	See table 14
MADRRM's costs of mobilizing water for irrigation throughout the country	4		1,148,148	See table 14
Expansion of irrigation services using hydroponic gardening and related water-efficient techniques	1	Japan/ GoCV	617,284	See table 14

[18] For the period 2008-2013 the European Commission has supported the government of Cabo Verde with funding out of the European Development Funds amounting up to 70 million USD

[19] 82% of the identified funds

Project	Linked to outcome	Donor/ agency	Project cost (USD)	Current status
Projects identified in PIMS 4091 project document				
Land-use planning on the hydrographical basin of Picos e Engenhos [20]	1	Government of Cabo Verde	308,642	Completed
Integrated Development Project for Hydrographical Basins on Santiago Island	1	Government of Cabo Verde	182,403	See table 14
Water supply on Fogo and Brava Islands	2	Luxemburg	6,650,000	Completed
Water supply on Santo Domingo	2	Luxemburg[21]	2,358,090	Completed
UN Office's direct support to project management	4	UNDP	200,000	Ongoing
Several water interventions	4	UNICEF	800,000[22]	Ongoing
National Centre for Climatic Modelling and Forecast	3	USAID	50,308	No data
TOTAL projects			**63,699,027**	
Projects NOT identified in PIMS 4091 project document				
Watershed Management and Agriculture Support Project	2	MCC (USA)	10,000,000	Completed
Mobilization of surface water and strengthening of capacities in integrated water resources management	2	AfDB	1,153,660	Ongoing
Mise en œuvre des Installations Hydroponiques Pilotes au Cap-Vert (TCP/CVI/3304)	2	FAO	369,962	Completed
TOTAL projects NOT identified in PRODOC			**11,153,660**	

[20] With the support of the African Development Bank

[21] Luxembourg cooperation has invested ca. 73 million USD in education, health, water and sanitation and food security in the period 2006-2014

[22] A review of the One UN annual work plans 2010-2014 reveals budgets for activities related to water and sanitation by UNICEF amounting to 465,500, i.e. 58% of the funds identified in the project document

Table 13 actual parallel funding

Subtotal agencies actual	***Amount***
European commission	*25,220,000.00*
Government of Cabo Verde	*30,257,490.00*
UN agencies	*1,035,462.00*
Government of Luxembourg	*9,008,090.00*
African Development Bank	*1,153,660.00*
MCC (USA)	*10,000,000.00*
Government of France	*13,300,000.00*
Total	***89,974,702.00***

Table 14 *government investment on baseline projects for 2012. Data does not distinguish between government own funds and funds provided through projects or direct budget support.*

State institution	Intervention	Investment (USD)
Ministry of Environment, Housing and Land-use planning.	Meteorological services	1,759,491
	Water management	1,236,196
	Spatial planning expenses	547,475
	Sanitation expenses	76,859
	Drinking water supply	659,365
	Disaster risk reduction	1,208,909
	Environmental quality monitoring	100,508
Ministry for Rural Development	Environmental management	2,695,991
	Water infrastructure, supply and management of watersheds	19,500,153
	Research and development	1,300,251
	Agro-silvipastoral development	1,006,745
	Food security and vulnerability expenses	106,421
	Poverty reduction and social services	59,123
TOTAL		**30,257,490**

Country ownership, mainstreaming, catalytic role and impact

Country ownership

The project directly implements priorities expressed by Cabo Verde in its 2007 National Adaptation Plan of Action (NAPA) and has used government procedures for its implementation. Moreover, the project has acted consistently in partnership with local authorities and aligned with the government's water and agricultural policies.

Mainstreaming

Alignment with UNDP's country program document and the Cabo Verde United Nations Development Assistance Framework (UNDAF)

The project design was fully consistent with the 2008-2012 UNDAF[23]. The current UNDAF (2012-2016) is oriented along the national priorities as expressed in the Poverty Reduction Strategy Paper (DECRP III) and, hence, as discussed in the section relevance, the project is indeed relevant to that strategy. Specifically the project contributes to the outcomes 4.1 and 4.2 of the current UNDAF.

Contributions to improved governance, disaster preparedness, gender and conflict transformation

Project implementation favored participation of women as beneficiaries of pilot projects and trainings. Moreover, the project established partnerships with women's association to raise awareness on climate change issues. However, the project did not have any specific and holistic gender strategy that involved analysis of gender roles and power balances and inequities.

The project had links to governance and disaster preparedness in terms of development of capacities of local officials on climate change and construction of checkdams and other structures that dissipate flood energy and prevent soil erosion. However, the project did not explicitly aim to strengthen local government structures or improve governance of natural resources.

The project was sensitive to conflicts on water use and proactively work to transform them. Site coordinators worked with local communities to identify potential conflicts, conducting negotiation with the parties involved and proposing technical solutions for optimal resource sharing. For instance, in one case in Santo Antão (Lagoa, Campainha, Matinho) project activities that provided water supply to village upstream of water sources used by herders. To address herders concerns on future availability of water the project conducted a technical analysis that showed that there would not be any significant impact on the water resources downstream and negotiated provision of additional infrastructures (cattle troughs) for herders.

[23] PIMS 4091 Project document

Also in Santo Antão, at the locality of Ponte Sul, (Chã do Morto, Porto Novo) parceling-up and installation of drip irrigation on communal land has exacerbated a preexisting conflict between the beneficiary farmer's association members and pastoralist who had been using the land for grazing. The project has been involved in solving this conflict.

Catalytic role[24]

The catalytic role of the project is summarized in table 13

Table 15 *Catalytic role of the project*

Aspect	Project contribution
Development of new technologies/ approaches	The project did not develop any new technology or approach. However, it has indeed promoted the adoption of new irrigation techniques (drip irrigation), screen houses and renewable energy (solar power) solutions among other government initiatives, as well as initiative supported by other development partners
Demonstration	All pilot interventions of the project, particularly drip irrigation in screen houses are meant as demonstration activities and farmer's schools. However, strong monitoring mechanisms have yet to be developed to enable optimal extraction of lessons learned for replication
Replication	There has been a non-quantified increase in drip irrigation on farms at the project target's locations. Adoption by farmers will ultimately depend on economic viability, i.e. the eventual replication will depend on market factors that are largely determined by non-climatic variables such as market prices and farm to market process, transport and storage
Scaling-up	The government is committed to a more efficient mobilization of water resources for the development of commercial agriculture as means to reduce poverty. In this line, drip irrigation and renewable energies would take critical roles. However, the project needs yet to capitalize on the knowledge generated by its activities to promote scaling-up of its pilots

[24] The catalytic role of a project is defined in the UNDP Guideline for Terminal Evaluation of GEF projects as the degree to which the project has contribute to:
Production of public good: development of new technologies and/or approaches
Demonstration: Steps have been taken to catalyze the public good, through demonstration sites or training
Replication: Activities, demonstrations, and/ or techniques are repeated within or outside the project
Scaling-up: Approaches developed through the project are taken up on a regional/ national scale, becoming widely accepted

Impact

Short description of the GEF impact evaluation framework

The GEF impact evaluation framework includes the project's theory of change, (project strategy or the results chain), i.e. the logical connection between the projects inputs, activities, outputs and outcomes and contribution to the intended impact, as well as additional elements to help understand the process leading to the impact: assumptions, drivers of impact and intermediate states. The assumptions refer to significant factors that are expected to contribute to the achievement of the projects impacts but are largely beyond the power of the project to influence; impact drivers refer to factors that are expected to contribute to the achievement of the projects impact and can be affected or influenced by the project; intermediate states are the steps or transitional conditions between the projects outcomes and its impact[25].

It goes beyond the scope of this consultancy to undertake a full impact analysis, but based on the project logical frame analysis (see project design/formulation section) a brief outcomes-impacts analysis will be undertaken in this section to identify the impact drivers, assumptions and intermediate stages to provide a basis for the impact rating.

Review of the impact chain logic, including logic steps towards outcomes, intermediates and impact

As described in the previous sections, the project strategy intended to develop capacities on data gathering, analysis and interpretation to be able to developed more accurate projections, and demonstrate the adaptation value of improved agriculture in terms of savings in water and other inputs to promote its replication and support by public policy. Moreover, the project aimed to raise awareness among public officials to set-up a framework of policies and state strategies that would incorporate climate change risks and opportunities.

The strategy is logically coherent but it involved challenging coordination of different elements involving the policy-making cycle and the implementation timeframe and proper documentation of the results of field interventions. Moreover, the production of accurate projections that account for climate change impacts requires a critical mass of meteorological observations through at least a decade with sufficient geographical resolution, as well as enhanced capacities by the staff of the National Meteorological Institute (INMG).

Thus, the contribution of this project to its intended final impact, i.e. reduction of vulnerability would be true if a series of intermediate steps, drivers and assumptions are true:

Assumptions:

- Groups of society targeted by the project, pupils, public officials, journalists and politicians have indeed raised their awareness on climate change and its impacts on Cabo Verde

- Research on the adaptation benefits of interventions piloted by this project would prove to outpace the negative impacts of climate change on water resources

[25] See, GEF Evaluation Office, 2009, The ROtI Handbook for a detail explanation of the GEF impact evaluation framework

Impact drivers:

- Economic growth continues at moderately good rate and government investment on water and environmental management, as well as agricultural research would increase as economic growth increases government revenue

- Rural Extension work is strengthened by applied research and means to reach out to farmers

Intermediate steps:

- Government policy includes economic/ financial instruments that incentive efficient water use, including drip irrigation and discourage non-efficient practices

- Government and private investment facilitate the growth of agribusiness based on efficient use of resources by fostering inter-island trade and linking up with specialized markets

- The meteorological network continues to grow as new capacities for data processing and modeling are developed and applied to agricultural research

Sustainability

This section evaluates the risks to the sustainability of the project benefits by assessing the likelihood of financial, political, social and environmental risks.

Financial sustainability

Investments in efficient agriculture and watershed management measures are likely to continue and increase in the next five to ten years. For instance, the National Program for Agricultural Investment (PNIA) 2011-2015 foresees investments in improved water management amounting to 150 million USD of which ca. 76 million have already been mobilized. The program, to be implemented by the MDR with the support of INIDA includes promotion and expansion of drip irrigation, improve watershed infrastructure, including dams, reservoirs, and pumping and conveyance systems.

Donor support for similar initiatives include funding amounting to ca. 17 million USD for the period 2012-2016 by the government of Luxembourg to support integrated water resource management, implemented in partnership with ANAS, MAHOT and the National Association of Municipalities with the objective of improving access to water supply and sanitation. In the same line, the US Millennium Challenge Corporation will be providing financial support amounting to 17 million USD to support creation of an enabling environment for land investments, as well as further 41 million USD for policy reform and infrastructure in water and sanitation.

Further public support will be needed at municipal level if a more decentralized management of water resources is intended. With an average annual budget not exceeding 5 million US$, of which most is used in regular expenditures such as salaries and maintenance of facilities and equipment, municipal councils would find it very challenging to increase investment in water infrastructure without further government or external assistance.

Financial sustainability of water efficiency measures at farm level would mostly depend on the economic viability of the irrigated parcel, i.e. it will depend on the farm price of the produce against the costs involved in rain-fed or flood irrigation production. The additional costs involved in drip irrigation include the conveyance system and the necessary valves, pipes, tubes and emitter plus its maintenance and replacement.

Hence the costs will easily surpass profits if the market price for a given produce falls, as it may be the case of vegetables. Factors that are mostly beyond the control of the farmers, such as demand, transportation costs (in turn depending on road and storage infrastructure) can therefore erode or eliminate the economic incentive for drip irrigation.

Public interventions both regulatory and economic can act to modify market pressures by e.g. subsidizing drip irrigation producers either directly or indirectly through distinct water tariffs for inundation vs. drip irrigation uses or preferential attention by extension services. Also, municipal ordinances or national legislation could be enacted limiting or progressively banning flood inundation to favor the adoption of the more efficient alternative. Additional investment in extension services would support the development of farmer's capacities to increase their yield through technical assistance to production and market information.

Additionally, to cope with the initial high costs needed to setup or expand drip irrigation (against the cheaper flood irrigation) farmers would benefit from access to credit services through agricultural banks or microfinance institutions. As agricultural loans usually have high interest rate, efforts could be made to introduce risk transfer mechanisms, i.e. insurances to make loans more affordable. Risk transfer costs, in terms of assessment and fight against fraud could be diminish by introducing index insurances that would compensate losses based on a given meteorological index, as recorded by an official meteorological station in the same area as the insured parcels.

Socio-economic sustainability[26]

If the current level of commitment of the municipal governments in seeking out partnerships and mobilizing resources to improve water supply and agriculture in their territories, as well as the commitments and efforts by both the National Agency for Water and Sanitation and the Ministry for Rural Development to create conditions for a more efficient and strengthened use of water resources for agricultural development, poverty eradication and food security , socio-economic sustainability would have a negligible risk.

Institutional sustainability[27]

[26] Risk that the level of stakeholder ownership will be insufficient to allow for the project outcomes/ benefits to be sustained

[27] Risks that the current policy and governance framework would not sustain project benefits

As mentioned in the section dedicated to financial sustainability, policy reform would be needed to provide adequate support for the sustainability of investments in water efficiency at farm level. These reforms would include the development of policy instruments to provide incentives to more efficient agricultural techniques, such as drip irrigation in the form of indirect or direct subsidies, as well as regulatory instruments to prevent expansion of inefficient models.

The policy reform and implementation process should be informed by updated information on the quantity and quality of water resources, which would require intense coordination and co-finance effort by several agencies, primarily the municipal water services (SAAS), the municipal/ regional delegations of INGRH/ ANAS and the delegations of the directorate of agriculture of the Ministry of Rural Development to come up with coherent, concrete and feasible policy support for efficient water management.

Environmental sustainability

Investments and policy and technical support for agriculture and enhancements in water supply for agricultural purposes can create incentives to expand agriculture and settlements even beyond relatively productive, sub-humid areas into marginal dryland currently used as rangeland. This would incur in the risk of maladaptation, as Cabo Verde turns drier as a result of increasing temperatures caused by global climate change.

To prevent maladaptation, watershed management and spatial planning are necessary tools to guide investment in settlements and agriculture not only on exploitation capacities, which can be developed by increased public investment, but also on the carrying capacity of the ecosystem.

An opportunity to strengthen watershed management and planning exists in the development of national capacities to monitor and manage environmental data such as meteorological and hydrological data, including development of capacities to project future conditions through climate modeling and downscaling techniques and hydrological and crop models.

Conclusions, recommendations & Lessons learned

Project formulation

The project outcomes are well formulated and are logically linked to the project objective. The narrative of the project strategy goes as follows: if the policy framework for water management incorporates risks and impacts of climate change and adaptation measures (outcome 1) and concrete adaptation benefits of specific interventions are tested (outcome 2) and documented in terms of enhanced availability, cost-effectiveness and efficiency of water resource use and disseminated and fed back into the planning cycle (outcome 3), upscaling and replication should occur resulting in a net reduction of vulnerability (project objective).

The project formulation included a risk analysis and mitigation strategies. The identified risks were relevant, particularly the risk of project activities being hampered by conflicts around water use rights. Although the project did not include a systematic strategy for conflict prevention, the project proactively worked for transformation of conflicts by offering technical solutions to create win-win situations.

The project design set specific activity targets in terms of number of hectares to be planted with *Aloe vera* and cubic meters of dams to be constructed. The budget for their respective outputs was based on these targets. However, as at least two years lapsed between project design and beginning of implementation the calculated budget prove to be insufficient for the targets set. Moreover, the specific activity targets later determined site selection and project focus to a great degree.

Recommendation

Project design should remain concrete enough without constraining project implementation by setting too specific activity level targets, especially when the budget is calculated based on these targets. Instead, more flexible targets could be established, such as range of hectares to be afforested or cubic meter of dams to be constructed in function of known effects on water balances, including infiltration, runoff, evaporation and peak flows, and erosion. Moreover, budgets should include a provision for changes in prices as typically at least two years elapse between project design and implementation.

Cooperation and management arrangements

The project established strong partnerships and collaboration with municipal projects with the objective of enhancing water supply for human consumption and agriculture, with active participation of the municipal delegations of the Ministry of Rural Development and the National Water Management Institute (INGRH/ANAS).

The project also cooperated on a cost sharing basis with the GEF/ UNDP Small Grant Program.

The project counted with flexible management structures that allowed for supervision and work plan approval at political level (steering committee) with enough technical support (technical committee) and strong links to the local context (local coordination committee). However, the political reform that started at the begin of the implementation of this project, including the reorganization of rural development, agriculture and environment responsibilities among ministries and the reform process of the executing agency, the INGRH/ ANAS diverted attention of the involved institutions from the project, which had its effects on the implementation of the project, particularly outcome 1.

Lesson learned

A technical committee that supports project implementation and acts as an intermediate technical body between a high-level project steering committee and the project implementation units can provide both agility in decision making and political leverage by enabling access by project implementation units to other relevant institutions.

To be effective, the technical committee should include officials of institutions that have been involved in the process of project formulation, whose agencies objectives are related to the project objectives, assuming political stability, e.g. that participating agencies will not be undertaking deep structural reforms during the project timeframe.

Moreover, a local coordination committee is a valuable body that could be kept as a permanent coordination forum for all development activities taking place within a municipality. However, constitution and membership of such bodies must take other projects being implemented in the same territory and the institutional responsibilities of its members into consideration to avoid straining the normally constraint staff capacities at local level.

The delivery modality of the Small Grant Program (SGP) has important advantages by its ability to deliver crucial impacts at local level with relatively low delivery costs and hence feasibility of partnerships with the SGP should always be considered for partnerships with other initiatives.

Monitoring and evaluation

Both impact and performance indicators were generally well formulated and responded to SMART criteria (specific, measurable, achievable, relevant and time-bond), and included baselines and targets.

However, there were also significant weaknesses. For instance, at the level of project indicators, lack of a proper baseline and adequately defined data collection methodology for the second impact indicators *(% of state budget dedicated to climate change*) led to the calculated value for 2012 and the baseline not to be comparable.

Also, obtaining data for the third impact indicator, the vulnerability reduction assessment (VRA), which was expected to shed light on the actual reduction of vulnerability experienced by communities that were beneficiaries of the project proved to be both time-consuming and costly.

Moreover, there are justified concerns about the relevance of such index, as perceptions of communities may be influenced by factors not related to the project or even by climatic variables, e.g. random extreme rainfall event or drought can cause vulnerability perceptions to sore even if the project has been effectively implementing sound adaptation measures.

The most important weakness in terms of design of the indicator framework were the indicators of outcome three. Outcome 3 was supposed to contribute to the systematization and transmission of lessons learned from the project to be used as inputs in the policy making cycle. However, the indicators chosen, number of clicks on the project website (never setup) or contributions sent to the Adaptation Learning Mechanism did not have any relevance for the outcome strategy.

The PMU did indeed monitor and report progress towards the project objectives, outcomes and outputs, with a clear focus on the latter. However, weak definition of responsibilities in terms of data collection led to unsystematic collection of data, not only related to the project's indicator framework but also to important data related to the use of water and agricultural output.

Recommendation

The project management unit, with the support of the steering committee must verify the validity of the indicator framework immediately after start of project implementation. Quality issues, i.e. relevance, specificity, baseline, targets etc. must prompt an agile response by both management and steering committee to introduce modifications of the indicator framework. For GEF funded projects, the figure of the UNDP-GEF regional technical advisor is of crucial importance to support justified modifications of the project logical framework, including indicator variables, baselines and targets.

The responsibility for the collection and analysis of the data for monitoring of the impact and performance indicators must lie with the project coordinator or the monitoring and evaluation officer, should one be recruited. Although overall responsibility of collecting, organizing and reporting data lies with the national project coordinator, other members of the project coordination unit in charge of implementation or supervising project activities (project specialists, regional coordinators, etc.) should keep proper records and documentation, not only of data to feed the project's indicator framework but also data on cost per unit installed/ constructed, as well as on specific location of the activities. The availability of such data, including georeferred data (i.e. geographical location and extent of interventions and effects), as well as specific financial data (i.e. cost per unit constructed/ installed) would be crucial in avoiding halts in project implementation in the case of staff turnover or delays in the process of evaluation

Lesson learned

The importance of monitoring for adaptive management in a results based management context, i.e., beyond the simple tallying of activities conducted, must be understood by the steering committee and the project management unit, particularly the project coordinator. This understanding must lead to give high priority to monitoring as means of understanding the progress towards the project objective. Failure to do so would result in missing opportunities for effective and efficient investment and ultimately missing opportunities to support national and local government to combat poverty and increase resilience of the populations

Project results

The project strategy was based on the NAPA priority projects that were also linked to national development objectives. Sustainable agriculture and enhanced water supply and efficient use constitute also priorities at municipal and community level. Thus, the project strategy is highly relevant to both national, municipal and communities development strategies, policies and objectives.

The project has had important local impacts at community/ farm level in terms of water savings and increased yields. However, the general objective of contributing to transform national response to climate change to a better-planned and systematic one, and specifically, to ensure that water availability, supply and quality are maintained under climate change conditions, has only been partially achieved.

The success in achieving this specific objective was to be signaled by the three impact indicators of mainstreaming climate change into relevant local and national policies, strategies and plans, increase in state budget dedicated to climate change and reduction in the perception of vulnerability by communities beneficiaries of the project. The results are described below.

The project has partially achieved its targets in terms of mainstreaming climate change into key water sector policies and plans at national and local level, having submitted proposal for mainstreaming climate change risks into the National Plan for Water and Sanitation (PENAS), contributed to the review of the National Environmental Plan (PANA) with a “climate lens” and submitted proposals or addenda for the integration of climate risks into all municipal development plans. However, this mainstreaming was limited to the presentation of proposals that remained rather generic in nature, without using the full potential of the information generated or that could have been generated by the implementation of the activities under outcome 2 (pilot adaptation activities).

The project successfully conducted two VRA exercises that indicated a reduction in the perception of vulnerability in the communities involved in the exercise by 13%. Rather than this achievement being below the target of a 25% reduction in VRA index, the real issue here is to which extent the VRA does indeed represent a real reduction in vulnerability, i.e. how e.g. climate variability during the implementation timeframe affect the vulnerability perception, as well as the influence that the project may have, e.g. awareness raising on climate risks could potentially make people feel more vulnerable.

Although an increase in public budget linked to climate change adaptation has been preliminarily calculated, actual quantification would require a clear methodology and a proper public expenditure review. However, the baseline calculated in the project document or during project implementation (at the 2011 PIR) is not comparable with the budget review conducted by the project in 2012, as the criteria used to add up budget accounts that are “dedicated to climate change” were different in all cases.

Outcome 1 Climate change risks and adaptation measures integrated into key national policies, plans and programs for water resource management

The project has produced a significant amount of knowledge products that have been used during project implementation to take first steps to integrate climate change into national and local development plans and policies and to train and raise awareness of different sectors of the population: ministry and municipal officials, school pupils, journalists and members of parliament.

However, the project failed to achieve the targets of this outcome mainly due to the lack of leverage by the project management unit to affect any influence on the formulation process that was led by the national directorate for planning of the Ministry of Finances and Planning, but with inter-institutional presence, including the executing agency and the Ministry of Environment. The process of institutional reform of the executing agency must indeed have played a role in this lack of leverage. However, the steering committee and/ or the technical advisory committee should have been capable of providing access to this crucial planning process. The same is true for the failure to affect influence on the sectoral policies identified as targets for this outcome. However, efforts have been made to work with the sector clusters that develop specific policies based on the main document.

Other important factor weakening the effectiveness of the mainstreaming process, including those policy documents (PANA, PDMs, PENAS) for which proposals were submitted, was the general nature of the analysis of risks and the recommended adaptation measures. This is due in great part to the uncertainties involved in the assessment of both the intensity and the economic costs of the impacts of climate change, as well as uncertainties in the estimation of the costs of adaptation measures. Moreover, the knowledge products, especially those produced by the international consultants with expertise in climate change data analysis and mainstreaming, remained rather general with little added value in terms of new knowledge and were mostly limited to cite information already contained in previous reports and documents.

However, critical information on costs and effects of adaptation measures both in monetary as well as in water balance terms is still contained in the project documentation and the data collected by INIDA as part of their memorandum of understanding with the project. Moreover, the study on vulnerabilities of infrastructure conducted by the Civil Engineering Laboratory (LEC) has indeed generated important new knowledge that can be used in future infrastructure planning.

While the installment of any additional number of automatic meteorological stations is critical to recover and expand the capacity to produce meteorological data, four additional meteorological stations would not constitute an early warning system on their own, as claimed in the project formulation and indeed acknowledged by the project team in several project implementation reports that insisted in the need of changing the formulation of the output. However, the new four stations are now in service, together with other stations that may be installed in the short-term future, will have strengthened the national capacities to produce accurate meteorological bulletins and add up data for better and more accurate downscaling of model results.

Recommendation

Specific data on costs and water balance effects of the project interventions, as well as future projections based on climate change models, such as future water deficits contained in the project documentation and/ or collected by INIDA must be disseminated to provide the basis for an effective integration of climate risks into the policy framework. Special attention must be given to the risk classification for infrastructure developed by LEC. This information could be packaged and addressed to the specific target audiences within key institutions, particularly the National Planning Directorate, Directorate of Agriculture of the Ministry of Rural Development, as well as the Ministry of Finance and Planning and others as deemed appropriate.

Lesson learned

The high level project steering committee and a technical or mid-level advisory committee play a crucial role in providing political leverage and hence access to other national institutions by the project implementation team. Failure to act on this role and responsibility will lead to lost opportunities and failed investments.

The effectiveness of mainstreaming of climate change into development policies, strategies and plans would depend to a high degree in the quantification of impacts of climate change and evaluation of costs of adaptation within the necessary limits of uncertainty. Care must be put in the quality of knowledge products to ensure that they indeed add value to the current knowledge and to select how this information is communicated to guarantee capturing the attention of key decision-makers.

Outcome 2 Small and medium scale climate change adaptation practices for water resource management are demonstrated and implemented in selected hydrographical basins

The project has made investments that have had important local impacts for individual farmers and associations, as well as entire communities. These benefits include the facilitation at no cost for the least affluent or with some counterpart from the famer or farmer's association of drip irrigation systems and screen houses, as well as the restoration, improvement or enhancement of watershed infrastructure and pumping facilities and conveyance systems for both irrigation and drinking water supply purposes.

However, the limited funding available for this outcome, which amounted only to ca 1.7 million USD for five watersheds, resulted in interventions scattered throughout the selected basins and therefore dissipating the watershed approach of downstream benefits intended at the project design. For comparison purposes, the Millennium Challenge Corporation Compact I project *Watershed Resources Management Project* invested ca. 5.4 million USD in just one watershed (Paul in Santo Antão), resulting in expansion drip irrigation by 50 hectares, and construction of watershed infrastructure and reservoirs, agribusiness and value chain development activities, as well as quantification of erosion and water balance effects.

The locality of the project interventions was defined by consensus among stakeholders and by establishing synergies and cooperation with undertakings supported by other organizations, such as municipal councils, the GEF's Small Grant Program (SGP), PIMS 4176 *Consolidation of Cape*

Verde's Protected Areas System or the Small Grant Program, as well as accomplishing the targets fixed at the project document rather than selecting locations systematically with a watershed approach.

The project systematized the selection of beneficiaries with the development of transparent criteria in the last year of implementation. The selection was previously based on availability and interest on the part of the farmer and unsystematic assessments conducted by the local delegation of the Ministry for Rural Development with the support of the local coordination committees. This has led to a great variety of beneficiaries that range from relatively affluent farmers, with greater capacities in terms of knowledge and resources that have used project resources to enhance and expand their agricultural exploitations, to farmer's associations that have started cultivation with project support on communal or state land that has significant limitations and reduced crop options.

The project would yet need to produce and publish all the results specified in the memorandum of understanding with the National Institute for Agrarian Research and a system would need to be in place to monitor the results of the investment in terms of agricultural production, costs and hydrological effects of the interventions. This systematization and quantification would allow a better agricultural planning as projected future water deficits.

The value added of this project lies in the quantification of adaptation benefits in terms of water balance and identification of costs of adaptation measures to allow for effective integration of climate change risks into development plans and strategies. Failing to do that would reduce this project to a limited investment in comparison with public expenditure in watershed management or even other official development assistance funded projects.

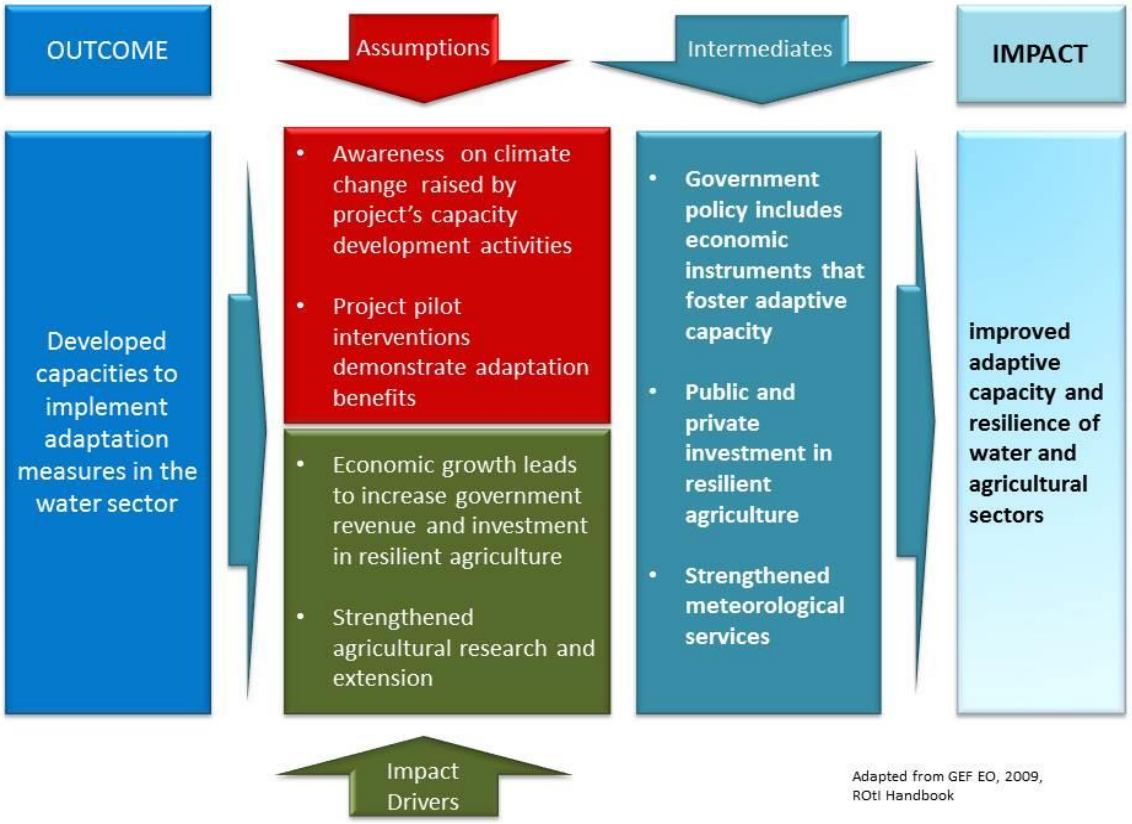
The project actively promoted inclusion of women as beneficiaries of investments and capacity development activities and kept record of the gender of the participants in the activities.

The actual implementation of the activities of outcome three was directed to obtain more visibility for the project and to raise awareness on climate change issues among the general public. As such, outcome three lost its original place in the project strategy and functioned rather as an output of outcome one.

Impact

In terms of impact, the project has reached the first steps of an hypothetical intermediate state (figure 12), defined using the theory of change approach, if the assumptions that awareness on climate change has been raised across different segments of society and that the adaptation benefits of interventions piloted by this project would prove to outpace the negative impacts of climate change on water resources, as well as the costs involved in their installation and maintenance.

Figure 12 *PIMS 4091 theory of change*



Recommendations

Planning, implementing, concluding, monitoring and producing technical documentation of field activities is a complex matter that needs an adequate timeframe and investment of resources. Therefore, results of such activities should not be expected to yield immediate results that can be used to feedback the policy and regulatory framework. Efforts should be directed to have a design that allows the extraction of firm conclusions and lessons learned by having a research approach that allows the comparison of "treatment" localities with "control" localities, as well as accounting for other variables involved, i.e. to have a scientific approach to the design of field activities[28].

As a corollary, the project strategy must specifically define the targets of the intervention and the results they can yield, e.g. should the intervention focus on poor farmers (defined based on locally tested criteria) to secure sufficient agricultural production for subsistence or should the intervention rather support more affluent farmers to foster resilient commercial agriculture and employment or both groups to establish which intervention would be the most cost-efficient?

[28] See Ferraro, 2011, Experimental Project Design in GEF

If a project intends to take gender roles into consideration, this cannot be limited to tally the number of female participants to workshops and trainings or the number of female beneficiaries. A gender strategy involves proper analysis of gender roles and inequities and work with communities to transform these inequalities.

Efficiency

The project suffered significant delays at the beginning of its implementation timeframe. This delays were due to the electoral process in Cabo Verde that culminated in the February 2011 elections and consequent ministerial reorganization after the new government took office. Other factor that determined the late start of the project was the lengthy recruitment process of the two key figures of the project implementation unit, the national project coordinator and the chief technical advisor.

After the project inception workshop in April 2011, implementation ran generally smoothly and at good pace till 2014, suffering only a major setback with the resignation, for personal motives, of the national project coordinator in 2012. Although project implementation continued during the ca. one year that the position was vacated, this kept a slower rhythm till the new coordinator took office in June 2013.

There were high expectations on the figure of the chief technical advisor who was expected to provide guidance to two projects, this one PIMS 4091 *Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde* and PIMS 4176 *Consolidation of Cape Verde's Protected Areas System*. The different issues addressed by the two projects compounded by limitations in technical and communication capacities motivated the discontinuation of the position.

Project expenditure corresponded to the planned budget with minor divergences. Also, the project management costs were kept close to the 10% benchmark for project costs foreseen in the project document budget. Most expenditures were accounted under the budget account contractual services, companies that reflect the investment made on watershed infrastructure and water efficiency measures, as was foreseen in the project document.

Most of the parallel funding identified in the project document has been accounted for; in fact, 41% more than the parallel funding identified in the project document has been accounted for.

Disbursement and administration of the project did not suffer any significant setbacks besides some delays in procurement process due to either misunderstandings on particular administration requirements between the implementation units, the executing agency and the supervision of the implementing agency or to lengthy timeframes inherent to some procurement processes.

Sustainability

The financial sustainability of the farm investments in water efficiency measures would depend on sustained economic profits surpassing the costs of operation and also the costs involved in less

efficient/ productive cultivation methods, such as rain fed agriculture and/ or flood irrigation. Profits would depend on market dynamics and market access issues, factors that are largely beyond the scope of the project and the farmers themselves.

However, public policy interventions can create an enabling environment by implementing policy instruments that provide incentives to water-efficient agriculture. Policy instruments could include subsidies or differentiated water tariffs according to water efficiency or regulatory measures that deter or prohibit the use of techniques deemed resource wasteful or damaging natural resources. In addition, facilitation of credit and risk transfer services to farmers would greatly facilitate investments in sustainable water-efficient agriculture, if other policy incentives were in place.

Since public commitment in terms of strategies and investment to improved and more productive agriculture through enhanced mobilization of water resources is guaranteed in the midterm, public policy would also be crucial to limit the expansion of agriculture and settlement within the carrying capacity of the ecosystem, taking impacts of climate change into account. Failing to do this could incur the risk of maladaptation.

Annexes

Annex I evaluation matrix

Annex II List of interviews

Annex III List of literature consulted

Annex IV scores