ADAPTATION FUND

PROJECT PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT INFORMATION

Project Category:	Regular
Country:	South Africa
Title of Project:	Building Resilience in the Greater uMngeni Catchment
Type of Implementing Entity:	National
Implementing Entity:	South African National Biodiversity Institute
Executing Entity:	uMgungundlovu District Municipality
Amount of Financing Requested:	USD 7,495,055

Short Summary

Climate projections indicate that the uMgungundlovu District Municipality (UMDM), in KwaZulu-Natal, South Africa, will experience a warmer future with uncertain changes in mean annual rainfall, but with an increased number of flash flood and storm events due to an increase in short duration rainfall. With floods, severe storms and wildland fires already being among the main hazards currently faced by communities in the UMDM, the projections are of concern as they indicate an increased risk of these climate-driven events, and do not exclude the potential for an increase in drought events.

The projections are of particular concern for the areas and populations in the UMDM as many are already vulnerable to these hazards due to various non-climate related reasons, including: i) low-cost and informal housing located close to river watercourses or on flood plains within catchments; ii) housing of poor standard located on steep hillsides; iii) under-resourced fire stations; iv) high-density informal and formal settlements; v) poor land use management and over-exploitation of natural resources, including grasslands; and vi) small scale farmers using crops and methods that are not resilient to the impacts of climate change. The predicted increase in frequency and intensity of climate-driven events will significantly increase the vulnerability of affected communities within the UMDM, where adaptive capacity is low. This is *inter alia* related to low levels of income and education, a significant young (under 19) and old (over 70) population, and a general lack of awareness with regard to impacts of climate change.

The overall objective of the uMngeni Resilience project is to reduce the vulnerability of these communities and small scale farmers in the UMDM to the impacts of climate change. This is to be achieved by increasing climate resilience and adaptive capacity by combining traditional and scientific knowledge in an integrated approach to adaptation. This will be enabled through implementing a suite of complementary gender-sensitive project interventions, focussing on: i) early warning and ward-based disaster response systems; ii) ecological and engineering infrastructure solutions specifically focused on vulnerable communities, including women; iii) integrating the use of climate-resilient crops and climate-smart techniques into new and existing farming systems; and iv) disseminating adaptation lessons learned and policy recommendations, to facilitate scaling up and replication. A number of sites were identified by the UMDM as demonstration sites for the project. Four sites were selected, based on the results of a vulnerability assessment, stakeholder consultations, and subsequent short-listing and ground-truthing through site visits. The sites are: i) low-lying high-density settlements; ii) the rural area of Ward 8 of Vulindlela, Msunduzi Local Municipality; iii) the rural farming area of Ward 8 of Swayimane, uMshwathi Local Municipality; and iv) the rural area of Ward 5 of Nhlazuka, Richmond Local Municipality.

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Acronyms

AF	Adaptation Fund
AFIS	Advanced Fire Information System
AGCM	Atmospheric General Circulation Model
AMESD	African Monitoring of the Environment and Sustainable Development
ARC	Agricultural Research Council
BESG	Built Environment Support Group
CBFiM	Effective Community-Based Fire Management
CBO	Community-Based Organisations
CoGTA	Cooperative Governance and Traditional Affairs
DAEA	Department of Agriculture and Environmental Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DUCT	Duzi uMgeni Conservation Trust
EBA	Ecosystem Based Adaptation
EE	Executing Entity
EIA	Environmental Impact Assessment
EIPP	Ecological Infrastructure Partnership Programme
ELLA	Evidence and Lessons Learned from Latin America
EMF	Environmental Monitoring Framework
EPS	Ensemble Prediction System
EPWP	Expanded Public Works Programme
ESP	Environment and Social Policy
EWS	Early Warning System
FAO	Food and Agriculture Organisation
FPA	Fire Protection Association
GCM	Clobal Circulation Model
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit
GSAP	Gender and Social Action Plan
HCD	Human Capacity Development
IDP	Integrated Development Plan
ISOE	Intersectoral Centre of Occupational Excellence
KPA	Key Performance Area
KZNCCCSD	KwaZulu-Natal Council for Climate Change and Sustainable Development
LGSETA	Local Government Sector Education & Training Authority
LTAS	Long-Term Adaptation Flagship Research Programme
M&E	Monitoring and Evaluation
miniSASS	Stream Assessment Scoring System
MLM	Msunduzi Local Municipality
MM	Municipal Manager
MOU	Memorandums of Understanding
MOS	Model Output Statistics
NDHS	National Department of Human Settlements
NDP	National Development Plan
NGO	Non-Governmental Organisation
NIE	National Implementing Entity
NLDTF	National Lottery Distribution Trust Fund
NPC	National Planning Commission
NQF	National Quality Framework
NRM	Natural Resource Management
NTFP	Non-Timber Forest Product
NUSP	National Upgrade Support Programme
PCC	Project Coordinating Committee
PMU	Project Management Unit
RCE	the Regional Centres of Expertise
RLM	Richmond Local Municipality
SADC	South African Development Community
SAEES	School of Agriculture, Earth and Environment Sciences
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SAQA	South African Qualifications Authority
SASRI	South African Sugarcane Research Institute
SAWS	South African Weather Service
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SLA	Service Level Agreements
SMS	Short Message Service
SPLUMA	Spatial Planning and Land Use Management Act
UKZN	University of KwaZulu-Natal
UMDM	uMgungundlovu District Municipality
UMLM	uMshwathi Local Municipality
UNDP	United Nations Development Programme
UW	Umgeni Water
WESSA	Wildlife and Environment Society of South Africa
WoF	Working on Fire
WRM-DSS	Water Resource Management Decision Support Services
WWF	Worldwide Fund for Nature
ZAR	South African Rands

Project Background and Context:

South Africa's Second National Communication (SNC)[1] states that signs of warming and increased frequency of rainfall extremes are evident in the country. Statistically significant temperature trends have been detected at a large proportion of stations in South Africa, with maximum temperature extremes increasing more rapidly than minimum extremes. While there are no consistent trends in terms of annual rainfall, daily rainfall intensity and dry spell duration have shown a statistically significant increase across the Southern African region[1]. The increase in rainfall intensity has resulted in an increased frequency of flooding events[2]. In the eastern parts of South Africa a rising trend in the intensity and frequency of convective storms has been reported[2]. Increasing temperatures are also associated with greater risk of damaging wildland fires. The increase of extreme events and associated disasters pose a threat to many South African communities, particularly poorer communities with low adaptive capacity that live in informal settlements established in exposed and poorly planned locations. In the past decade extreme climatic events have severely affected such vulnerable communities, causing loss of life, damage to infrastructure and loss of assets.

The observed changes in extreme climate events, and the associated disasters, are projected to continue in the twenty-first century. According to the SNC, temperatures are projected to increase across South Africa, and the eastern parts of the country are projected to experience enhanced precipitation and more intense rainfall events. Numerous climate change studies[3] have indicated that the KwaZulu-Natal Midlands area, within which the uMgungundlovu District Municipality (UMDM) is located (see Figure 1), is an area of high climate change risk and is one of three climate change hotspots in South Africa. This is because of the warming already observed and the projected changes in climate and the associated impacts on people, ecosystems and economies[4].

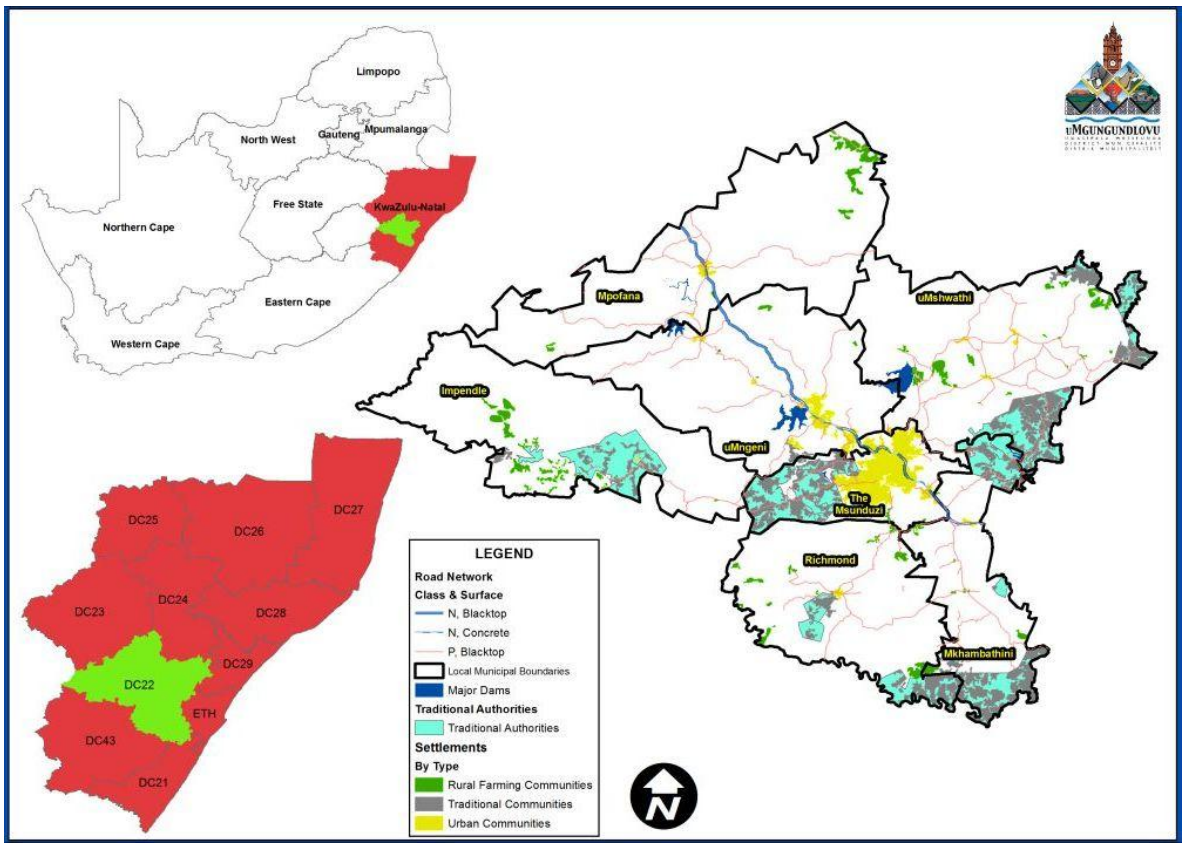


Figure 1: UMDM locality map, showing its location within South Africa and KwaZulu-Natal Province.

[1] DEA. 2011. South Africa's Second National Communication under the United Nations Framework Convention on Climate Change. Department of Environmental Affairs, Republic of South Africa, Pretoria.
[2] DEA (Department of Environmental Affairs). 2013. Long-Term Adaptation Flagship Research Programme (LTAS) for South Africa. Climate Trends and Scenarios for South Africa. Pretoria, South Africa.
[3] Including: Hewitson, B., Tadross, M, and Kack, C. 2005. 'Scenarios developed with empirical and regional climate model-based downscaling', in Schulze, R. (ed) Climate Change and Water Resources in Southern Africa, WRC Report, 1430/1/05.
[4] Stuart-Hill, S. and Schulze, R.E. 2010. Does South Africa's Water Law and Policy Allow for Climate Change Adaptation? *Climate and Development* 2, 2, 128-144.

Based on statistical downscaling of four Global Climate Models (GCMs), the UMDM Status Quo Assessment on Climate Trends and Projections[5] found that projections indicate an increase of 1.75 to 2.5°C in mean annual temperatures across the UMDM by the middle of this century (see Figure 2). The report further found projected increases in maximum and minimum temperatures across the District.

The UMDM Status Quo report found that rainfall projections indicate an increase in mean annual rainfall and daily maximum rainfall, as well as an increase in extreme events for most of the District. Figure 3 illustrates how short duration extreme rainfall, associated with storms and flash flooding, is projected to increase to varying degrees across the UMDM. Rainfall projections using global models remain uncertain for this region, with mechanistically downscaled projections indicating the potential for long-term drying trends[6]. However, these drying projections do not exclude the potential for increased frequency of high rainfall and flooding events.

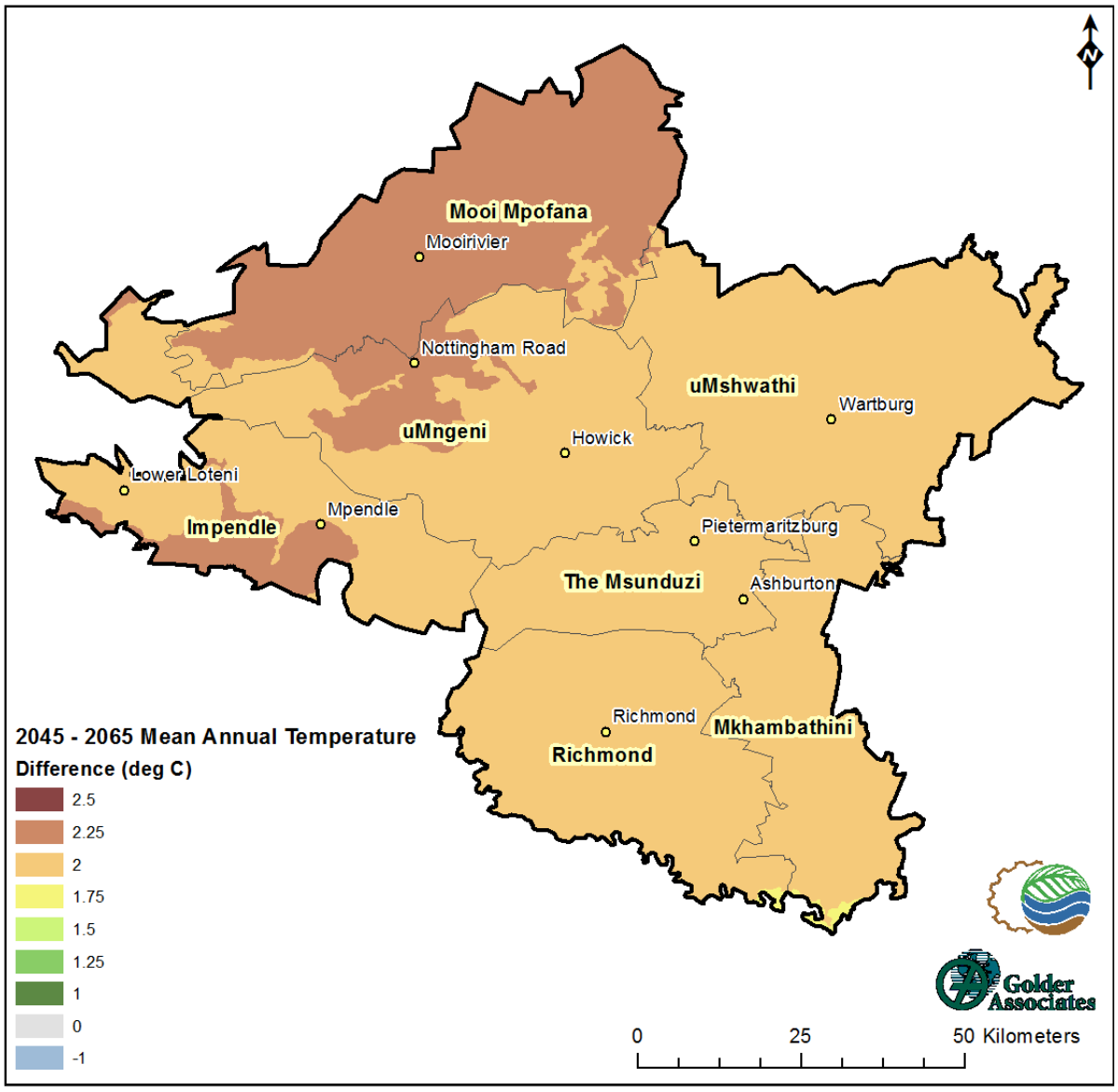


Figure 2: Projected changes in mean annual temperature into the intermediate future (using statistical downscaling of multiple GCMs) (Source: Golder Associates).

[5] Golder Associates. 2011. Status Quo Assessment: Climate Change Trends and Projection. uMgungundlovu Climate Change Response Strategy and Plan. Report Number: 1161595710991-3.
[6] Archer, E., *et al* (2010). "South African risk and vulnerability atlas". Department of Science and Technology. Available online at http://www.sarva.org.za/download/sarva_atlas.pdf.

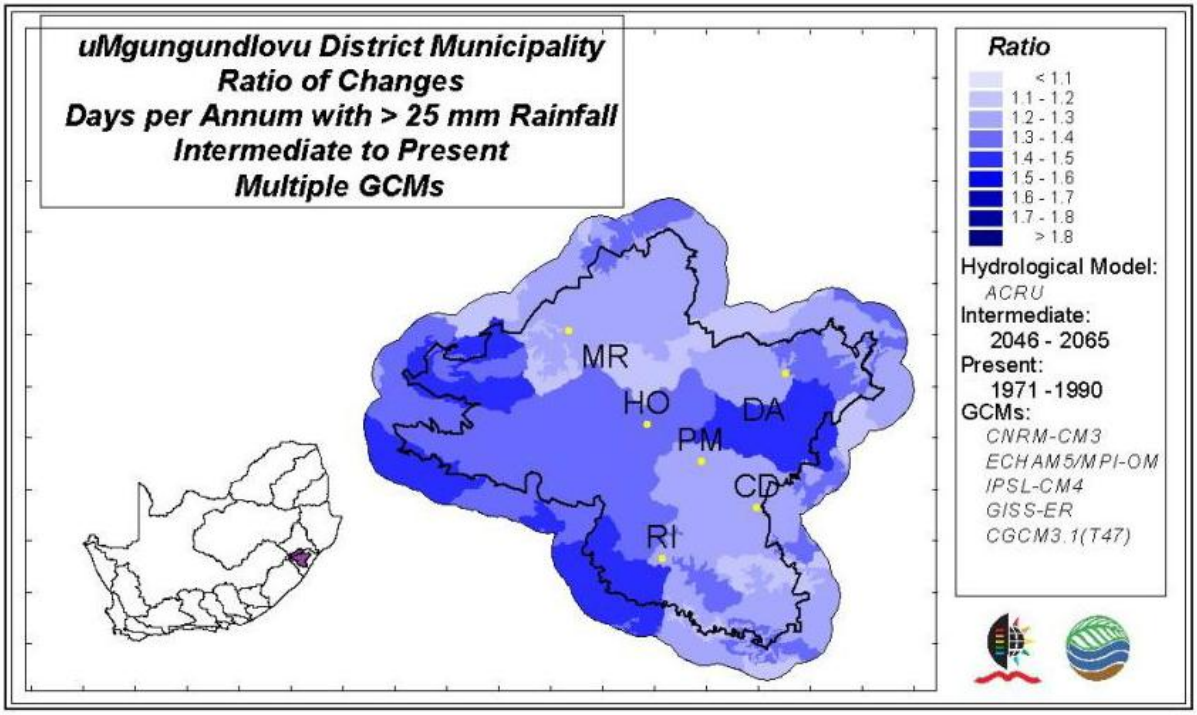


Figure 3: Projected change in the number of days exceeding 25 mm – as a proxy for short duration rainfall - into the intermediate future (using multiple statistical downscaling of GCMs).

Both the larger scale GCM projections and the downscaled projections thus indicate that the UMDM may experience a warmer future with uncertain changes in mean annual rainfall, but with an increased frequency and intensity of severe storms and flash flooding, due to an increase in short duration rainfall. Lightning strikes, also associated with the increase in frequency and intensity of severe storms, are predicted to increase as a result of climate change. With severe storms, floods and wildland fires already being among the main hazards currently faced by communities in the UMDM, the projections are of concern as they indicate an increased risk of these climate-induced hazards, and they do not exclude the potential for drought events.

The projections are of particular concern for the areas and populations in the UMDM that are already vulnerable to these hazards due to various reasons including: i) low-cost and informal housing located close to river watercourses or on flood plains within catchments; ii) housing of poor standard located on steep hillsides; iii) under-resourced fire stations; iv) areas with a shortage of fire hydrants or water filling points; v) high-density informal and formal settlements; vi) poor land use management and over-exploitation of natural resources, including grasslands; vii) traditional houses with thatched roofs[7]; and viii) small scale farmers using crops and methods that are not resilient to the impacts of climate change

The projections are also a concern for agriculture in the UMDM. Heat stress, flooding, fire and lightning, wind and hail associated with severe storms have been identified as some of the key natural threats already facing the agricultural sector[7]. While commercial (large scale) farmers are considered to have the capacity to some extent to adapt to climatic changes, there is concern for small scale and subsistence farmers, who tend to lack access to information and the resources necessary to adapt.

The uMngeni Resilience project (hereafter referred to as 'the project') seeks to reduce the vulnerability of rural communities and small scale and emerging farmers in the UMDM in the province of KwaZulu-Natal, South Africa to anthropogenic climate change, focusing on prevention of flooding, management of wildland fire and ensuring water security by combining traditional and scientific knowledge in an integrated approach to adaptation.

[7] Golder Associates. 2013. Impact and Vulnerability Assessment. uMgungundlovu Climate Change Response Strategy and Plan. Report Number: 1161595710984-4.

Environmental and Socio-economic Context

South Africa is a country of huge disparities of wealth: while a small minority is wealthy and enjoys relatively easy access to the country's natural resources, the majority of South Africa's rural population lives in poverty with no or limited access to natural resources and agricultural land. However, although access is limited, rural populations are largely dependent on natural resources to sustain their livelihoods. The productivity of these natural resources is threatened by both climate and non-climate driven factors, increasing the vulnerability of rural communities. As a result of a combination of a slow land reform process and limited access to alternative livelihood options, the majority of the population in the province of KwaZulu-Natal lives in rural or peri-urban areas, often in informal settlements (see below for further details on project sites).

The project will be implemented at selected sites in the UMDM (area: 9,513km²), one of the 11 district municipalities of KwaZulu-Natal Province (see Figure 1). The UMDM is located in the KwaZulu-Natal Midlands and comprises seven local municipalities. The main city is Pietermaritzburg, the legislative capital of KwaZulu-Natal. The UMDM is both a Water Services Authority and a water service provider.

Land in the UMDM is either owned privately, by the state, or is communally owned. Land that is not privately owned is either administered by the Local Authorities or, in the case of the communal areas, by the Ingonyama Trust Board. This Board is an entity responsible for the administration of Ingonyama Trust land, which comprises approximately 8% of the land in the UMDM.

Almost 40% of the UMDM's land cover is agricultural, with timber and sugar cane being the dominant crops. The UMDM is an important industrial, timber, dairy and agricultural hub, and has a modern road and rail infrastructure with easy access to airports and the port of Durban.

The UMDM includes most of the greater uMngeni River catchment[8], which is considered to be one of the most important water catchments in South Africa. It provides potable water to almost half the population of the KwaZulu-Natal (more than 5 million people) within the greater Durban-Pietermaritzburg area, the second largest economic region in the country.

The UMDM has a population of approximately one million people, the majority of whom speak Zulu as their home language. With the highest prevalence of HIV/ AIDS in the country (42%) and a pattern of migratory work outside the District, there is a very high proportion of female-headed households in the UMDM: 46% (125,061) of households (both urban and rural) in the District are headed by women. The predicted increase in frequency and intensity of climate-driven events will significantly increase the vulnerability of affected communities within the UMDM, where adaptive capacity is low. This is *inter alia* related to low levels of income and education, a significant young (under 19) and old (over 70) population, and a general lack of awareness with regard to impacts of climate change.

The patterns of settlement and economic activity in the UMDM reflect the legacy of segregation and inequality inherited from the past. This inequality persists in social, economic and spatial terms. According to the World Bank[9], "South Africa remains a dual economy with one of the highest inequality rates in the world, perpetuating inequality and exclusion. Spatially, an advanced, modern urban economy coexists in sharp contrast with the socioeconomic poverty of disadvantaged townships, informal settlements and rural areas".

Within the UMDM there are centres of wealth and privilege, and extensive areas of poverty and climate vulnerability. Most settlements occur along the N3, the national highway that links the two largest economic regions in South Africa viz. the Johannesburg and Durban city regions. More than 50% of the UMDM's population lives along this corridor, in the city of Pietermaritzburg and the towns of Howick, Camperdown and Mooi River.

As one moves away from the N3 corridor, informal settlements predominate, tending to sprawl over undulating, often steep terrain and in floodplains. Rivers flow through these settlements, most of which have highly inadequate stormwater drainage systems. These areas are particularly vulnerable to extreme weather events such as flooding and strong winds, and are also exposed to wildland fire

[8] The greater uMngeni River catchment includes the catchments of the uMngeni River, the Msunduzi River and their tributaries.
[9] World Bank. 2013. Country Partnership Strategy for the Republic of South Africa for the Period FY2014-2017. Report No. 77006-ZA.

risks. With actual and projected increases in the prevalence of extreme events and flooding as well as increased wind speeds, the informal and traditional housing sector is of particular concern.

There are more than 21,500 informal dwellings and more than 58,000 traditional dwellings in the UMDM[10]. Residents have limited access to social, economic and municipal basic services. For example, 16% of the population within the UMDM has no access to municipal drinking water and a further 19% rely on communal water pumps. Residents have limited access to employment and to land for farming. Census 2011 estimated that the UMDM had an average unemployment rate of 30%. Unemployment is highest in the more remote local municipalities. For instance, the very rural Impendle Municipality has an unemployment rate of 45%.

In the Vulnerability Assessment undertaken by the UMDM prior to formulating a climate change response strategy for the District, the key priorities identified were environmental health (i.e. the capacity of natural systems to provide climate-resilient service including flood attenuation and water filtration), maintaining agricultural production and minimizing the disruption of services to vulnerable communities and damage to infrastructure resulting from climate variability and change.

The areas of the UMDM most vulnerable to climate variability and change are thus characterised by extremely high levels of unemployment and poverty, a significant proportion of female-headed households, large informal settlements prone to flooding, wildland fire and other climate-driven risks, degraded ecosystems, marginal small scale subsistence farming and often inappropriate farming practices, and an overall lack of resources and capacity by vulnerable groups to undertake successful strategies to adapt to climate variability and change.

The project will focus on building the climate resilience of these vulnerable communities in informal/formal settlements and traditional houses, as well as on small scale subsistence and emerging farmers. Vulnerable groups in these communities, including women, youth, the aged and unemployed will receive particular attention.

Site Selection and Description

Process for site selection including list of potential sites and criteria for evaluation:

The selection of demonstration sites for the implementation of adaptation interventions was a stakeholder driven, participatory process, led by the UMDM. This process was initiated by a project-specific vulnerability study undertaken by independent consultants, with assistance from the University of KwaZulu-Natal (UKZN) and the Duzi uMngeni Conservation Trust (DUCT). See Annex I for the vulnerability study (Preliminary Prioritisation of Vulnerable Communities for Climate Change Adaptation in the uMgungundlovu District Municipality). This vulnerability assessment was commissioned following the development of the Project Concept, but prior to the detailed project design process. Drawing on the stakeholder consultations undertaken in preparation of the UMDM Strategic Environmental Assessment (SEA) and Strategic Environmental Management Plan (SEMP) as well as the UMDM Climate Change Response Strategy and Plan, the study identified the quaternary catchments with communities most likely to be affected by the predicted impacts of climate variability and change. The approach to prioritising quaternary catchments and associated vulnerable communities is outlined below, and further detailed in Annex I.

- Step 1: Selection of vulnerability-defining characteristics.
  The vulnerability-defining characteristics were selected to align with the anticipated outcomes of the uMngeni Resilience project, as follows:
  - transformed areas vulnerable to increased run-off due to hardened surfaces and lack of basal cover;
  - degraded catchments that can be rehabilitated, with the potential for downstream benefits;
  - mean annual rainfall taking cognisance of rainfall variability across the UMDM;
  - quaternary catchments draining high rainfall areas;
  - communities reliant on boreholes, springs, dams, water tanks, rainfall and rivers for water supply;
  - communities engaged in subsistence agricultural activities;
  - areas known to have a high frequency of flooding and storm events; and

[10] Statistics South Africa. 2012. Available at: http://www.statssa.gov.za/publications/SAStatistics/SAStatistics2012.pdf.

- areas projected to receive increased short duration rainfall, associated with flash flooding.

- Step 2: Geographic Information System (GIS) screening and identification of key quaternary catchments.
  Features representing the vulnerability-defining characteristics were mapped using ArcGIS in order to determine the extent to which communities within the UMDM met the set characteristics, and to facilitate the prioritisation process. Quaternary catchments were used as planning units in which the target communities would be identified.
- Step 3: Selection of target communities.
  Once key quaternary catchments were identified, communities within these catchments were prioritised based on a focused situational analysis which included consultation with stakeholders currently undertaking community-based projects in the UMDM, and site visits for ground-truthing purposes.

Based on the above approach, the following quaternary catchments with communities most vulnerable to the predicted impacts of climate variability and change were prioritised:

- Quaternary catchments U20H and U20J that encompass the catchment of the Msunduzi River, that drains into the uMngeni River, and include many low-lying high-density settlements, as well as the rural areas of Vulindlela;
- Quaternary catchment U70C, that encompasses the steep slopes of the Umkomazi River catchment, and includes the rural areas of Nhlazuka;
- Quaternary catchments U10A, U10B, U10D and U10E in the Impendle area in the upper reaches of the Nzina and Lotheni Rivers, including areas outside of the UMDM's jurisdiction; and
- Quaternary catchment U20K that encompasses the subsistence farming areas on the lower portions of the Msunduzi and uMngeni Rivers, and includes the rural areas of Swayimane.

Using the results of the vulnerability assessment and inputs provided by stakeholders through engagements culminating in a workshop led by the UMDM (see Section II.H and Annex II.3), a short-list of potential sites was generated for further investigation, including site visits. Sites selected for further investigation included those identified in the vulnerability assessment, as well as additional sites in all seven local municipalities i.e. Msunduzi, uMshwathi, Richmond, Impendle, uMngeni, Mpofana and Mkhambathini (see Section II.H and Annex II.5). Associated with the short-list of sites, a set of criteria for site selection was developed, and further refined through a series of technical workshops (see Section II.H and Annexes II.6-8). The set of criteria included the following:

- degree of vulnerability of communities to negative effects of climate variability and change, particularly vulnerability to flood, wildland fire and drought risks;
- potential for interventions to make a concrete, tangible difference in terms of reducing vulnerability to climate variability and change;
- number of community members affected i.e. potential number of beneficiaries. For example:
  - agriculture on marginal land, which affects the majority of subsistence farmers in the region;
  - residential settlement on steep slopes, which affects the many settlements in the region; and
  - land governed by traditional authorities, which includes 60% of the area of the UMDM.
- attitude of beneficiaries/nature of receiving environment, including willingness of:
  - community members and authorities to participate in project interventions;
  - community members and subsistence farmers to change their practices; and
  - community members to maintain privately owned infrastructure that may be provided through the project.
- history of successful development work in the area, and potential for scaling up and building on previous interventions;
- degree to which interventions at the site could be integrated with implementation at other sites, to increase the value of lessons learned;
- type of settlement, focusing on existing settlements as opposed to new, rapidly developing areas, and considering a variety of settlement types;
- potential to restore/conserve degraded environments and ecological infrastructure; and
- potential for replication at other, similar sites based on the lessons learned through the project, considering a range of ecological environments and settlement types.

Selected sites:

Based on the results of the vulnerability assessment, the subsequent short-listing and the ground-truthing through site visits, four sites were selected by the UMDM to act as demonstration sites for the

project. The sites are shown in Figure 4 and listed below. A brief site description is provided, as well as photographs and maps of each of the sites (see Annex III).

- **Low-lying high-density settlements** primarily because of: i) high population densities and the associated potential to benefit many people; ii) high degree of vulnerability of communities in low-lying areas to flooding rivers, including the Msunduzi, uMngeni and other rivers; iii) low income of residents, increasing vulnerability; and iv) the potential for replication in other informal/formal settlements across the UMDM, as well as other parts of KwaZulu-Natal and the country.
- **Ward 8 of Vulindlela**, MLM, primarily because of: i) the high level of poverty and associated vulnerability of rural communities to the predicted impacts of climate variability and change; and ii) the support of traditional authorities who welcomed the project interventions, particularly those related to rehabilitation of degraded grasslands and riparian areas in the ward.
- **Ward 8 of Swayimane**, uMshwathi Local Municipality (UMLM), primarily because of: i) the high level of vulnerability of small scale farmers to the predicted changes in rainfall for the area; and ii) the potential to scale up the positive results of the UKZN School of Agriculture, Earth and Environment Sciences (SAEES) pilot project currently benefitting a limited number of small scale farmers in the ward.
- **Ward 5 of Nhlazuka**, Richmond Local Municipality (RLM), primarily because of: i) the high level of poverty and associated vulnerability of rural communities to the predicted impacts of climate variability and change; ii) the support of traditional authorities who welcomed the project interventions, particularly those related to the built environment; and iii) the opportunity to implement interventions in an area dominated by degraded bushveld vegetation, in contrast to the grassland-dominated area of Vulindlela.

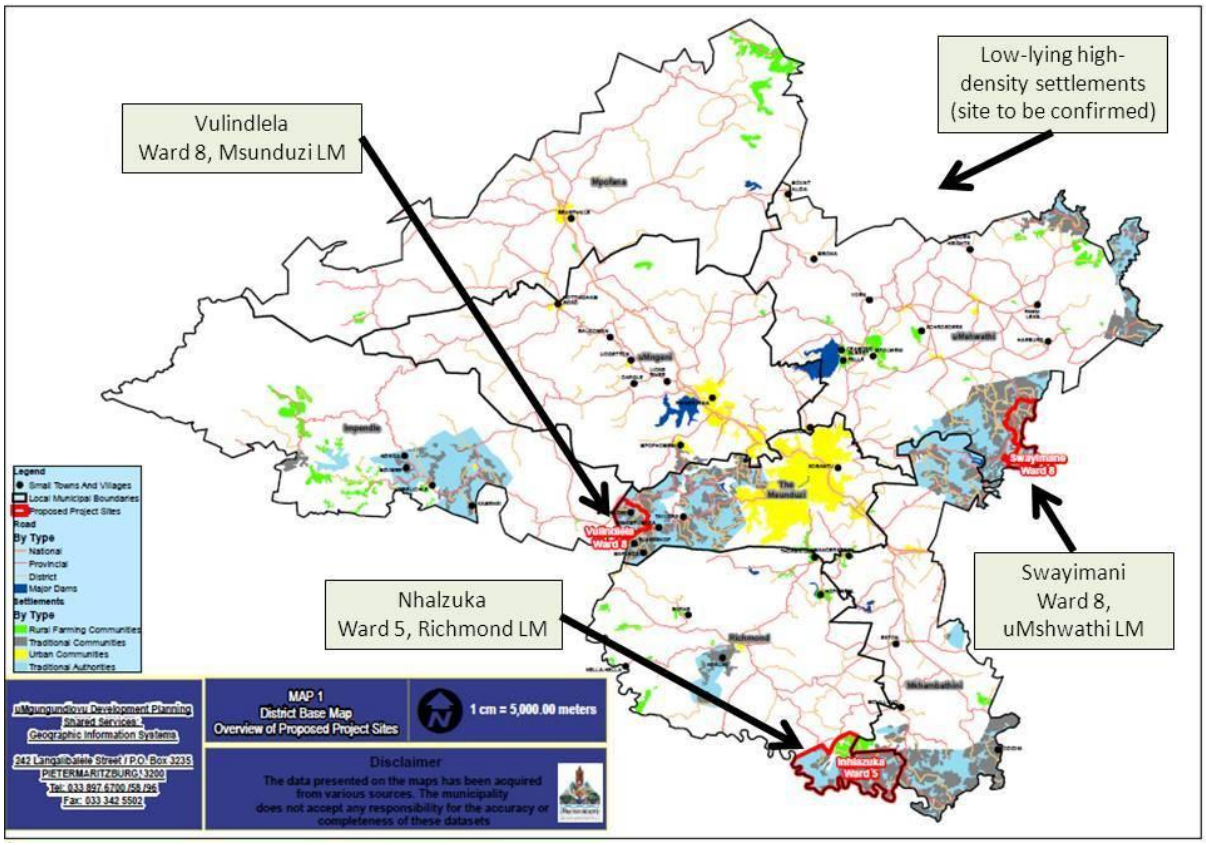


Figure 4: Demonstration sites for the uMngeni Resilience project.

Brief description of selected sites:

There are many informal and formal settlements in the UMDM that are located in **low-lying** areas and have **high population densities**. The majority are haphazard and unplanned in nature, with no defined roads, established stands or building lines that govern where the household structures may be built. These settlements are mostly located on steep hills (approximately 30% of the UMDM area consists of topography with a gradient steeper than 1 metre in 3 metres, i.e. 1:3) or within low-lying floodplains (see Figure 5). The most common building materials include brick, mud, wattle branches, corrugated iron and wooden pallets (see Figure 5). These pallets are cheap and easily accessible to residents because they are used and often discarded by factories. Settlements, particularly informal settlements, in the UMDM are typically densely populated, with up to 6 households on one stand, and up to 10 people per household. This inhibits services and infrastructure from being provided in the settlements because accessibility into the settlements, for the purpose of installing services, is limited for municipal vehicles. Settlements are general located in low-income areas, with limited access to jobs for inhabitants.

Principal climate change-related threats to such low-lying high-density settlements in the UMDM include an increase in frequency and intensity of rainfall events. Communities in low-lying settlements inappropriately located within river floodplains are at risk of losing assets and lives due to climate change-driven flooding from rivers. In addition, the lack of formal drainage systems means there is an increased likelihood of localised flooding and erosion within the informal and formal settlements, and downslope flooding and damage to households. Associated with this erosion and flooding is damage to informal and formal infrastructure, and degradation of natural environments, particularly water courses. In informal settlements this is exacerbated by the lack of formal toilet facilities. Settlements across the UMDM remain at risk as a result of the impacts of climate variability and change. In addition, climate change adaptation has not been, and is not likely to be taken into account during planning, designing and developing new or upgraded human settlements (such as developed or upgraded through the MLM Informal Settlement Upgrading Strategy and Programme).

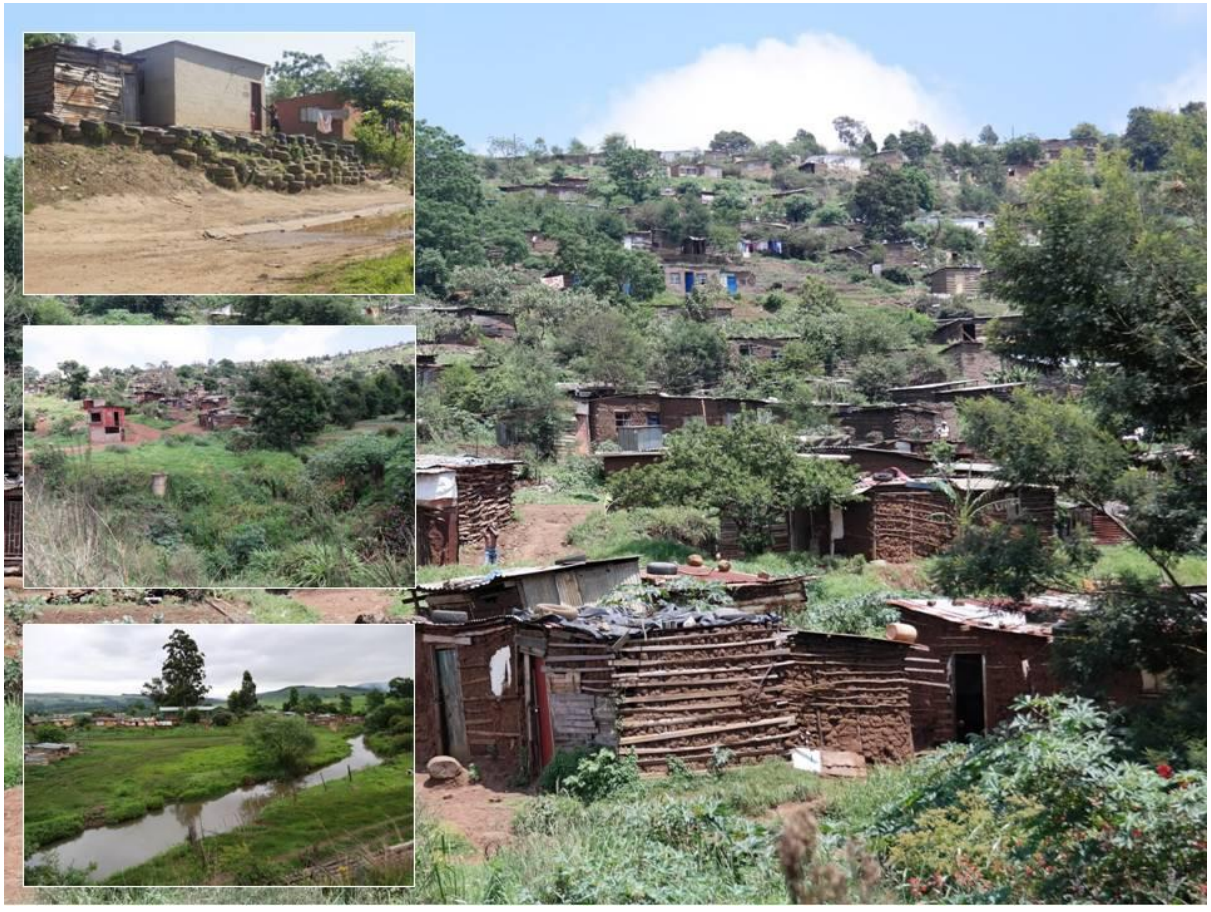


Figure 5: Typical examples of low-lying high-density settlements in the UMDM.

Ward 8 of Vulindlela covers an area of 23km^2. In 2011 the population was 15,290 (52% women), which equates to a density of 678 people/km^2. In 2011 there were 2,802 households in the ward, with an average of 5.5 people/household. All of the land in Ward 8 of Vulindlela is under communal land ownership. The majority (63%) of dwellings are traditional houses (round mud-based structures with thatched roofs – see Figure 6), while 30% of dwellings are brick-based houses. The majority (49%) of people are in the 20-59 year age group, while 44% of people are under the age of 19. The majority (70%) of people earn a "low" annual income i.e. < USD 3,638 per year.

The landscape consists of gently to steeply sloping degraded grasslands draining into tributaries of Msunduzi River (see Figure 6). The tributaries are incised and generally eroded. The grasslands are used as communal grazing for cattle. However, overgrazing and stands of alien trees limit the carrying capacity of the region. The predicted increase in frequency and intensity of rainfall events is likely to result in flash floods, as decreased vegetative cover reduces infiltration into grasslands and encourages downslope run-off. The low-level river crossings (i.e. places frequently used by residents to cross rivers that are vulnerable to flash flooding) in the ward present a safety risk to people crossing rivers during high rainfall and floods to reach places of employment, schools, clinics and other community facilities. Poor grassland management, including frequent burning to improve grazing for cattle, combined with the predicted higher temperatures and increased likelihood of lightning strikes present and increased risk of wildland fires and associated threats to assets and lives. Besides the reduction of grazing for cattle, the loss of vegetative cover in the grasslands and degradation of the riparian environment have resulted in many wetlands largely losing their functionality. Some of these wetlands are used to provide clay to build informal and traditional houses in the region. As the wetlands become degraded, the consequent reduction in the quality of clay results in homes being more vulnerable to the impacts of climate change-driven extreme storms and associated high winds and rainfall. Whilst fruit orchard planting projects have been successfully implemented in the ward, there is a general lack of use of improved, climate-resilient crop varieties for farming practices. This presents a food security and nutritional sustenance risk to community members within the ward. Whilst some agricultural and other built environment initiatives have been successfully implemented, such as the use of tyres to stabilise embankments, institutional and community level capacity is generally low.



Figure 6: Examples of grasslands and settlement patterns in Ward 8 of Vulindlela.

Ward 8 of Swayimane covers an area of 32km^2. In 2011 the population was 6,857 (53% women), which equates to a density of 213 people/km^2. In 2011 there were 1,356 households in the ward, with an average of 5.1 people/household. All of the land in Ward 8 of Swayimane is under communal land ownership. The majority (54%) of dwellings are traditional houses (round mud-based structures with thatched roofs), while 44% of dwellings are brick-based houses. The majority (49%) of people are under the age of 19, while 41% of people are in the 20-59 year age group. The majority (84%) of people earn a "low" annual income i.e. < USD 3,638 per year.

Livelihoods in the area are largely derived from subsistence farming (see Figure 7). The farming system includes cropping and animal husbandry on gently sloping ground. Crops dominate the agrarian system while animals are mainly used for land preparation, with low levels of milk production from cattle. Farmers grow maize, beans, amadumbe (taro), sweet potato and sugarcane. The area is characterised by good rainfall (500 to 800 mm/annum), predominant fog and deep soils. However, there are potential challenges with respect to the quality of the soils. The current short-term droughts and shortages of key mineral elements have a significant impact on crop performance to the extent of causing total crop loss any time from emergence to reproductive stage of plant development. The predicted increase in intensity and frequency of such dry spells, as well as intense rainfall periods which will likely result in brief periods of flooding, threaten food security and long-term livelihoods for the community. Climate change has resulted in seasonal shifts, which farmers have not yet responded to. Whilst there is a perception that crops can be grown all year round, UKZN SAEES crop trial results indicate that the risk of current crop failure during the winter period is now very high. This threat to farmers also represents a threat to the food security of surrounding communities, as surplus agricultural produce is sold at local markets, benefiting many people in the ward. Institutional and community level capacity is low. This is apparent in that while there are isolated uses of best practices, including the use of climate-smart agricultural techniques to conserve topsoil, these practices are not known, at times, to adjacent farmers, indicating there is no mechanism to share knowledge locally.



Figure 7: Examples of subsistence farming and UKZN SAEES crop trials in Ward 8 of Swayimane.

Ward 5 of Nhlazuka covers an area of 103km^2. In 2011 the population was 8,867 (55% women), which equates to a density of 86 people/km^2. In 2011 there were 1,775 households in the ward, with an average of 5.0 people/household. All of the land in Ward 5 of Nhlazuka is under communal land ownership. The majority (89%) of dwellings are traditional houses. The majority (52%) of people are under the age of 19, while 39% of people are in the 20-59 year age group. The majority (86%) of people earn a "low" annual income i.e. < USD 3,638 per year.

The landscape consists of hill tops and steeply sided valleys draining into the Umkomazi River and its tributaries (see Figure 8). The predominately bushveld vegetation is heavily invaded with alien vegetation, including bugweed (*Solanum mauritianum*), *Lantana camara*, bramble (*Rubus spp*.), famine weed (*Parthenium hysterophorus*) and wattle. Invasive vegetation is currently encroaching onto small scale agricultural plots/homegardens, as well as into watercourses and drainage lines. This bush encroachment provides cover for bushpigs (*Potamochoerus larvatus*) that damage crops grown in homegardens. The predicted increases in temperature and rainfall are likely to accelerate the growth of these invasive alien plants, exacerbating the bushpig problem and contributing to food security and nutritional sustenance risks to local communities. The hilly nature of the terrain increases the risk of lightning strikes from storms, threatening assets and lives. Associated with lightning strikes is the risk of wildland fires. The forestry plantations in Ward 5 and surrounding wards, as well as the increased fuel load from the alien invasive plants, exacerbate this risk to assets and lives. The high winds and rain also associated with extreme storms pose a risk to the resilience of households and community structures, whilst the numerous low-level river crossings in the ward present a safety risk in times of flash flooding to people crossing rivers to reach places of employment, schools, clinics and other community facilities. Drainage down steep slopes and valleys results in downstream erosion, whilst the generally un-terraced agricultural plots are at risk from loss of topsoil and associated negative impacts to production. Furthermore, there is a general lack of use of improved, climate-resilient crop varieties in homegardens. This presents a food security and associated nutritional sustenance risk to community members. The lack of terracing, widely used in other parts of the RLM, is an indication of limited institutional and community level capacity to share best practices.



Figure 8: Examples of the hilly terrain and steep slopes in Ward 5 of Nhlazuka.

Project Objectives:

The overall objective of the uMngeni Resilience project is to reduce climate vulnerability and increase the resilience and adaptive capacity of vulnerable communities and small scale farmers in production landscapes in the UMDM that are threatened by climate variability and change, through an integrated adaptation approach.

The project will adopt a suite of complementary gender-sensitive project interventions, focussing on: i) early warning and response systems; ii) a combination of ecological and engineering infrastructure solutions specifically focused on vulnerable communities, including women; iii) integrating climate variability and change responses into agricultural practices and infrastructure; and iv) disseminating adaptation lessons learned and policy recommendations, to facilitate scaling up and replication.

The project presents four components:

- **Component 1: Early warning systems (USD 945,737)**
  Early warning and response systems improve preparedness and adaptive capacity of local communities and small scale farmers, drawing on and integrating scientific and local knowledge.
- **Component 2: Climate-proof settlements (USD 3,197,307)**
  A combination of ecological and engineering solutions reduces vulnerability of communities to existing and anticipated impacts of climate variability and change.
- **Component 3: Climate-resilient agriculture (USD 1,410,476)**
  Small scale farmers have improved resilience and reduced vulnerability to existing and anticipated impacts of climate variability and change.
- **Component 4: Capacity building and learning (USD 698,116)**
  Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication.

Project Components and Financing:

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (USD)
1. Early warning and response systems improve preparedness and adaptive capacity of local communities and small scale farmers, drawing on and integrating scientific and local knowledge.	1.1 Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials. *Activities:* *1.1.1 Augment the Umgeni Water Decision Support System to provide early warning system information into a form that is useful for municipal officials and local communities.* *1.1.2 Develop appropriate partnerships and enhance the effectiveness of fire detection and suppression.* *1.1.3 Strengthen Municipal Disaster Management systems to enable a proactive response to flood, storm, fire and agro-meteorological climate information and warnings.*	Local capacities and tools for guiding responsive action triggered by hydro-climatological information reduce vulnerabilities and strengthen adaptive responses. • Hydro-climatological information systems integrate local and scientific knowledge to provide advance warning on appropriate time frames. • Communication protocols provide advanced warning information to communities about potential disaster events. • Officials integrate preventative and risk reduction interventions into approaches to disaster management. • Local communities and households using early	945,737
	1.2 Early warning systems empower municipal officials and local communities to respond timeously to seasonal forecasts and potential disaster events. *Activities:* *1.2.1 Pilot a Ward-Based Disaster Management Response System for floods and storms in a low-lying high-density settlement.*		

	1.2.2 Pilot a Ward-Based Disaster Management Response System for floods, storms and fires in Vulindlela and Nhlazuka. *1.2.3 Develop and operationalise community-based fire risk management plans in Ward 5 of Nhlazuka.*	warning system information to protect lives and assets against fire, storms and flooding. • Small scale farmers using information from seasonal weather forecasting in seasonal production planning. • Small scale farmers using early warning system information to protect assets against fire, storms and flooding.	
	1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability. *Activities:* *1.3.1 Develop and implement a farm-based agro-meteorological information generation and dissemination system, using Swayimane as a pilot.* *1.3.2 Mainstream agro-meteorological early warning systems into Agricultural extension services across the Province.*		
2. A combination of ecological and engineering solutions helps local communities to reduce vulnerability to the existing and anticipated impacts of climate variability and change.	2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities. *Activities:* *2.1.1 Develop and implement plans to climate-proof built infrastructure and shelter in vulnerable rural communities.* *2.1.2 Develop guidelines and policy recommendations for the inclusion of climate-proofing and adaptation mechanisms into rural settlement and municipal land use planning processes.*	Built and ecological infrastructure enhances resilience and reduces vulnerability to risks associated with climate variability and change. • Vulnerable rural households have increased resilience to climate-induced stresses, as a result of investments in ecological infrastructure. • Structural measures for infrastructure and community buildings (to respond to climate-related risks or threats) designed and implemented, benefiting vulnerable households. • Ha of quinary catchment (including wetlands) with improved functionality. • Development and land use planners in the UMDM integrate emerging disaster risks associated with climate change into local planning processes.	3,197,307
	2.2 Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream. *Activities:* *2.2.1 Restore and rehabilitate critical ecological infrastructure to improve its capacity to mitigate effects of climate induced disasters.* *2.2.2 Develop policy recommendations for including adaptation considerations into South Africa's Expanded Public Works Programmes and national sectoral adaptation response strategies.*		
	2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development plans and frameworks. *Activities:* *2.3.1 Develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant planning and infrastructure development*		

	plans/frameworks and municipal land use planning processes. *2.3.2 Build the vulnerability mapping and adaptation planning capacities of relevant officials to facilitate mainstreaming of the tool developed in 2.3.1.*		
3. Small scale farmers have improved resilience and reduced vulnerability to existing and anticipated impacts of climate variability and change.	3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers. *Activities:* *3.1.1 Increase agricultural yields through climate-smart farming on small scale farms and community homegardens.* *3.1.2 Link farming cooperatives to existing and new markets.* 3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation practices into its extension services and farmer support programmes. *Activities:* *3.2.1 Enhance the capacity of DAEA staff to mainstream climate change considerations into their activities.* *3.2.2 Mainstream climate-smart agricultural practices into ongoing farmer support programmes.*	Productive landscape resilience increased through the installation of farm-level infrastructure and the integration of climate change responses into agricultural practices. • Farm plans that include best practice adaptation measures produced collaboratively by Field Assistants, extension officers and farmers. • Best practice farm plans and climate change resilient agricultural practices implemented. • Market linkages established • Training materials developed and training courses held. • Extension officers trained to mainstream climate change adaptation into farmer support programmes.	1,410,476
4. Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication.	4.1. Community champions, officials and authorities are empowered to participate in the project's activities. *Activities:* *4.1.1 Build the capacity of local champions (including selected community members, councillors, traditional authorities and officials) to mainstream climate change adaptation responses into planning, budgeting and policy development processes.* *4.1.2 Produce and disseminate innovative educational and awareness raising materials about climate change adaptation.* 4.2 Project outputs and experiences are shared and captured. *Activities:* *4.2.1 Create partnerships with tertiary institutions that support students to study project interventions.* *4.2.2 Convene reflection workshops and learning exchanges where best practice approaches can be observed and captured.* *4.2.3 Provide platforms for project stakeholders*	Adaptation practices integrated in relevant climate variability and change policies at the municipal level, in targeted sectors and beyond. • Project partners have enhanced capacity to engage with climate change adaptation issues • Project results are shared at relevant local, national and international fora. • Policy recommendations to address climate variability and change risks formulated and disseminated. • Mechanisms are supported to include project processes and outputs in government planning and budgeting cycles.	698,116

	to share experiences nationally and internationally.		
	4.3 Policy recommendations support sustaining, scaling up and replicating project successes. *Activities:* *4.3.1 Convene national policy conferences to share outcomes of the project and promote linkages between these and relevant national policy processes.* *4.3.2 Develop a plan to sustain, scale up and replicate project outcomes.*		
Project Execution cost			656,249
Total Project Cost			6,907,885
Project Management Fee charged by the Implementing Entity			587,170
Amount of Financing Requested			**7,495,055**

Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	April 2015
Mid-term Review (if planned)	October 2017
Project/Programme Closing	March 2020
Terminal Evaluation	December 2019

PART II: PROJECT JUSTIFICATION

A. Describe the project components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience.

Component 1: Early warning and response systems improve preparedness and adaptive capacity of local communities and small scale farmers, drawing on and integrating scientific and local knowledge (USD 945,737).

This component will refine and extend existing Early Warning Systems (EWSs) for flooding, storms, wildland fires and drought conditions in the UMDM. It will also support the piloting of protocols and processes for this information to be provided timeously to local communities, and the development of local-level responses. Importantly, this component will simultaneously support top-town and bottom-up activities, so that meteorological data and early warnings reach vulnerable communities who are empowered to respond appropriately, thus enhancing their local-level resilience to climate risk.

In addition, the information will allow for an expansion of the role of the existing municipal disaster management division to include a more proactive approach that includes risk reduction and disaster prevention.

Output 1.1: Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials.

Output 1.1 will strengthen risk knowledge, monitoring and early warning information dissemination and communication systems so that warnings that are generated by the system are received in an appropriate format by the people at risk.

A number of EWSs currently exist in South Africa, some of which are highly technologically advanced. They include those of the South African Weather Service (SAWS), the Advanced Fire Information System (AFIS), the African Monitoring of the Environment and Sustainable Development programme

(AMESD), and an EWS for the uMngeni River operated by Umgeni Water (UW)[11]. The project intends to use the existing hydrological modeling, rainfall, riverflow and wildland fire detection systems as a framework upon which to build EWSs for floods, storms and wildland fire for the entire catchment, with a particular focus on areas of high vulnerability.

This output will strengthen the ability of UW to supply hydro-climatological information and warnings timeously, and in an appropriate format, for direct use by communities and relevant disaster response officials. It will also catalyse a reinvestment in the fire response capabilities of the UMDM, and with this, build partnerships and invest in a monitoring and warning service that will benefit rural communities across the UMDM. Finally, it will strengthen local response capabilities by supporting ward-based disaster management response systems.

Barriers will be identified for all of the systems outlined above, and where necessary, systems will be augmented and aligned so that information outputs are accessible, relevant and available in a user-friendly form for early warning and response purposes at local community level, as well as for relevant planning and disaster response officials.

Box 1: Existing Early Warning Systems in South Africa.

- SAWS provides the only official (and legislated) EWS. In addition to providing short-term forecasts, SAWS maintains two separate seasonal forecasting systems, the global Ensemble Prediction System (EPS) using the ECHAM4.5 Atmospheric General Circulation Model (AGCM), as well as a statistical forecasting system which is based on a Model Output Statistics (MOS) approach and is downscaled to the Southern African Development Community area.
- AFIS is a South African satellite-based fire information tool that provides near real time fire information to users across the world[12]. AFIS provides users with fire prediction, detection, monitoring, alerting, planning and reporting capabilities through the use of Earth observation satellites, weather forecast models and Information and Communication Technologies.
- The overall objective of the AMESD programme is to enhance monitoring for preparedness and adaptation to environmental change, including sustainable management of the environment, thereby contributing to poverty alleviation. The purpose of the program is to increase the information management capacity of African regional and national institutions in support of decision makers at different levels and to facilitate sustainable access to Africa-wide environmental information derived from Earth Observation technologies[13].
- The existing EWS within the UMDM is operated by UW, a state owned water service provider which operates in the UMDM and beyond. This EWS is a small scale Research & Development pilot project to guide the operation of weirs and levels of water for a storage dam. The system primarily monitors rainfall data and weather projections on a daily basis in this pilot area, and through the use of hydrological modeling is able to project if rainfall and riverflow thresholds in the area will be exceeded. The existing system is rudimentary and does not monitor when rainfall or river flow exceeds a risk threshold across the entire catchment and its tributaries, nor does the system exist in areas of highest vulnerability to flooding. The current system is elementary and does not have the ability to send early warnings to communities via text messages, or to trigger community sirens, to warn of impending flood events.

(1.1.1) Augment the Umgeni Water Decision Support System to provide early warning system information in a form that is useful for municipal officials and local communities.

Specifically, this output will augment the Water Resource Management Decision Support System (WRM-DSS) that is currently used by UW for the UMDM. The present framework, which has been designed to predict and manage operations and flooding related to bulk water infrastructure such as weirs and dams, will be expanded to allow for the monitoring of river flow in the UMDM in areas where communities are vulnerable to flooding. Early warnings will be made available for sending, regarding floods and storms, across the UMDM. The dissemination, receiving and reacting to such early warning will be tested in a low-lying high-density settlement, and in the rural areas of Vulindlela and Nhlazuka (through Output 1.2) with a view to replicating project successes post project in other vulnerable areas, such as Impendle.

The project will support real time modeling and allow for the timely generation and dissemination of automated warnings across the UMDM against predefined threshold/alarm conditions, specific to different areas of the District. Rather than funding the purchase of new and additional equipment, the

[11] Umgeni Water is a state-owned business enterprise, established in 1974 to supply potable water in bulk to municipalities within its operational area. See http://www.umgeni.co.za/.
[12] http://www.afis.co.za/.
[13] http://au.int/amesd/.

project will optimise the use of existing data sources, invest in the required software and model configuration, and develop data input application and output publications (in the form of warnings and information tailored to the relevant end users). Project investments will: i) improve the high-level/course configuration for the whole UMDM area, including the rural areas of Ward 8 in Vulindlela, Ward 5 of Nhlazuka and other areas such as those in Impendle where flash flooding of rivers presents a danger to communities needing to cross drainage lines; and ii) provide detailed, high resolution monitoring in high risk areas, where numerous informal and formal settlements and community facilities are threatened by flooding rivers. The detailed, high resolution monitoring includes hydraulic and hydrologic modeling components requiring detailed elevation configurations. This data will be provided through the use of remote sensing technology (Lidar) along 75km of prioritised river courses in the UMDM, deemed flooding "hotspots". The location of the specific "hotspots" will be confirmed during project implementation, based on participatory community mapping (anecdotal evidence) and flood risk analyses. Indicative areas include the low-lying areas along the Msunduzi River, where many high density settlements are located, and the areas below the confluence of the uMngeni and Lions Rivers, including the informal settlements in Lidgetton.

Forecasts of river flow in the UMDM will be produced daily (based on daily running of the configured models). These forecasts will be for a 7-day period, based on existing rain predictions such as the SAWS 7-day forecast, which is issued daily. This river flow information will be made available on a daily basis to officials and authorities, and to the public if requested (for example, by adding ones name to a mailing list). When the daily forecasts exceed the established thresholds (i.e. a flood is predicted), reports will be sent automatically and instantly via e-mail and Short Message Service (SMS)-based alerts to officials and authorities, and by SMS to relevant community members in an appropriate, tailored format, to be established through Outputs 1.2.1 and 1.2.2.

As part of this process, the project will support the development a data sharing agreement between the UMDM, UW, SAWS and any other relevant institutions to ensure that investments are appropriately targeted and that data flows are sustained. A maintenance agreement will be developed between UMDM and UW, with a view to establishing the augmented WRM-DSS as the long-term EWS for the UMDM, thus sustaining the benefits beyond the project investment period.

(1.1.2) Develop appropriate partnerships and enhance the effectiveness of fire detection and suppression.

This output will support Integrated Fire Management in the UMDM by strengthening partnerships to enhance the effectiveness of wildland fire detection and suppression within the area currently under surveillance, expanding the coverage of the monitored area to include rural regions with communities vulnerable to the risks of increased intensity and frequency of wildland fires under conditions of climate change, and catalyzing appropriate investments by the UMDM in its fire suppression function.

The project will work with the District and Local Authority Fire and Emergency Services to develop a strategy and associated protocols for improving the existing wildland fire suppression and warning system for the area under current surveillance. This strategy will clearly articulate roles and responsibilities including capacity, budget, fire suppression equipment and infrastructure requirements.

In South Africa, the National Veld and Forest Fire Act 101 of 1998 makes it compulsory for all land owners to be members of Fire Protection Associations (FPAs). These associations provide early detection, management, communication of warnings[14] and wildland fire suppression services to their members. Several FPAs currently operate within the UMDM boundaries, including the Provincial Umbrella FPA, and the Lions River, Mooi River, Richmond and Umshwathi FPAs. These associations currently support a network of thirty-two fire-detection cameras within the UMDM (see Section II.I). These cameras are linked to the FPA Detection Centres, Incident Command Centres and Working on Fire's (WoF) Dispatch Centres. They enable FPAs to instantly disseminate information and warnings regarding wildland fire risk and occurrence, and to dispatch helicopters for transporting firefighters or for aerial firefighting support.

Land that is not privately owned in the UMDM is either owned/administered by the Local Authorities or, in the case of the communal areas, by the Ingonyama Trust Board. For historical reasons, neither

[14] As in the Fire Danger Index, which categorises a day of extreme fire danger as a 'red day', when for example the burning of firebreaks and other fuel should not be undertaken.

of these authorities are members of the FPAs. The project will support the development of Public-Private-Partnerships between the relevant FPAs, the Ingonyama Trust Board and the Local Authorities.

In order for all communal areas within the UMDM to benefit from the FPA wildland fire detection and response services, six new towers equipped with cameras will need to be added to the current network. This will necessitate the installation of additional hardware at the FPA Detection Centres, the provision of an operating budget and the hiring and training of technicians to maintain and operate the system. Provided that the necessary partnership agreements are in place, the project will pay for the costs of installing the additional towers and cameras. The operational costs associated with this enhanced service would need to be covered by the UMDM, through an agreement.

(1.1.3) Strengthen Municipal Disaster Management systems to enable a proactive response to flood, storm, fire and agro-meteorological climate information and warnings.

This output will facilitate the development of a coordinated response strategy and associated disaster risk protocols that will support relevant authorities to receive, interpret and respond to hydro-climatological, storm and fire risk information, and make this available to communities in accessible and user-friendly formats. It will focus particularly on strengthening partnerships and clarifying roles and responsibilites across the different spheres of government so that forecasting and the provision of meteorological information effectively enables appropriate and timely ward-based disaster management responses.

The generation and dissemination of flood, storm and wildland fire warnings will be linked to the UMDM Disaster Management centre, which is supported by the Department of Cooperative Governance and Traditional Affairs (CoGTA). These protocols will support a ward-based disaster management response system. They will improve timeous and appropriate responses to forecasting, ensure a consolidated approach to preventing and managing flooding and other disasters and will empower officials to take more effective action. Importantly, with the support of CoGTA, they will enable UMDM to scale up the project beyond the Vulindlela and Nhlazuka pilots (see Output 1.2).

Currently, the disaster management function in UMDM is focussed on responding reactively to disaster events. The project will work to expand the focus of this function to include a disaster risk reduction function, and to improve its capacity to respond proactively to predicted climate variability and change impacts and early warnings that are issued.

The project will support the development of new strategies, response protocols and operating rules for municipal disaster management services that focus on disaster risk reduction. It will also support processes to develop the capacity of municipal officials in the District and Local Municipalities in disaster risk reduction, including the development of handbooks and training materials that are applied in the pilot areas of Vulindlela, Nhlazuka and the selected low-lying high-density settlement (see Output 1.2) and that facilitate the scaling up of the project to the broader UMDM. Project learnings will also be used to inform the ongoing review of the Disaster Management Act, 2002 (Act No. 57 of 2002)[15].

Output 1.2 Early warning systems empower municipal officials and local communities to respond timeously to seasonal forecasts and potential disaster events, reducing vulnerability to extreme weather events.

Vulnerable communities in Vulindlela, Nhlazuka and the selected low-lying high-density settlement will be engaged through carefully designed, gender-sensitive participatory processes that begin by introducing community members to the project and building their capacity to participate meaningfully in its detailed design processes. This will include a focus on environental and social risks management and the project's Environmental and Social Risk Management Plan in particular. The project will support such groups to, together with officials in the municipal early warning and disaster management functions, develop, implement and test appropriate response measures that integrate scientific and traditional knowledge. Community champions from each of the project target areas will be trained, through Output 4.1 (see Activity 4.1.1), in disaster management related skills, including basic first aid. This will allow ongoing community engagement with officials and assist in the UMDM and Local Municipalities in proactive disaster management through the ward-based disaster

[15] Mr Jonty Ndlazi, KZN Provincial Disaster Management Centre, pers. comm., 24 April 2014.

management response systems piloted through this output. It is envisaged that four community members from each project target site will be trained through accredited courses. Equitable representation of women in training and capacity-building programmes and in project decision-making structures will be ensured.

(1.2.1) Pilot a Ward-Based Disaster Management Response System for floods and storms in a low-lying high-density settlement.

Using a participatory approach in a selected low-lying high-density settlement, and building on the information that is generated from the augmented UW hydro-climatological model, the project will support the development of a community-level flood and storm response plan. The project may install sirens in highly vulnerable communities to alert them to imminent flooding, as soon as the alerts are received from the augmented WRM-DSS in Output 1.1.1. Training will be undertaken to ensure communities know how to interpret received information, and how to respond when warnings are issued. This may include the establishment of community-based disaster committees, working within existing structures wherever possible. Results of the pilot project will be shared with a view to the UMDM and selected Local Municipality scaling up the pilot to other areas.

The project site will be selected through a consultative process between UW, UMDM and relevant Local Municipalities and will be based on agreed criteria that include local vulnerability and risk considerations. The site will be along the 75km of prioritised river courses in the UMDM, deemed as flooding "hotspots" (see Activity 1.1.1).

In addition to traditional methods of conveying messages, the project will investigate setting up a SMS-based EWS to warn residents at risk in areas not covered by sirens (due to their risk levels being lower), and to warn motorists travelling to areas at risk. This system will be developed in partnership with cellular phone companies and modeled upon the Alerta Rio system currently being operated in the city of Rio de Janeiro, and the disaster risk reduction system of the City of Cape Town, with whom the UMDM has developed a working relationship[16]. The potential for different agencies to use a common system will also be explored. This would assist with coordinating responses between agencies involved in disaster risk reduction and management. The project will also investigate the feasibility of expanding the scope of the existing UMDM Disaster Management center that currently focuses on monitoring crime via a camera network. The UMDM Fire and Rescue Services is already in negotiations with the Disaster Management centre and relevant FPAs, with a view to forming a partnership to support an integrated approach to risk reduction and result in pooling of resources and reduced costs. The project will build on these current negotations.

(1.2.2) Pilot a Ward-Based Disaster Management Response System for floods and fires in Vulindlela and Nhlazuka.

The project will use a participatory approach to develop and implement community-level flood and storm response plans for Ward 8 of Vulindlela and Ward 5 of Nhlazuka, and community-level wildland fire response plans for Ward 5 of Nhlazuka. Specifically, the project will support the design and implementation of ward-based disaster management systems in Vulindlela and Nhlazuka. This ward-based system will mobilise ward committee members to notify community members (those that do not received warnings directly through SMS-based alerts) of climate risks, and to coordinate appropriate actions. As part of this process, local response plans will be developed and implemented. These may require the installation of necessary equipment (including sirens, signs, assembly points and low-cost pedestrian bridge crossings) and reservoirs for wildland fire suppression activities.

These local-level response plans will be supported by local-level protocols, norms and standards, trainer manuals/handbooks and public awareness materials for responding to floods and storms. In addition, as described above, community members from Vulindlela and Nhlazuka will be trained in proactive disaster management to assist the Msunduzi and Richmond Local Municipalities with disaster management during and after the project.

[16] The UMDM has already visited the city of Rio de Janeiro and the City of Cape Town to understand and review the early warning systems that are currently operational. Both cities have indicated a commitment to support the UMDM to develop a system modeled on the systems they have built in Rio de Janeiro and Cape Town.

The response plan for Ward 5 of Nhlazuka will be developed and implemented in association with the community-based wildland fire response strategy (see below).

(1.2.3) Develop and operationalise community-based fire risk management plans in Ward 5 of Nhlazuka.

Community-based fire risk management and response plans, based on the FireWise Communities Programme approach (see Box 2), will be developed with three pilot communities in Ward 5 in Nhlazuka. This area is surrounded by commercial plantations and is particularly vulnerable to the climate-driven threat of an increase in frequency and intensity of wildland fires. As above, the development of this plan will entail a participatory process that builds the capacity of the communities. The focus of a FireWise Communities Programme is the prevention of wildland fires. Fire risk assessments of each area will therefore be undertaken with technical support, and mitigation and/or management measures will be included in the response plan. Associated with this will be training on measures to prevent wildland fires, reducing fire risks in relevant areas, and disseminating warnings relating to high fire-risk weather conditions when community members should avoid using fire outdoors. Community FireWise teams are volunteers who primarily undertake fire prevention work. They do not do any fire-fighting, except for 'first response' when a fire has just started. Teams can be used for 'mopping up' after suppression by WoF firefighters, under supervision by the FPA. The FireWise Committees will be supplied with the necessary equipment to implement their fire management plans, including buckets and 'fire beaters'.

A participatory approach will also be used to determine the most appropriate means of packaging and disseminating wildland fire-related information and warnings, including a combination of traditional and modern methods of conveying messages. The establishment of a FireWise Communities Programme will include the election of a FireWise Committee, consisting of responsible community members and partners such as local government representatives. Committee members will become part of the Richmond FPA, and the Committee will be responsible for issuing wildland fire risk warnings to the community, once warnings are received from the Richmond FPA. Implementation of the community-based fire risk management plan will also include the provision of necessary infrastructure such as sirens, signs, assembly points and lightning conductors. The plan will be kept current through follow up training sessions that support community member reaction readiness for when wildland fires occur, and through the development and dissemination of education materials.

Training will be undertaken, as per the FireWise Communities Programme approach, to ensure communities are aware of how to interpret received information, and how to respond when warnings and instructions are issued by the Committee and or the Richmond FPA. Implementation will also include periodic mock events so that the capacity to respond appropriately is retained beyond the project. The design and installation of infrastructure will be integrated with the activities set out in Component 2 of this project.

Box 2: FireWise Communities.

The FireWise Communities Programme seeks to protect people and property from wildfire risks by encouraging local solutions for wildfire safety. This involves homeowners, community leaders, planners, developers, firefighters, and others in this effort. The goal is to enhance the sustainability and protection of life, livelihoods and the environment through integrated fire management in order to contribute to economic empowerment, skills development, social equity and accelerated service delivery. The FireWise approach emphasises community responsibility for planning in the design of a safe community. It is the community that is responsible for effective emergency response, and the individual within the community who is responsible for safer home construction and design, landscaping and maintenance. The voluntary FireWise Community aims to:

- improve safety in the wildland/urban interface by learning to share responsibility,
- create and nurture local partnerships for improved decision making, and
- encourage the integration of FireWise concepts into community and disaster alleviation planning.

Damaging wildfires in the wildland/urban interface will continue unless people work together to solve basic community development planning issues at a local level. Interdisciplinary, cooperative problem solving across land ownership is part of the solution. It is important to note that the FireWise Community volunteers undertake primarily fire prevention work, rather than operate as fire fighters. However, training on the suppression of small scale fires is provided, as is the necessary suppression equipment. Each voluntary FireWise Community is represented by an elected FireWise Committee, consisting of responsible community members and partners such as local government representatives. The Kishugu Public Benefit Organisation provides training and support, along with the necessary equipment, to enable communities to create a FireWise environment.

Output 1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability.

This output will seek to strengthen agro-meteorological EWSs for farmers in the Swayimane area through the dissemination of short-term and seasonal agro-meteorological forecast information, primarily on temperature and rainfall and the anticipated effects on agriculture.

(1.3.1) Develop and implement a farm-based agro-meteorological information generation and dissemination system, using Swayimane as a pilot.

Short-term and seasonal downscaled meteorological forecasts will be integrated with improved crop modeling results, within a GIS-based framework, to generate agro-meteorological forecasts at the farm level. The development of this integrated model will be based on the work done to date by crop scientists from UKZN SAEES. The required input data will be derived from KwaZulu-Natal Provincial Department of Agriculture and Environmental Affairs (DAEA) scientists and agricultural extension officers, local small scale farmers, and the network of Automatic Weather Stations established by SAWS, the Agricultural Research Council (ARC) and the South African Sugarcane Research Institute (SASRI) in Swayimane.

The project will support small scale farmers and DAEA agricultural extension officers (who provide technical support, extension and specialist advisory services) to use this newly available information through the development and implementation of training programmes. Activities will be linked to those of Output 3.2, related to the climate-resilient agricultural practices. The seasonal forecasts will build the resilience of small scale farmers, who at present have a low adaptive capacity as they are not aware of the anticipated quantity and timing of rainfall in the growing season rainfall,

1.3.2 Mainstream agro-meteorological early warning systems into Agricultural extension services across the Province.

The process will be designed in conjunction with the DAEA and, via its Provincial extension services, will be used to support a process that strengthens agro-meteorological EWSs for farmers across the KwaZulu-Natal Province.

Table 1: Indicative work programme for Component 1.

Output	Indicative Work Programme
1.1 Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials.	*Launch and assessment of flood and storm EWS within UMDM.* • Convene launch workshop with all relevant stakeholders to introduce the project and build working relationships. Stakeholders will include representatives from UMDM, UW, SAWS, the Department of Water Affairs (DWA), CoGTA and local and traditional authorities and community leaders from the pilot areas. The workshop will be used to, *inter alia*: i) broker data sharing agreements between UW, SAWS and DWA; ii) short-list potential flooding "hotspots"; and iii) confirm the working relationship between SAWS and UMDM, including the establishment of the SAWS "portal" at a relevant location. • Undertake an assessment of the roles, responsibilities, strengths and weaknesses of authorities and institutions who play a role in flood and storm EWS information dissemination and proactive management/responses in the UMDM, including the adequacy of information generation models, the effectiveness of dissemination strategies, the effectiveness of response strategies and the extent to which planning and human settlement design functions in the UMDM are able to utilise relevant information. *1.1.1 Augment the Umgeni Water Decision Support System to provide early warning system information into a form that is useful for municipal officials and local communities.* • Develop terms of reference for the hydraulic and hydrologic modeling required to augment the current WRM-DSS system run by UW, to allow elementary early detection of floods across the UMDM. • Develop and implement the WRM-DSS augmentation plan. • Undertake risk and vulnerability assessments of short-listed flooding hotspots, Ward 8 of Vulindlela and Ward 5 of Nhlazuka. These assessments will include flood risk analyses and the identification of monitoring equipment per site. • Undertake required cross-sectional mapping and ground-truthing at selected hotspots. This information will be used to configure a hydrological model (currently used by UW for water resources monitoring). The simulated outputs will be used to configure the MIKE 11 hydraulic model (currently used by UW) at "hotspots". Thresholds will be set, and the

	expanded WRM-DSS system configured to raise warnings when thresholds are predicted to be exceeded. • Procure and install the required monitoring software. • Develop MOUs between cooperating parties, and agree on a plan of action for delivering an integrated EW and response strategy for floods and storms in the UMDM, including communication channels and most effective means of disseminating information and messages to the UMDM, relevant institutions and communities (using the site selected in Activity 1.2.1, Ward 8 of Vulindlela and Ward 5 of Nhlazuka as pilot sites). *1.1.2 Develop appropriate partnerships and enhance the effectiveness of fire detection and suppression.* • Convene a launch workshop with all relevant stakeholders to introduce the project and build working relationships. This will include representatives from UMDM Disaster Management and Fire and Rescue, provincial and local FPAs, WoF, FireWise (Kishugu Public Benefit Organisation) and CoGTA. The workshop will be used to *inter alia* facilitate the establishment of the required partnership between UMDM and the FPAs. • Undertake an assessment of the roles, responsibilities, strengths and weaknesses of authorities and institutions that play a role in detecting, responding to and suppressing wildland fire in the UMDM. • Develop a strategy and associated protocols for improving the existing wildland fire suppression and warning system for the area under current surveillance, that clearly articulates roles and responsibilities including capacity and infrastructure requirements • Calculate the annual investments that would be required from the various partners to support the effective implementation of the strategy • Develop public-private partnerships between cooperating parties to enable timeous and effective disaster responses. • Install additional infrastructure for rolling out the strengthened response plan in high risk areas. *1.1.3 Strengthen Municipal Disaster Management systems to enable a proactive response to flood, storm, fire and agro-meteorological climate information and warnings.* • Design a CoGTA-UMDM sustainable operating plan for, where appropriate, coordinating, processing/ packaging, transmitting, receiving and reacting to information and warnings about floods, storms, wildland fires and agro-meteorological information. This will include a consolidation of the UMDM and CoGTA roles and responsibilities in Output 1.1, 1.2 and 1.3. • Formulate and apply new strategies, structures and Standard Operating Procedures for municipal disaster management services that focus on disaster risk reduction, so as to improve responses to predicted climate variability and change impacts and early warnings • Develop capacity within UMDM officials, including within the Disaster Management and Fire & Emergency Sections, to react to flood, storm, wildland fire and agro-meteorological-related information and warnings, and to work with communities to prevent loss of assets and life. This will include the development of handbooks and training materials and training of officials in pilot areas.
1.2 Early warning systems empower municipal officials and local communities to respond timeously to seasonal forecasts and potential disaster events.	*1.2.1 Pilot a Ward-Based and Disaster Management Response System for floods and storms in a low-lying high-density settlement.* • Select the project site through a consultative process between UW, UMDM and relevant Local Municipalities. • Develop community profiles and undertake risk assessments in the selected low-lying high-density settlement. The community engagement will be used to assess the most appropriate means of packaging and disseminating flood-related information and warnings, including traditional methods of conveying messages. • Using a participatory approach, develop a community-level flood and storm response plan. The response plan will also identify equipment needed to support the system. Training will be undertaken to ensure communities are aware of how to interpret received information, and how to respond when warnings are issued. This will include the establishment of community-based disaster committees, working within existing structures wherever possible. • Install the necessary equipment (including sirens, signs, assembly points). • Implement the community-level flood and storm response plan, including testing through mock events. • Taking gender considerations into account, train, through Output 4.1, selected community champions from the low-lying high-density settlement on proactive disaster management so as to assist UMDM and Local Municipality officials during and after project completion. *1.2.2 Pilot a Ward-Based Disaster Management Response System for floods, storms and fires in Vulindlela and Nhlazuka.*

	• Taking gender considerations and the project's Environmental and Social Risk Management Plan into account, undertake workshops and training to build the capacity of local community members to engage with the development of community-level flood and storm response plans. The workshops will be used to assess the most appropriate means of packaging and disseminating flood-related information and warnings, included traditional methods of conveying messages. • Using a participatory and gender-sensitive approach, develop community-level flood and storm response plans for Ward 8 of Vulindlela and Ward 5 of Nhlazuka. This will include local-level protocols, trainer manuals/handbooks and public awareness material on the use of *inter alia* radio, television, print media, SMS-based alerts, satellite phones, sirens/loud hailers, signal/flag systems and traditional methods for responding to floods and storms. The response plan will also identify equipment needed to support the system. Training will be undertaken to ensure communities are aware of how to interpret received information, and how to respond when warnings are issued. This will include the establishment of community-based disaster committees, working within existing structures wherever possible. The response plan for Ward 5 of Nhlazuka will be developed and implemented in association with the community-based wildland fire response management strategy developed through Output 1.2. • Install the necessary equipment (including sirens, signs, assembly points and low-cost pedestrian bridge crossings – linked to Output 2.1). • Implement the community-level flood and storm response plan which will include periodic mock events so that the capacity to respond appropriately is retained beyond the project. • Taking gender considerations into account, train, through Output 4.1, selected community champions from Vulindlela and Nhlazuka on proactive disaster management so as to assist UMDM and Local Municipality officials during and after project completion. *1.2.3 Develop and operationalise community-based fire risk management plans in Ward 5 of Nhlazuka.* • Convene launch workshops with all relevant stakeholders to introduce the project and build working relationships. Stakeholders will include representatives from UMDM Disaster Management and Fire and Rescue, provincial and Richmond FPAs, WoF, FireWise (Kishugu Public Benefit Organisation), CoGTA, local and traditional authorities, community leaders and community champions. Gender considerations will be taken into account in this process. A FireWise Committee, comprising of community members, will be established over the course of the workshops. • Undertake workshops and training to build the capacity of local community members to engage with the development of community-level Integrated Fire Management plans, which will include wildland fire management (prevention and response) plans. The workshops will be used to assess the most appropriate means of packaging and disseminating wildland fire-related information and warnings, included traditional methods of conveying messages. The workshops and training will be held in conjunction with the EW flood and storm response system workshop in Output 1.1. • Develop a community-based Integrated Fire Management plan for Ward 5 in Nhlazuka, including the assignment of roles and responsibilities for implementing fire risk reduction activities, suppressing small scale fires and communicating wildland fire risk warnings and processes for building the capacity of community members to respond appropriately. Communities will select representatives to be part of the Richmond FPA, to strengthen community involvement in Integrated Fire Management. • Implement the plan, including the installation of necessary infrastructure and development of education materials. Such infrastructure will include sirens, signs, assembly points, lightning conductors and low-cost pedestrian bridges (linked to Output 2.1). • Ensure that the community-based Integrated Fire Management plan is kept current through follow up training sessions that support community members to manage fire risks.
1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability.	*Launch.* • Convene launch workshops with all relevant stakeholders involved in the generation and use of agro-meteorological data in the UMDM to introduce the project and build working relationships. Stakeholders will include representatives of National Department of Agriculture, Forestry and Fisheries (DAFF), DAEA, UKZN SAEES, SARI, SAWS, ARC, UMDM and other relevant Non-Governmental Organisations (NGOs)/Community-Based Organisations (CBOs). The workshop will be used to discuss, inter alia, the concept of bioresource units, the availability of data, data sharing, data requirements, analyzing the data and generating short-term and seasonal forecasts for agriculture. • Determine the roles and responsibilities for agro-meteorological-related farmer support in UMDM, both for the duration of the project and for the longer term. Assess the strengths and weaknesses of authorities and institutions that offer farmer support. *1.3.1 Develop and implement a farm-based agro-meteorological information generation and dissemination system, using Swayimane as a pilot.*

	• Taking gender considerations into account, engage small scale farmers in Ward 8 of Swayimane to determine: i) the feasibility of incorporating traditional knowledge into the generation of short-term and seasonal agro-meteorological forecasts; ii) the most appropriate recipients of the short-term and seasonal forecast information; and ii) most appropriate means of packaging and disseminating the information, including the use of traditional methods for conveying messages. Farmer engagement will take place in association with the activities of Output 3.2. • Design a system for incorporating short-term and seasonal forecast information into crop planning at the farm level, and an associated integrated crop-climate-GIS model for Ward 8 of Swayimane. Along with the necessary hardware and software, this model will require farm-specific input information such as soil type, aspect and slope, and will generate farm-specific information on crop selection, planting and harvesting times. Associated with the system will be a dissemination mechanism, to convey the appropriately packaged short-term and seasonal agro-meteorological forecast information to small scale farmers in Ward 8 of Swayimane. Partnerships will be established with the necessary institutions to allow the incorporation of available agro-meteorological information into the system. • Develop a capacity building programme, with associated training materials, that empowers small scale farmers and extension officers to incorporate the short-term and seasonal agro-meteorological forecast information into farm planning. This will include annual workshops before growing season. In the target areas, young people and women in particular will be identified and mentored through the workshops and extension officer support. • Monitor the uptake of short-term and seasonal agro-meteorological forecast information. This will be undertaken in the form of annual surveys and workshops with small scale farmers. Results and lessons learned will be shared through Component 4. *1.3.2 Mainstream agro-meteorological early warning systems into Agricultural extension services across the Province.* • Develop a strategy for scaling up the Swayimane pilot to areas within the UMDM / Province. • Design a process for increasing the capacity of extension officers across the Province to provide improved agro-meteorological information to farmers. This process will be linked to other processes relating to DAEA extension officers as set out in Output 3.2.

Component 2: A combination of ecological and engineering solutions helps local communities to reduce vulnerability to the existing and anticipated impacts of climate variability and change (USD 3,197,307).

This component will support existing development work being undertaken by local municipalities within the UMDM and by UW regarding adapting basic infrastructure to improve resilience to increased frequency and intensity of flash flooding. It will also support job-creation in low income communities through labour-intensive construction methods.

Specifically, this component will:

- build the climate resilience of rural communities by climate-proofing *inter alia* houses and homesteads, community facilities, stormwater drainage channels and low-level river crossings;
- restore and protect degraded ecological infrastructure to enhance the ability of ecosystems to buffer against climate change impacts; and
- demonstrate how climate change adaptation considerations can be incorporated and mainstreamed into land use planning, service delivery and settlement upgrade processes.

This integrated approach will reduce the vulnerability of communities in the target areas, including through the creation of awareness of the risks posed by climate variability and change, and show how lessons learned can be applied to similar areas elsewhere in the UMDM. Arising from lessons learned through this component, policy recommendations will be formulated for the inclusion of climate-proofing adaptation mechanisms and standards into building regulations and planning at the municipal level, into municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs), as well as into the national Expanded Public Works Programme (EPWP)[17].

In all instances, the project will work in a participatory manner, involving vulnerable groups including women, youth and the aged effectively in planning, implementation and learning from the process. In addition, the information generated in Component 1 will be used to inform the design and

[17] For more information on the national Expanded Public Works Programmes see www.epwp.gov.za.

implementation of the climate-proofing plans. As part of this process, communities will be empowered detect and mitigate environmental and social risks, as set out in the AF Environmental and Social Policy (ESP) and the project's Environmental and Social Risk Management Plan. Processes to build local community capacity to do this will be integrated in the capacity building activities that are envisaged during the early stages of each project component, and will be essential in ensuring that local communities understand the intentions of the project and can contribute to the design of sub-component activates accordingly, know their rights and are aware of the recourse they may have for raising any risk-related issues should these arise.

Output 2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities.

In the rural areas of Ward 8 of Vulindlela and Ward 5 of Nhlazuka, project resources will be used to identify critical settlement infrastructure, community facilities and homesteads that are susceptible to climate risks, and to strengthen these. Lessons from this process will be used to influence spatial planning processes of both traditional and municipal authorities, and to inform policy recommendations.

(2.1.1) Develop and implement plans to climate-proof built infrastructure and shelter in vulnerable rural communities.

Building on the vulnerability mapping undertaken for the UMDM climate change response strategy, small groups of households in communities will be supported to develop and implement rural built infrastructure upgrade plans. These will be same communities as those who are participating in the ward-based disaster management systems developed in Output 1.2.

This process will include a household-level capacity building programme, participatory mapping and risk and vulnerability analyses to identify:

- community safety centres that are vulnerable to the impacts of climate variability and change;
- houses that are at risk from storms and floods, including lightning strikes;
- eroded or overloaded stormwater drainage lines and systems, or areas where stormwater has not been channeled away from human settlements, that are triggering downstream flooding and sedimentation;
- community access routes to schools, clinics and other essential services, and river crossings susceptible to flash flooding for which warnings will be generated in Output 1.1 and disseminated in Output 1.2; and
- cultivated and built up areas that are vulnerable as a result of increased frequency and intensity of rainfall and severe storms.

The project will also explore the need and feasibility of using alternative building materials that are more resilient to climate induced risks, or that reduce pressures on ecological infrastructure.

A Gender and Social Action Plan (GSAP) will be prepared at the outset of implementation, in order to: i) ensure that people affected by the project, and in particular, vulnerable and marginalized social groups such as women, children, youth, the elderly, unemployed and those living with HIV are fully informed and consulted about the project and how they can participate; ii) to avoid disproportionate negative impacts on them; iii) to ensure that project benefits are distributed fairly; and iv) to ensure that local communities are empowered to identify and mitigate environmental and social risks as set out in the project's Environmental and Social Risk Management Plan.

Box 3: Gender and Social Action Plan

The Gender and Social Action Plan (GSAP) will include a rapid assessment to be undertaken in beneficiary communities by the Gender and Social Expert, based on the Vulnerability Assessment and on census information from Statistics South Africa, to identify vulnerable and marginalized social groups in each beneficiary community. This assessment will form the basis for indicators and targets regarding the inclusion of vulnerable groups in project activities, training, representation on project structures and receipt of project benefits.

The GSAP will include measures to ensure transparency, fairness and equity in selection processes for project benefits. This will ensure that all applicants who qualify for benefits have an equal chance of being selected to take part, that the selection methods used are fair and transparent, and that grievances and complaints are

effectively addressed. The GSAP will contain measures to encourage and support the participation of identified vulnerable groups and individuals in the various project activities, including participation in capacity building and training opportunities, community decision making structures, project planning and implementation activities. This is an effective means of ensuring that their voices are heard and that their needs and concerns are correctly identified and provided for. Monitoring and evaluation will be undertaken during the project and at the end, to see whether the GSAP has achieved its aims.

(2.1.2) Develop guidelines and policy recommendations for the inclusion of climate-proofing and adaptation mechanisms into rural settlement and municipal land use planning processes.

Based on lessons learned, and in association with relevant stakeholders, including traditional leaders in particular (due to their role in land allocation in communal areas), guidelines and policy recommendations for considering climate resilience as part of spatial land allocation processes will be developed. It is envisaged that these will be integrated into municipal development and spatial planning processes as well as into standards for building public facilities and homes, stormwater drainage and flood-line delineation processes. In addition, the project will promote the integration of adaptation practices into relevant climate change policies in other targeted sectors in local, provincial and national planning processes, including environment, water, agriculture and disaster risk management. This process will be linked to ongoing interventions that aim to develop environmental layers for Municipal Planning under the recently promulgated Spatial Planning and Land Use Management Act, Act No. 16 of 2013 (SPLUMA). This Act provides a new framework for spatial planning and land use management in South Africa, focusing on inclusive, developmental, equitable and efficient spatial planning at the different spheres of government. Moving forward, national, provincial, regional and municipal SDFs will have to be prepared in terms of SPLUMA.

Furthermore, specific guidelines such as on the design and installation of low-cost pedestrian bridges in rural areas prone to flash flooding will be developed, so that lessons learned in Vulindlela and Nhlazuka can be applied to other rural areas within the UMDM.

The sharing of these lessons learned through innovative methods including school art/poster competitions and the printing and distributing of those posters judged to be most informative, as well as the development of policy recommendations for integrating climate change adaptation into rural development planning and upgrade processes, will be undertaken through Component 4.

Box 4: Institutions with experience in climate-proofing settlements.

In working towards climate-proofing settlements, the UMDM will be working with various actors with a range of relevant experience, as follows:

The eThekwini Municipality (which includes the city of Durban) and the UMDM are neighboring municipalities with a long history of co-operation. The eThekwini Municipality has extensive experience in adapting stormwater water systems to reduce the risk of flooding, either through increasing the diameter of pipes and culverts or installing trash netting at entry points to stormwater catch-pits in order to prevent solid waste from blocking stormwater drainage systems. The eThekwini Municipality also has an extensive Ecosystem Based Adaptation (EBA) programme, which has been implemented in partnership with the Wildlands Conservation Trust, has generated significant lessons that are relevant for the UMDM. Much of the design work for the eThekwini Municipality projects has been undertaken by the UKZN, who are also strategic partners of the UMDM and available to assist in sharing lessons learned to contribute to the successful implementation of this aspect of the project.

The Built Environment Support Group (BESG), an NGO based within the UMDM, has implemented various projects across the KwaZulu-Natal province aimed at increasing the resilience of housing and structures in low income settlements through their Greener Pastures and Housing Support Centre projects. This organisation is willing to assist the UMDM with implementing climate-proofed housing structures in highly vulnerable communities.

DUCT is a local NGO that works on restoration of riparian zones to increase the capacity of ecological infrastructure to attenuate flooding, reduce sedimentation and water quantity through their renowned alien invasives and river care programme. DUCT is based in the UMDM and works in partnership with the UMDM on many projects, and is available to assist the UMDM in sharing lessons learned to contribute to the successful the implementation of this aspect of the project.

The Worldwide Fund for Nature (WWF South Africa) has implemented climate-proofing projects successfully through ecosystem based approaches, and is willing to support the UMDM by sharing lessons learned.

Output 2.2: Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream.

(2.2.1) Restore and rehabilitate critical ecological infrastructure to improve its capacity to mitigate effects of climate induced disasters.

This output will restore degraded ecological infrastructure that, when functional, plays a critical role in buffering communities from climate change impacts and provides a range of ecosystem services. The site selection for the project was based on the results of a vulnerability study (Annex I) of the District. Within the prioritized sites, communities with Ward 8 of Vulindlela and Ward 8 of Nhlazuka are highly reliant on ecosystem services. In Vulindlela, livestock rearing is an important livelihood activity. However, grasslands are degraded and overgrazed. The predicted impacts of climate variability and change, including more intense short-term rainfall events and longer dry spells, will exacerbate the deteriorated condition of the grasslands. The lack of grass cover will result in the flushing of topsoils into watercourses during and after periods of intense rainfall, resulting in eroded watercourses and deposition into downstream wetlands. This will reduce rainfall infiltration and water table recharge, and limit the ability of wetlands to attenuate floods and improve water quality. Wetlands are used by communities as water collection points, fishing grounds and clay collection points (for brick-making), and reduced ecosystem service delivery will increase the vulnerability of reliant communities in Vulindlela. In Nhlazuka, bush encroachment equates to an increased fire risk as a result of increased fuel loads, as well as reduced food security because of the covered afforded to bushpigs who damage crops in community homegardens. This encroachment will therefore exacerbate the predicted increase in frequency and intensity of fires as a result of climate variability and change, and the anticipated crop failure (in the absence of adaptation interventions), thereby increasing the vulnerability of rural communities in Nhlazuka.

To build climate resilience in the communities within the target areas, the project will invest in rangeland management, grassland restoration and riparian zone rehabilitation in Ward 8 of Vulindlela, and in the management/prevention of bush encroachment and fire break creation in Ward 8 of Nhlazuka. Rangeland management guidelines will be developed and implemented as part of the process. These guidelines will take into account the warnings generated in Output 1.1 and disseminated through Output 1.2, particularly those relating to flash flooding and the potential risk to livestock. The management/prevention of bush encroachment and fire-break creating activities will be undertaken aligned with the wildland fire-related warnings activities of Output 1.1 and 1.2.

The project will adopt a participatory approach based on capacity building interventions as part of the output in the targeted vulnerable communities. Local and traditional authorities, officials and local communities will participate in processes to quantify risk, degradation and community use, and in the design of the risk reduction, restoration and management plans, enhancing the sense of ownership and of accountability for the restored areas and the likelihood that gains will be maintained once the project is completed.

In order to ensure the sustainability and persistence of the project interventions, the project will prioritise hard infrastructure that will last (such as gabion structures in erosion gulleys, stone packing on eroded slopes and wetland rehabilitation using engineered structures), rather than looking only at activities that are dependent on ongoing social management systems. It is noted that some activities require provincial authorisations and rehabilitation plans that are approved by the National Department of Environmental Affairs (DEA). These processes, time frames to achieve approval, and the associated costs including the development of management plans have been factored into project design and are described in Section III.D and Annex V.

Rehabilitation and restoration activities will be implemented with the support of South Africa's Natural Resource Management (NRM) programmes, which have an excellent track record supporting ecosystem rehabilitation. This approach will enable the project to strengthen the consideration of climate change adaptation in NRM programmes beyond the project pilot areas.

Box 5: Department of Environmental Affairs Natural Resource Management programmes.

DEA-NRM will undertake the work of the uMngeni Resilience project as part of a country-wide integrated investment in natural resource management and ecological infrastructure. The work will be implemented using preferred local service providers that will be selected at project inception. Local organisations active in restoration and rehabilitation in the Greater uMngeni Catchment will be encouraged to apply. Such organisations include DUCT, Midlands Conservancies Forum, WWF and Ezemvelo KZN Wildlife. Employment opportunities will favor local residents from the project target sites, promote gender considerations and provide opportunities for unemployed youths[18]. Procurement will follow the National Government guidelines of the poverty relief principles (i.e. those applied by the EPWP) under which at least 55 % of employees are required to be women and at least 55% of employees are required to be youths (under 35).

Apart from their commitment to the uMngeni Resilience project, DEA-NRM have committed to investing in restoring ecological infrastructure in adjacent, complementary sites, and investing in the long-term maintenance of the project's restored areas. This scaling up of project interventions will happen during the lifespan of the uMngeni Resilience project, through funding provided by *inter alia* DEA-NRM's Land User Incentive Programme.

The risk reduction and restoration plans will be designed to complement other project interventions such as:

- the establishment of a community-based fire management strategy in Nhlazuka (Output 1.2), including prescribed burning and the creation of fire breaks;
- the rural area built environment plans (Output 2.1), where the restored ecological infrastructure will assist in buffering investments from climate change impacts; and
- the establishment of community homegardens in Nhlazuka (Output 3.1), where the prevention of bush encroachment will assist in prevention of damage to community homegardens by bushpigs that live in overgrown areas.

(2.2.2) Develop policy recommendations for including adaptation considerations into South Africa's Expanded Public Works Programmes and national sectoral adaptation response strategies.

A workshop will be convened with relevant roleplayers to develop policy recommendations for including adaptation considerations into South Africa's EPWP and national sectoral adaptation response strategies. This workshop will include community members so as to facilitate the consideration of the perspectives of vulnerable groups in the policy recommendation process.

The sharing of lessons learned from the interventions of this output, and the sharing of policy recommendations including suggested budget provision to integrate maintenance of restored ecological infrastructure into EPWP and national/provincial adaptation response strategies, will be captured as case studies and undertaken through Component 4, specifically Output 4.3.

Output 2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development plans and frameworks.

The interventions of this output will result in the development of: i) a tool to facilitate the mainstreaming of climate change adaptation into local level development planning, infrastructure development and land use management; and ii) capacity within relevant officials and institutions to apply the tool in their respective roles and responsibilities.

(2.3.1) Develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant planning and infrastructure development plans/frameworks and municipal land use planning processes.

This intervention will develop a toolkit to mainstream climate change adaptation considerations/ standards into settlement design and upgrade planning in the UMDM, and to reflect on policy implications for relevant provincial, national and municipal building codes, regulations, infrastructure standards, planning and associated budget provision processes, including into the National Housing Code and municipal IDPs and SDFs. This process will also be linked to ongoing interventions that aim to develop environmental layers for municipal planning under SPLUMA. There is a need for planning

[18] According to the Youth Act, the South African definition of "youth" is between 14 and 35 years of age, but in terms of the EPWP only those youths of a legal working age are recruited. The legal working age in South Africa is 15, according to the Basic Conditions of Employment Act 75 of 1997.

practices to evolve in the short-term to plan for the impacts of climate variability and change over the longer term. The toolkit will facilitate this planning and the mainstreaming of adaptation considerations/standards into the results of ongoing and planned climate vulnerability mapping processes, so that best practice innovations to adapt to the impacts of climate variability and change, such as the use of Sustainable Urban Drainage System (SUDS), can be prioritized in ongoing and planned infrastructure projects. For example, programmes such as the Msunduzi Local Municipality Informal Settlement Upgrade Strategy and Programme (under the National Department of Human Settlements' (NDHS) National Upgrade Support Programme (NUSP), through which the 70 informal settlements in MLM will be upgraded) are aware of the need to factor climate change adaptation into planning processes and have prioritized sites based on many factors, including climate vulnerability. However, the programme lacks guidelines and expertise on how to mainstream climate change adaptation considerations into the design, planning and implementation processes. The toolkit developed through the uMngeni Resilience project will provide such guidelines for this and all ongoing infrastructure development plans/frameworks and municipal land use planning processes, as well as implications and recommendations for the relevant policies and strategies.

Box 6: Sustainable Urban Drainage Systems.

Sustainable Urban Drainage Systems (SUDS) aim to minimise or eliminate stormwater run-off from a site, thus reducing the downstream impact. Additionally, unlike traditional urban stormwater drainage systems, SUDS can help to protect and enhance ground water quality. SUDS could include measures such as artificial wetlands, detention and retention ponds and permeable paving. SUDS are being used by the City of Cape Town (South Africa), in combination with Water-Sensitive Urban Design (WSUD), to minimise the impacts of urban sewer flooding, remove pollutants and reduce downstream flooding effects. Consequently, the concepts of SUDS and WSUD have been mainstreamed into the City of Cape Town's Management of Stormwater Impacts Policy and the Cape Town SDF.

(2.3.2) Build the vulnerability mapping and adaptation planning capacities of relevant officials to facilitate mainstreaming of the tool developed in 2.3.1.

Relevant officials, including those involved in planning, engineering and risk management services at the district and local levels, will be empowered to use the toolkit developed in 2.3.1 through a series of at least 15 workshops and practical training sessions. Each official will be required to bring a relevant tool, framework, strategy or policy into which climate change adaptation can be mainstreamed. This will ensure that the training is output driven and applied to the relevant officials.

Table 2: Indicative work programme for Component 2.

Output	Indicative Work Programme
2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities.	*Launch and capacity building to allow stakeholders to inform detailed rural built infrastructure plan design.* • Convene launch workshops with all relevant stakeholders to introduce the project and build working relationships. Stakeholders will include UMDM engineers and Disaster Management officials, community leaders and champions, traditional authorities and other relevant NGOs/CBOs. The workshops will be used to select pilot communities from within the rural areas, and outline plans for risk and vulnerability assessments and infrastructure upgrades. • Develop a Gender and Social Action Plan. • Design and undertake capacity building workshops and training of local community members, traditional authorities and local authorities (including councillors and officials, and ensuring gender equity in representation) from the selected areas within Ward 8 of Vulindlela and Ward 5 of Nhlazuka, so that they can engage in the development of the rural built infrastructure and maintenance plans. *2.1.1 Develop and implement plans to climate- proof built infrastructure and shelter in vulnerable rural communities.* • Building on the UMDM climate response strategy, undertake detailed participatory risk and vulnerability assessments of the selected areas within the pilot wards, to delineate infrastructure (including houses, community buildings, schools, clinics, meeting centres) and identify areas vulnerable to climate-induced risks (including low-level river crossings, eroded stormwater drainage lines and steep-sloped cultivated or built up areas). These activities will be undertaken in conjunction with those of Outputs 1.2 (community-based flood and fire risk management strategies), Output 2.2 (mapping of ecological infrastructure in Vulindlela and Nhlazuka) and Output 3.2 (development of climate-resilient farm plans in Vulindlela and community homegardens in Nhlazuka).

	• Taking gender considerations into account , engage local and traditional authorities and local communities in the interactive development of a plan that responds to the identified vulnerabilities and risks. • Develop a rural built infrastructure implementation and maintenance plan for the identified pilot areas within Ward 8 of Vulindlela and Ward 5 of Nhlazuka, including the establishment of the required partnerships. Climate change adaptation interventions will include: i) construction of stormwater drainage channels to divert stormwater away from houses and community facilities during times of high run-off from roads and other built surfaces; ii) installation of gabions to stabilise draining channels; iii) installation of lightning rods – presently available through CoGTA funding – at houses and community facilities susceptible to lightning strikes; iv) use of chicken wire/plaster on eroded areas to strengthen houses; v) construction of concrete aprons around houses to reduced base erosion; vi) roof strengthening of houses and key community facilities; vii) terracing of individual and community homegardens on steep slopes to prevent erosion; viii) bank stabilization and retaining wall support using tyres and sandbags; ix) installation of rainwater tanks to harvest rainwater for drinking, washing and irrigation, as well as to reduce downstream erosion; x) planting of multi-use, indigenous trees to provide shade, soil stabilization and fruit; and xi) constructing low-cost pedestrian bridges upstream of community river crossing points that are vulnerable to flash flooding. The strengthening of houses and key community facilities, including emergency meeting points, and the terracing of individual and community homegardens will be undertaken in conjunction with the activities of Outputs 1.1, 1.2 and 3.1. • Explore the need and feasibility of using alternative building materials that are more resilient to climate induced risks, or that reduce pressures on ecological infrastructure. • Implement the rural built infrastructure implementation and maintenance plans for the identified pilot areas within Ward 8 of Vulindlela and Ward 5 of Nhlazuka. *2.1.2 Develop guidelines and policy recommendations for the inclusion of climate-proofing and adaptation mechanisms into rural settlement and municipal land use planning processes.* • Based on lessons learned, in partnership with local and traditional authorities and taking gender equity into consideration, review the climate risks associated spatial land allocation processes in communal areas • Develop a set of guidelines for the mainstreaming of climate risks into the location of municipal infrastructure in a participatory and gender-sensitive manner. These guidelines will include steps on how to ensure climate resilience is incorporated into the design and maintenance of infrastructure, as well as infrastructure standards and will include a handbook for the installation of low-cost pedestrian bridges in rural areas that are prone to flash flooding (upstream of the low-lying river crossings currently used by community members).
2.2 Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream.	*Launch and capacity building to allow stakeholders to inform detailed ecological infrastructure plan design.* • Develop terms of reference for an ecological infrastructure coordinator (to be shared between the Vulindlela and Nhlazuka project sites), hire the coordinator and procure office and other relevant equipment. • Convene launch workshops with all relevant stakeholders to introduce the project and build working relationships. Stakeholders will include Ezemvelo KZN Wildlife, DEA-NRM, UMDM Disaster Management officials, community leaders and champions, traditional authorities and other relevant NGOs/CBOs. The workshop will be used to select sites from within the rural areas, and outline plans for risk and vulnerability assessments and infrastructure upgrades. • Taking gender considerations into account, design and undertake capacity building workshops and training of local community members from the selected areas within Ward 8 of Vulindlela and Ward 5 of Nhlazuka, so that they can engage in the development of the ecological infrastructure restoration and maintenance plans, including the wetland rehabilitation plans (see Section III.D). • Submit wetland rehabilitation plans to the DEA for approval, under the provincial authorisation that is provided through the Working for Wetlands Programme. *2.2.1 Restore and rehabilitate critical ecological infrastructure to improve its capacity to mitigate effects of climate induced disasters.* • Undertake detailed site assessments, including mapping of ecosystems to identify valuable, degraded and vulnerable areas. The mapping will be undertaken in a participatory, gender-sensitive manner, and will aim to quantify ecosystem goods and services use and to prioritise ecosystems for restoration. Recommendations will be developed for: i) rangeland management and grassland restoration in Vulindlela; and ii) management/prevention of bush encroachment, and fire break creation in Nhlazuka. • In partnership with Ezemvelo KZN Wildlife and DEA-NRM, and in consultation with local and traditional authorities and local communities, develop ecological infrastructure

	restoration plans and management models for the area, focusing on rangeland management and grassland restoration in Vulindlela, and management/prevention of bush encroachment, as well as fire break creation, in Nhlazuka. • Implement the ecological infrastructure restoration plans, with support from DEA-NRM. Where required, nurseries will be established to initiate the restoration work. FireWise (Kishugu Public Benefit Organisation) will undertake fire risk assessments and fire management planning, including prescribed burning in Nhlazuka. • Explore the feasibility of generating alternative fuel sources (e.g. charcoal and pellets) from the alien vegetation cleared through the management of bush encroachment and creation of fire break in Nhlazuka. *2.2.2 Develop policy recommendations for including adaptation considerations into South Africa's Expanded Public Works Programmes and national sectoral adaptation response strategies.* • Convene a workshop with relevant role players to develop policy recommendations for including adaptation considerations into South Africa's EPWP and national sectoral adaptation response strategies.
2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development plans and frameworks.	*Launch and capacity building to allow stakeholders to inform detailed plan to mainstream climate change adaptation considerations/standards into settlement upgrade plans.* • Convene launch workshops with all relevant stakeholders to introduce the project and build working relationships. Stakeholders will include representatives of Human Settlement, Engineering, Planning and Disaster Management officials from the UMDM. • Analyse the extent to which the UMDM is currently able to include climate change considerations into settlement planning, considering both technical and human resource capacity. *2.3.1 Develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant planning and infrastructure development plans/frameworks and municipal land use planning processes.* • Working with relevant officials in the UMDM and in National Government, develop a tool for mainstreaming climate change adaptation considerations/standards into settlement design and upgrade planning, as well as into all relevant planning and infrastructure development plans/frameworks and municipal land use planning processes. The tool will be focused on the UMDM, but will be relevant to the rest of KwaZulu-Natal as well as other areas of South Africa. • Develop a training toolkit for climate change adaptation mainstreaming. • Develop recommendations on how this tool could be incorporated in relevant provincial, national and municipal building codes, regulations, infrastructure standards, planning and associated budget provision processes, including into the National Housing Code and municipal IDPs and SDFs. *2.3.2 Build the vulnerability mapping and adaptation planning capacities of relevant officials to facilitate mainstreaming of the tool developed in 2.3.1.* • Undertake 15 output driven training and workshops with relevant officials to build the capacity of UMDM and other actors involved in planning, engineering and risk management services so that they can apply the tool through their respective roles and responsibilities.

Component 3: Small scale farmers have improved resilience and reduced vulnerability to existing and anticipated impacts of climate variability and change (USD 1,410,476).

Within the UMDM, a range of small scale agricultural enterprises exist, many of which are beneficiaries of national land reform and redistribution programmes. These include small scale crop production, commercial forestry, dairy farming and sugar cane, as well as traditional livestock grazing. Many small scale farmers (a considerable proportion of who are women) operate marginal enterprises that are highly vulnerable to climate variability and change.

Some work is being undertaken in the UMDM to improve resilience and reduce the vulnerability of small scale farmers to climate variability and change, including identifying appropriate crops and cultivars, exploring integrated wildfire management approaches, and permaculture. This includes work done by the DAEA, UKZN SAEES, and a variety of NGOs and CBOs. These actors have individually, and sometimes collectively, worked on a range of pilot projects to reduce the risks facing small scale farmers due to climate variability, and there is an opportunity to support a coordinated attempt to assist small scale farmers to practice climate-resilient agriculture in the UMDM and beyond.

Box 7: Ongoing agricultural projects in the target area. See Section II.F and II.I for additional detail.

- UKZN SAEES scientists and field workers have been running on-farm crop trials in the Swayimane region since 2011. Initial results show that contrary to indications by farmers that traditional crops can be grown all year round, there is a risk of crop failure during the winter period. Additional crops that are resilient to drought and water logging have been introduced to limited portions of land owned by small scale farmers.
- The Food and Agriculture Organisation (FAO) has partnered with the University of Pretoria and the South African government to deliver a programme that aims to develop and promote smallholder farmer innovative techniques, methods and approaches to managing climate-related risks to crop production and post-harvest handling. The programme is being implemented in Southern African areas that are prone to climate-related disasters, including KwaZulu-Natal.
- South Africa's Food Security Programme supports small scale and emerging farmers with inputs in the form of "food parcels" that include seeds, fencing and rainwater harvesting infrastructure. Training and mentoring are provided to assist with food provision for household use.

This component will strengthen the climate resilience of small scale farmers in the UMDM through a suite of concrete interventions resulting in tangible benefits, notably increased yield from farms using climate-resilient crops and climate-smart techniques. This will be achieved by building on and scaling up a farm trials pilot project that is currently underway in Swayimane, and by creating linkages between this work and the extension services and climate change adaptation strategies of the DAEA. This will facilitate the sharing of site-based lesson across the Province, and allow project outputs to be scaled up and replicated through existing departmental interventions.

This output will focus mainly on Ward 8 of Swayimane and Ward 8 of Vulindlela where DAEA extension officers and UKZN SAEES Field Assistants will work with cooperatives of small scale farmers to introduce and increase the use of climate-resilient crops and climate-smart agricultural practices, and set up market linkages.

The project will second two extension officers from UKZN to the DAEA, and project staff including Field Assistants, extension officers and farmers will collaboratively develop and implement farm-level plans for climate change adaptation and resilience. These will include interventions focused on soil conservation, conservation agriculture, organic farming and irrigation. Wildland fire risk assessments and fire management planning will contribute to more effective grazing management, improved productivity and landscape resilience. Project staff will also provide support to the community in Ward 5 of Nhlazuka where terraced community homegardens that are fenced for protection from wild animals (including bushpigs) will be established to improve food security.

Investments in small scale physical infrastructure at the farm level, in combination with improved seasonal forecasting through Output 1.3, will build resilience to the impacts of climate variability and change, secure water from reliable and appropriate sources (including rainfall harvesting), and provide storm shelters for livestock and harvests, where appropriate. At the same time, investments in ecosystem restoration and rehabilitation will enhance agricultural resilience to climate variability and change.

A significant proportion of small scale farmers are women. The project will pay particular attention to the concerns and needs expressed by this particularly vulnerable group in both project planning and implementation.

Through the development of support materials and training, the adaptive capacity of DAEA personnel will be increased, and the Department will be supported to mainstream adaptation practices into its extension services. In collaboration with farmers, best practice guidelines for targeted agricultural practices will be developed. This intervention will result in concrete adaptation benefits to small scale farmers in the target areas, as well as others supported by DAEA extension officers.

Lessons learnt from this project will be used to develop policy recommendations for mainstreaming into the policies and practices of relevant farmers' associations, the DAEA and municipalities.

As described in Section III.A, this component will be coordinated by a Task Team that will provide a platform for relevant organisations to coordinate their programmes of work, including those that are not directly related to the outcomes of the uMngeni Resilience project.

Output 3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers.

Specifically, this output will strengthen the resilience of small scale farmers and local communities in the three target areas by generating concrete adaptation benefits through:

- expanding on the on-farm trials undertaken by UKZN SAEES scientists and field workers, and applying the results at 200 farms (totaling 2,000 ha) within Ward 8 of Swayimane, benefitting 300 women and 100 men small scale farmers;
- initiating on-farm trials at 200 farms (totaling 1,000 ha) in Ward 8 of Vulindlela, based on modeling results of climate-resilient crops, and introducing climate-smart agricultural practices, benefitting 300 women and 100 men small scale farmers; and
- establishing 5 community homegardens (totaling 2.5 ha) in Ward 5 of Nhlazuka, benefitting 100 women and 50 men community home gardeners.

(3.1.1) Increase agricultural yields through climate-smart farming on small scale farms and community homegardens.

In Swayimane, interventions will build on the traditional knowledge, crop and climate modeling results and outcomes of the on-farm trials gathered by UKZN SAEES scientists and field workers over 2011-2013. The 400 small scale farmers with whom the UKZN SAEES has previously worked with will be divided into groups of ~20 farmers, who will work collaboratively in different target areas with the intention of increasing the size of farmed land from ~2 ha to ~10 ha per household. Each group will therefore farm an area comprising ~200 ha. These will be the same small scale farmers engaged through and benefiting from the interventions of Output 1.3, aimed at generating and disseminating agro-meteorological information. Based on farm plans developed collaboratively through farmer engagement undertaken at the outset of this output, climate-resilient crops will be planted. Plans will be informed by the results of the previous on-farms trials and crop models. Species will include legumes (such as dry bean, bambara groundnut and cowpea) and cereal crops (such as sorghum and millet) that are drought tolerant, and taro that is tolerant to water logging. This will enable year-round harvesting, according to a harvesting schedule. In addition, some crops (e.g. bambara groundnut and cowpea) are able to fix atmospheric nitrogen and improve the fertility of the soil. These species will be intercropped with existing crops such as taro, maize and dry bean to diversify crop production. The groups of small scale farmers will be trained in climate-smart agricultural techniques, such as integrated crop management, water conservation, storage and irrigation management, and minimum tillage practices. The required infrastructure and equipment will be provided, such as water storage tanks, fencing requirements, harvesting equipment such as hand hoes and garden forks, and tractors to replace cattle for land preparation. These adaptation benefits will increase yield from farmed areas, building food security and reducing the vulnerability of 300 women and 100 men small scale farmers in the area. Whilst the adaptation interventions will target 400 small scale farmers directly, 'farmer field school' days will be held, to share the lessons learned with all farmers in the ward, and subsequently benefit ~1,000 households.

In Vulindlela, the community will be engaged to identify 300 women and 100 men small scale farmers to participate and directly benefit from the project. The selection of small scale farmers and delineation of agricultural areas, including community homegardens, will be initiated through launch workshops for the component, which will include interviews conducted by project personnel, DAEA agricultural extension officers and UKZN SAEES Field Assistants. These workshops will facilitate, in consultation traditional authorities and community leaders, the identification of a representative, gender-sensitive group of small scale farmers to participate in a risk and vulnerability analysis, which will include quantification of farmer productivity, assessments of natural resource capacity and identification of climate-induced risks specific to small scale farms. Based on the results on the engagements and interviews, willing small scale farmers will be identified (by virtue of interest shown and participation in meetings), and those most vulnerable (based on the risk and vulnerability assessment) will be selected as the 400 participants for a series of on-farm trials of different climate-resilient crops and climate-smart agricultural techniques. The trials will be based on collaborative farm plans, and will include the provision of necessary farming equipment. This suite of concrete adaptation benefits will improve the resilience of farming systems in the target area, resulting in increased yield from climate-resilient crops, this reduce the vulnerability of 300 women and 100 men small scale farmers in Vulindlela. The selection will be made in association with community leaders and traditional authorities. The use of improved grassland species and animal husbandry will be included in the trials, as well as investigations into legumes and cereal crops that can be used for

human consumption as well as animal feed. As in Swayimane, 'farmer field school' days will be held, to share lessons learned from the on-farm trials with all farmers in the ward.

In Nhlazuka, community homegardens will be established in areas where subsistence farming is currently being practiced on communal land. Plans for the community homegardens will be developed collaboratively with community members, taking gender considerations into account. A risk and vulnerability assessment will be undertaken to select the areas for planting, and to select the community members who will be involved. Approximately 5 community homegardens will be established, each 0.5 ha in size, directly benefitting at least 150 community members (100 women and 50 men) who will be trained in the use of different climate-resilient crops and climate-smart agricultural techniques. Where necessary, community homegardens will be terraced – this technique is not currently widely used in Ward 5 of Nhlazuka, where small subsistence homegardens are regularly located on steep slopes and therefore vulnerable to erosion from the predicted increase in frequency and intensity of rainfall events. To counter the widespread and growing problem of crop damage from bushpigs in the area, community homegardens will be fenced, and a concrete slab footing will be laid beneath the fence to prevent the bushpigs from digging under the fence. This suite of adaptation activities will improve food security and provide concrete adaptation benefits to communities tending to the homegardens. These activities will be linked to the ecological infrastructure interventions of Output 2.2. The terracing and fencing techniques, as well as demonstration on the benefits of climate-resilient crops and climate-smart agricultural practices, will be shared with the wider community through 'farmer field school' days.

(3.1.2) Link farming cooperatives to existing and new markets.

The use of climate-resilient crops and improved farming techniques in Ward 8 of Swayimane will allow for an increase in the size of farmed land from ~2 ha to ~10 ha per household. This increased production will facilitate a shift towards commercial agriculture in this region. The potential of a commercial agriculture operation will necessitate the establishment of cooperatives and benefit sharing schemes, based on a business plan and the necessary marketing material. This will be piloted in Ward 8 of Swayimane, where presently farmers sell surplus produce as hawkers, or to hawkers in small towns. Post-harvest storage requirements will be identified and a pack-house constructed. Supply chains and the required contracts will be established, linking the cooperatives to markets and regular buyers, thereby facilitating a regular flow of income from the climate-resilient farming practices. Profits can then be re-invested in the cooperative, sustaining the commercial agriculture. As a result, linking small scale farmers to new and existing markets is a concrete adaptation activity that will further reduce the vulnerability of small scale farmers in the target area. Research will also continue to evaluate the possibility of producing crops all year round, ensuring the supply chains are continually satisfied.

A national conference with the aim of establishing a platform for sharing climate change adaptation agriculture lessons across the country, and making research-policy linkages, will be convened. This, as well as processes to develop policy recommendation to continue long-term UKZN SAEES projects and sustain support to small scale farmers in the target areas, and throughout the UMDM, will be funded through Component 4.

Output 3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation practices into its extension services and farmer support programmes.

(3.2.1) Enhance the capacity of DAEA staff to mainstream climate change considerations into their activities.

This output will strengthen the support, extension and special advisory services that the DAEA provides to small scale farmers in the UMDM. The primary target areas will be Ward 8 in Swayimane and Ward 8 in Vulindlela. An extension officer will be placed in each of these areas and trained to provide the required services. In addition to these new extension officers, capacity will be developed within existing extension officers, based on the results of a capacity assessment, to be applied to other agricultural areas of the UMDM, including Ward 5 of Nhlazuka. Training will be in the form of short courses, handbooks and manuals aligned with current programmes being developed and implemented by the DAEA, and will focus on the integration of risks, resulting from climate variability and change, into farm planning and ongoing support. This will develop capacity on the use of climate-resilient crop species, climate-smart agricultural techniques and short-term and seasonal forecast information. Contracts will be signed with extension officers to ensure that they remain committed for

the duration of the project, and with the DAEA for a stipulated period thereafter. National agricultural stakeholders will be engaged through the Task Team of the component, as well as through policy conferences as described in Component 4.

(3.2.2) Mainstream climate-smart agricultural practices into ongoing farmer support programmes.

Opportunities will also be identified for integrating the outputs of the project into ongoing farmer support programmes and other agricultural interventions across KwaZulu-Natal. A review of current and planned agricultural projects and farmer support programmes in the Province will be undertaken, to identify entry points for the mainstreaming of climate-smart agriculture based on lessons learned through the participatory trials of the project, and taking gender considerations into account. Based on this review, a mainstreaming plan will be developed and implemented.

Table 3: Indicative work programme for Component 3.

Output	Indicative Work Programme
3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers.	*Launch and capacity building to allow stakeholders to inform farm/community homegarden plan design.* • Develop terms of reference for a Component Coordinator, Field assistants, contract these project staff, and procure necessary equipment, including computers. • Convene launch workshops with all relevant stakeholders in Ward 8 of Swayimane, Ward 8 of Vulindlela and Ward 5 of Nhlazuka to introduce the project and build working relationships. Stakeholders will include DAFF, DAEA, UKZN SAEES, community leaders, traditional authorities, representatives of farmers' associations, UMDM and other relevant NGOs/CBOs. The workshops will be used to discuss, *inter alia*: i) who will participate in the project interventions; ii) the most effective and gender-sensitive means of community and small scale farmer engagement; iii) how best to benefit all small scale farmers and community members in the three target areas; and iv) the role of DAEA agricultural extension officers in the project and the nature of the support required. The workshops will be linked to those of Output 3.2, and will be used to ensure that gender considerations are mainstreamed into the approach for this component of the project. • Undertake community consultations in the target areas. At Swayimane this will entail informing the participating farmers of the expansion of the previous three years work, and the formation of collaborative groups of ~20 farmers each. At Vulindlela and Nhlazuka, consultations with community leaders, traditional authorities and small scale farmers, as well risk and vulnerability analyses will be used to select farmers/community members for participation in the project. UKZN SAEES Field Assistants will assist with the community engagement in the three areas. • Develop training programmes for small scale farmers to build capacity in the use of climate-resilient crops and climate-smart agricultural practices. The training programmes will comprise ongoing courses, delivered through farmer field schools, as well as brochures. Training programmes will ensure that women are adequately represented and involved in the project. • Train ~400 small scale farmers each of Ward 8 of Swayimane and ~400 in Ward 8 of Vulindlela, and train ~150 community home gardeners in Ward 5 of Nhlazuka. *3.1.1 Increase agricultural yields through climate-smart farming in small scale farms and community homegardens.* • Develop, collaboratively with small scale farmers through workshops, and drawing on the crop and climate models and traditional knowledge, farm plans for Ward 8 of Swayimane and Ward 8 of Vulindlela, and community homegarden plans for Ward 5 of Nhlazuka. These will include: i) GIS maps of the agricultural areas; ii) planting and harvesting schedules for the climate-resilient crops (e.g. bambara groundnut, cowpea, sorghum and millets); iii) the development of seed production and storage systems of the identified crops; iv) outline of soil preparation and cropping systems according to climate-smart agricultural principles; v) identification of water storage and irrigation requirements; vi) identification of equipment needs, including tractors, fencing requirements and harvesting equipment such as hand hoes and garden forks; vii) links to EWSs developed in Component 1, including flood, storm, and fire warnings and the provision of short-term and seasonal forecast information; and viii) links to ecological infrastructure interventions outlined in Output 2.2. • Implement climate-resilient farm/community homegarden plans with the assistance of DAEA agricultural extension officers, UKZN SAEES Field Assistants. This will include procuring and installing the required equipment and infrastructure. The plans will form 5 year business plans to test the sustainability of interventions through participatory trials. • Establish long-term monitoring stations at project intervention sites. These stations will be

	a continuation of the work initiated by UKZN SAEES in 2011, and will contribute towards the generating data for publication in peer-reviewed literature. This will contribute towards sustainability of the project interventions, and facilitate continued support to small scale farmers after the duration of the project. • Develop training material based on the lessons learned, and train additional farmers not directly benefiting from the project at a number of 'farmer field school' days in the three target areas, taking gender considerations into account. This will increase the number of beneficiaries of the improved knowledge generated by the project on climate-resilient crops and climate-smart agricultural techniques. *3.1.2: Link farming cooperatives to existing and new markets.* • Taking gender considerations into account, establish/register cooperatives in Ward 8 of Swayimane, including the development of a business plan and marketing material to sell surplus produce, and a benefit sharing scheme to distribute profits among member farmers. • Identify post-harvest storage requirements and establish a pack-house. • Negotiate contracts to establish market linkages and supply chains for the reliable sale of produce. Potential buyers include supermarkets from within the UMDM as well as the KwaZulu-Natal Province.
3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation practices into its extension services and farmer support programmes.	*3.2.1 Enhance the capacity of DAEA staff to mainstream climate change considerations into their activities.* • Develop terms of reference for two extension officers, hire the extension officers and procure the necessary office and field equipment, including computers. • Clearly define roles and responsibilities of the extension officers, particularly linkages with the Provincial DAEA and National Agriculture Departments. This will include procedures to incorporate the extension officers into the DAEA at the end of the project. • Convene launch workshops with all relevant agriculture sector partners and establish working relationships for the project. Stakeholders will include DAFF, DAEA, UKZN SAEES, UMDM and other relevant NGOs/CBOs. • Analyse the capacity of DAEA agricultural extension officers and develop an extension training programme that is supported by the project. • Develop short course training materials to support the DAEA extension programme and build the climate change adaptation knowledge of DAEA agricultural extension officers and senior officials. Training material will be based on best practice guidelines on the use of climate-resilient crops, climate-smart agricultural techniques, and short-term and seasonal forecasts, will take gender considerations into account and will comprise ongoing courses, handbooks and manuals. • Train DAEA agricultural extension officers and senior officials through workshops/symposia. Contracts will be signed with extension officers to ensure that they remain committed for the duration of the project, and with the DAEA for a stipulated period thereafter. *3.2.2 Mainstream climate-smart agricultural practices into ongoing farmer support programmes.* • Undertake a review of current and planned agricultural projects and farmer support programmes in KwaZulu-Natal, to identify entry points for the mainstreaming of climate-smart agriculture based on lessons learned through the participatory trials of the project. • Develop a mainstreaming plan, based on the review of relevant projects and programmes. • Establish the required links with projects and personnel, to mainstream the appropriate agricultural practices. Potential projects include the FAO Food Security Programme and efforts by the South African government to support small scale and emerging farmers with agricultural inputs, including seeds, fencing and rainwater harvesting infrastructure, training and mentoring – see Section II.F for additional detail.

Component 4: Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication (USD 698,116).

Component 4 has been designed to enable effective and gender-sensitive participation in the project, to capture learning and to support the sustaining, scaling up and replication of project successes.

At the outset of the project, a Knowledge Management Strategy will be developed. This strategy will detail processes for capturing, sharing and disseminating learnings. The Knowledge Management Strategy will also set out how learnings from the project will be integrated with existing knowledge and how this will inform adaptive management of the project itself.

Output 4.1: Community champions, officials and authorities are empowered to participate in the project's activities.

(4.1.1) Build the capacity of local champions (including selected community members, councillors, traditional authorities and officials) to mainstream climate change adaptation responses into planning, budgeting and policy development processes.

In support of the project's participatory approach, a capacity building programme will be designed and implemented from the outset of the project. This programme of work will be enabled in all of the components of the project, where selected community members, councillors, traditional authorities and officials will be empowered to engage with the programme of work of that is specific to that component. Participants will be selected using transparent processes that ensure women are adequately represented and involved, and are able to participate fully and equitably in project activities.

(Note to reviewers: Where capacity building is a direct enabler of implementation, the project's capacity building activities have been deliberately placed with the activities they are designed to enable. Capacity building activities that are applicable to the whole project are described in Component 4).

In Output 4.1, the project will target selected individuals as follows:

- Community champions at the four project sites (at least 32 in total). These champions will be provided with an opportunity to attend short courses on disaster management related skills, including basic first aid (accredited to National Quality Framework (NQF) Level 2). It is envisaged that this will empower community members to engage with officials and assist in the development and implementation of the EWSs at each of the sites, and assist the UMDM and Local Municipalities in proactive disaster management. It is envisaged that four community members from each project target site will be trained.
- Municipal officials and managers who are responsible for planning and service delivery at the project sites (at least 16 in total). These officials and managers will be offered an opportunity to attend a range of accredited work-place-based Environmental Practices training courses. Such courses will include *inter alia* understanding ecological infrastructure in a context of climate change risks and sustainability practices, as relevant to the specific project sites.
- Traditional authorities who have jurisdiction over the project sites (at least 8 in total). This may include a series of practical sessions where different climate change adaptation issues and practices can be explored and developed through 'practice based dialogue' and interactive 'sharing and doing'.
- Councillors who are elected in each of the areas (4 in total). A range of presentations will be developed, tailored to different councillors. The presentations will be supported by the sharing of a range of "change-choice-practice" methodologies that are designed in response to pressing sustainability issues in the region.

The approach that will be adopted for each of the targeted groups will be refined during the project's initiation activities, and in consultation with the anticipated participants in each group. Processes will be applied that mobilise local and traditional knowledge and beliefs and enable the strengthening of the project through the participation of local communities. Furthermore, the capacity of councillors and officials will be built to mainstream climate change adaptation responses into planning, budgeting and policy development processes. These processes will be essential if the outcomes of the uMngeni Resilience project are to be supported and sustained.

(4.1.2) Produce and disseminate innovative educational and awareness raising materials about climate change adaptation.

This output will support the production and dissemination of awareness-raising and educational materials about climate change adaptation. This will include using innovative mechanisms such as the Eco-Schools Programme[19] network which is active in UMDM. Eco-Schools have a strong community participation process which is encouraged through a 'school in community' approach. The programme is aimed at creating awareness and action around climate change adaptation and environmental

[19] The Eco-Schools Programme is an international programme of the Foundation of Environmental Education (FEE) and is active in 52 countries around the world. The Eco-Schools Programme was initiated in South Africa in 2003, with WESSA as the implementing agent. There are over 3,600 registered schools with the programme worldwide, and 250 within South Africa.

sustainability in schools and their surrounding communities, as well as supporting Education for Sustainable Development in the national curriculum. Support will be provided to existing Eco-Schools within the project target sites, to build on and disseminate lessons learned through the project at the relevant target sites. Other innovative means of teaching, for example through performance art, school art competitions and picture-building, has proved popular and effective elsewhere in the UMDM where functional literacy is weak, and will therefore be applied through the project.

An information sharing database will be designed with SMS connectivity to all participating individuals and institutions. This will be linked to the EWS dissemination systems developed in Component 1. Other social media applications will also be explored. This step in the capacity building will support the Knowledge Management Strategy developed at the outset of the output. This strategy will detail processes for capturing, sharing and disseminating learnings through Activity 4.1.2 of the output. The information portal will also set out how learnings from the project will be integrated with existing knowledge and how this will inform adaptive management within the project itself.

Box 8: WESSA's approach to the capacity building programme.

A second generation[20] climate change education programme will be applied through the uMngeni Resilience project. This programme will complement the awareness raising work of first generation approaches through situated, engaged and practice-based action taking. Second generation climate education programmes engage with participants, from their own perspectives, and offer much more than simply awareness raising presentations aimed at people. In essence they also invite participants to engage in 'change-choice-practices' that are relevant to their own daily lives.

The "Stepping up to Sustainability" concept, as developed through the SEMP process, is a second generation programme. It draws on issues and risks of sustainability and the Stockholm Resilience Centre's 'Planetary Boundaries' concept. The work emphasises a 'practice-based orientation'[21] and, while environmental understanding is a prerequisite, the actual practices are emphasised rather than simply awareness raising. This work is loosely based on the 'nudge' research experience[22] (Thaler & Sunstein, 2008).The nudge research shows that while it is not difficult to change people's attitudes to the environment, behaviour change is unlikely to follow when using the traditional awareness-based approaches to change. Globally, awareness videos such as Al Gore's An Inconvenient Truth achieved wide-spread popularity, but unfortunately the sought after change for more sustainable living has not followed to any great extent. Nudge research, however, goes on to explain that situations can be structured ahead of time in ways through which individuals are progressively able to select better, more sustainable life-style options.

Output 4.2: Project knowledge outputs and experiences are shared and captured.

This output will allow for the sharing of lessons learned within and between pilot communities, as well with municipal and provincial officials responsible for planning and policy development. Post-graduate opportunities will be provided for students to engage with the development and implementation of the project, and work with beneficiaries in communities to distill lessons learned through case studies specific to different aspects of the project. The case studies, as well as the various tools developed through the project, will be shared locally, nationally and internationally through platforms provided.

This output is expanded further in Section II.G.

(4.2.1) Create partnerships with tertiary institutions that support students to study project interventions.

Specifically, the UMDM will establish partnerships with tertiary institutions and, through the project, will provide bursary top-ups for students to study project interventions. This process will aim at

[20] First generation climate change education programmes include awareness raising and presentations to inform people. Such orientations tend to have a well-intentioned 'causal' approach to social change that seeks to 'cause' change in others through awareness raising and the creation of fear of climate change risks. Unfortunately, such approaches, which have a dominating top-down orientation, have not proved very successful. In fact many researchers are concerned that such approaches foster action paralysis as anxiety levels build in communities of people at risk. Furthermore, awareness raising, alone, does not lead directly to behaviour change.

[21] Kemmis, Stephen & Rebecca Mutton (2012): Education for sustainability (EfS): practice and practice architectures, *Environmental Education Research*, 18:2, 187-207. See: http://dx.doi.org/10.1080/13504622.2011.596929.

[22] Thaler, R.H., and C.R. Sunstein."Nudge: the gentle power of choice architecture."*Capital ideas: selected papers on decision research – May 2008 – nudge.*2008.The University of Chicago Booth School of Business.11 March 2013. See: http://www.chicagobooth.edu/capideas/may08/5.aspx.

attracting students who are from the uMgungundlovu area to select the UMDM as a focus of their studies.

(4.2.2) Convene reflection workshops and learning exchanges where best practice approaches can be observed and captured.

Processes to capture lessons will be designed to ensure that community members are supported to share emerging lessons and that local knowledge and the experiences of vulnerable communities are integrated in outcomes and recommendations. These may include reflection workshops and learning exchanges. The lessons learned throughout the life of the project will be captured in publications, case studies and as policy recommendations.

The project will facilitate two knowledge exchange forums. It is recommended that the first exchange emphasises enhancing learning within the project and that it is held mid-term as part of an adaptive management process. The second exchange should be held at or near termination with a greater focus on sharing lessons beyond the project.

In addition, results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will focus on facilitating horizontal learning between different districts and institutions as well as vertical learning between different spheres of government.

(4.2.3) Provide platforms for project stakeholders to share experiences nationally and internationally.

Finally, this output will also support processes and provide platforms for project lessons to be shared locally, nationally and internationally, and will aim to ensure that some of this sharing is delivered by local project partners so that the voices of vulnerable community members may be heard directly. This may include participation in Adaptation Fund (AF) and National Implementing Entity (NIE) and learning events.

Output 4.3: Policy recommendations support sustaining, scaling up and replicating project successes.

This output will support project partners to share policy recommendations and best practices that emerge from all four components of the project. The project will identify and participate in, as relevant and appropriate, scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

(4.3.1) Convene national policy conferences to share outcomes of the project and promote linkages between these and relevant national policy processes.

The UMDM will ensure that project outcomes are shared across District and Local Municipal platforms so that the lessons learned in the wards targeted by the project inform the formulation and implementation of climate change adaptation interventions across the UMDM. This sharing will be embedded in the project's task team from the outset of the project.

Provincial and national policy conferences will be convened to support this sharing, and will aim to integrate learnings from the project with other relevant learnings from across South Africa. These conferences will focus on policy recommendations for mainstreaming climate change adaptation into Agriculture, Human Settlement Planning and Disaster Management sectors. This will promote linkages and allow for focused engagements with other ongoing national adaptation projects and processes and the distillation of policy recommendations that are relevant for these processes.

As part of the UMDM's involvement in the Ecological Infrastructure Partnership Programme (EIPP), the project's ecological infrastructure pilot projects will be shared with South Africa's emerging ecological infrastructure programmes so that policy linkages can be made.

(4.3.2) Develop a plan to sustain, scale up and replicate project outcomes.

Under the leadership of the UMDM, project partners will develop a plan for sustaining, scaling up and officially adopting best practices that emerge from the project's interventions. This plan will clearly set

out how project outcomes will be sustained, replicated and scaled up beyond the focal areas of the project, with clearly assigned and agreed responsibilities for implementation.

Strategies, including motivations for long-term budget allocations, to sustain project interventions beyond the project investment period will be developed and distributed. Where relevant these commitments will be captured in Memorandums of Understanding (MOUs) and Service Level Agreements (SLAs), some of these at project inception. These include a continued proactive approach by the UMDM to managing disasters, and the continued functioning of the flood, storm, fire and agro-meteorological EWS established.

Strategies to scale up successful project interventions to other high risk areas locally and nationally will also be developed. This will entail the development of a set of targeted outputs to be integrated into institutional planning and budgeting cycles. Workshops and training sessions will be convened to facilitate the uptake of these outputs, so that project investments in this project can benefit vulnerable communities in other priority areas.

Table 4: Indicative work programme for Component 4.

Output	**Indicative Work Programme**
Launch	• Develop a Knowledge Management Strategy for the project
4.1. Community champions, officials and authorities are empowered to participate in the project's activities.	*4.1.1 Build the capacity of local champions (including selected community members, councillors, traditional authorities and officials) to mainstream climate change adaptation responses into planning, budgeting and policy development processes.* • Identify capacity building needs of community champions, councillors, traditional authorities and officials and their capacity building needs. • Design capacity building programme. • Implement the programme and empower selected community champions, councillors, traditional authorities and officials to participate in and to sustain the project's outcomes. *4.1.2 Produce and disseminate innovative educational and awareness raising materials about climate change adaptation.* • Identify awareness raising and educational material needs. • Develop a project information portal. • Produce and disseminate materials. • Support existing Eco-Schools in project target sites to build on and share project lessons learned.
4.2 Project knowledge outputs and experiences are shared and captured.	*4.2.1 Create partnerships with tertiary institutions that support students to study project interventions.* • Provide top-up bursary opportunities for MSc and PhD students who are from the UMDM area to study aspects of project implementation and develop case studies that can be shared. • Provide platforms for bursary recipients to share their findings with local community members and policy makers. *4.2.2 Convene reflection workshops and learning exchanges where best practice approaches can be observed and captured.* • Convene reflection workshops in each of the project sites, at mid-term and close to the end of the project, and capture outputs so they may be shared. • Convene workshops between community members and policy makers to enhance policy level understanding of community views and priorities, and capture outputs so they may be shared. • Convene learning exchanges between project stakeholders and stakeholders in other areas where best practice approaches can be observed. • Capture lessons in case studies, publications and policy recommendations. *4.2.3 Provide platforms for project stakeholders to share experiences nationally and internationally.* • Identify and utilise available opportunities to share tools emerging from the project with stakeholders beyond the project sites, so these may be integrated in approaches to climate change adaptation elsewhere in the UMDM, and beyond. • Provide platforms for project stakeholders to share experiences nationally and internationally including national learning exchanges and participation in NIE and AF learning events.
4.3 Policy recommendati	*4.3.1 Convene national policy conferences to share outcomes of the project and promote linkages between these and relevant national policy processes.*

ons support sustaining, scaling up and replicating project successes.	• Convene a national agriculture and climate change policy conference to share outcomes of the project and promote linkages between these and relevant national policy processes. • Convene a national human settlements, disaster management and climate change policy conference to share outcomes of the project and promote linkages between these and relevant national policy processes. As part of the human settlements conference, considerations to be addressed in developing guidelines and handbooks for integrating flood, storm and fire risks into informal settlement planning and upgrades should be identified. • Share the project's ecological infrastructure pilot projects with South Africa's emerging ecological infrastructure programmes so that policy linkages can be made. *4.3.2 Develop a plan to sustain, scale up and replicate project outcomes.* • Engage officials involved in operational activities in workshops that focus on capacity building and uptake and roll-out of project products. • Develop a plan that sets out how project outcomes will be sustained, replicated and scaled up beyond the focal areas of the project, with clearly assigned and agreed responsibilities for its implementation. • Develop a set of tools and handbooks to facilitate the scaling up of the project to the broader UMDM. Inputs will be identified through a participatory process during project implementation and outputs could, for example, include a handbook aimed at empowering communities and officials to create alternatives to low-level river crossings in the UMDM and similar environments, including low-cost pedestrian bridge design, handbooks for infrastructure maintenance and community education and empowerment materials. • Undertake focused activities, including workshops and training events with high-level officials in relevant departments, which focus on the incorporation of outputs in institutional planning and budgeting cycles. Include exploring influencing government's Medium Terms Expenditure Framework budgetary processes to include allocations that will sustain relevant project outcomes.

B. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Introduction

The current and projected impacts of climate variability and change in the UMDM region include severe storms, floods and wildland fires. Potential for drought events associated with anticipated seasonal shifts is not excluded. The projections are of particular concern for those areas and populations in the UMDM already vulnerable to these hazards.

Project sites have been selected on the basis of their ability to deliver and sustain economic, social and environmental benefits to the most vulnerable groups. The target areas of the UMDM are characterised by: i) extremely high levels of unemployment and poverty; ii) a significant proportion of female-headed households; iii) large informal settlements prone to flooding, wildland fire and other risks; iv) degraded ecosystems; v) marginal small scale farming and often inappropriate farming practices, or farming areas set to become marginal because of climate change; and vi) an overall lack of resources, knowledge and capacity within vulnerable groups to undertake successful strategies to adapt to climate variability and change.

The uMngeni Resilience project will result in improved resilience of vulnerable communities and groups to climate change impacts, including floods and storms, droughts and wildland fire. In addition to providing benefits to vulnerable communities in the target areas, the project will also serve to increase the capacity of government agencies to integrate climate change adaptation considerations into municipal planning and policy processes and in so doing, to sustain the delivery of benefits to vulnerable communities within and beyond the project target sites.

Note: The discussion of economic, social and environmental benefits below has been structured to follow the sequence of the project logframe.

Economic benefits

By providing timeous information on disaster events to vulnerable local communities and small scale farmers, enhanced early warning and response systems will improve their preparedness and adaptive capacity. Early warnings regarding storms and floods will be made available for sending across the UMDM. The dissemination, receiving and reacting to such early warning will be tested in the rural areas of Vulindlela and Nhlazuka, and in low-lying high-density settlements, with a view to replicating project successes post project in other vulnerable areas, such as Impendle. The piloting of the EWSs will reduce negative impacts, limiting costs of storm damage to property and potentially saving lives. Early warnings regarding wildland fires in Nhlazuka will permit the early detection and suppression of fires, thus reducing fire damage to persons and property. It is anticipated that at least 7,962 women and 7,327 men will benefit from the ward-based flood/storm response system in Ward 8 of Vulindlela, at least 4,852 women and 4,014 men from the ward-based flood/storm and fire response systems in Ward 5 of Nhlazuka, and at least 500 women and 500 men from the flood/storm EWS in the selected low-lying high-density settlement pilot site within the UMDM. UMDM disaster response costs will be reduced, as well as the costs of disaster assistance provided to those affected by flooding, storms and wildland fires.

Effective Community-Based Fire Management (CBFiM) programmes in Nhlazuka will lead to a reduction in uncontrolled wildland fires and consequently to reduced damage to crops, homesteads, livestock and residents, allowing for greater land productivity and economic security. The FireWise Community Programme in South Africa has found that[23]: *"[Firewise] Communities have experienced improved human security, as the danger of fires has been reduced; good fire management practices have been put in place and have resulted in reduced damage to life and property; and ….. the land is in better condition and more productive, increasing food security and improving incomes of emerging farmers*."

Agro-meteorological information, including seasonal forecasts, will reduce agricultural and financial risks to small scale farmers in Swayimane and Vulindlela. This will allow for better planning, limiting crop failures and wasted effort, and resulting in improved resilience to climate variability, increased production and associated livelihood benefits. In Ward 8 of Swayimane, it is anticipated that income derived from the sale of crops in the target area will increase three-fold, from an average of USD 76 / month to an average of USD 228 / month.

Public facilities (such as community centres, clinics, schools and roads) and rural homesteads currently built of traditional and informal materials in Ward 8 of Vulindlela and Ward 5 of Nhlazuka will be strengthened (at least 150 houses in each ward) against storm events including lightning strikes, hailstorms, high winds and torrential rain. New places of safety may also be constructed if these are identified as adaptation priorities by local communities. Resilience measures will include the installation of lightning conductors, roof strengthening measures and measures to harden exterior weather walls and aprons around dwellings. This will reduce damage to and destruction of both dwellings and public buildings, reducing the associated costs (including reconstruction costs) to poor households and to the UMDM. It will decrease the need for and cost of disaster assistance supplied by the UMDM, as well as costs of repairs and reconstruction of infrastructure, such as roads and community facilities.

The installation of sustainable stormwater drainage systems in Vulindlela and Nhlazuka will help to reduce flooding and storm damage. Stormwater infrastructure and management will be adapted through measures including detention and retention ponds, increasing the diameter of key pipes and culverts, and installing trash netting at entry points to stormwater catch-pits in order to prevent solid waste from blocking stormwater drainage systems. Stormwater drainage channels will divert stormwater away from homes and community facilities, gabions will be used to stabilise drainage channels, terracing will reduce erosion and banks and retaining walls will be stabilised. These interventions will limit costly storm damage to homesteads, roads, public facilities and other infrastructure in vulnerable communities.

Construction of low-cost pedestrian bridges over watercourses prone to flooding will secure uninterrupted access to community facilities, including schools, clinics, shops, to workplaces and to other parts of the community during periods of flood, thereby reducing loss of life and loss of income. In addition to in-situ pedestrian bridge construction, the project will also support the development of a

[23] Working on Fire, 2010. *Firewise Lessons Learnt Workshop Report*, Howick, KwaZulu-Natal, South Africa.

handbook for reducing risks associated with low-level river crossings, for application in local municipalities across the UMDM. This intervention will directly address a risk that, according to the UMDM Disaster Management Unit, results in the periodic loss of lives across the UMDM.

Grassland rehabilitation in Ward 8 of Vulindlela (at least 200 ha) will reduce erosion and counteract land degradation, increasing agricultural productivity and supporting a more predictable supply of fodder for livestock. Eradication and effective management of invasive alien plant species (including bugweed (*Solanum mauritianum*), *Lantana camara*, bramble (*Rubus spp*.), famine weed (*Parthenium hysterophorus*) and black wattle (*Acacia mearnsii)*) will reduce bush encroachment in Nhlazuka, helping to protect five newly established community homegardens from predation by bushpigs *(Potamochoerus larvatus).* This will result in more plentiful production of vegetables for subsistence and sale, with associated livelihood and health benefits.

Revised standards for upgrading vulnerable informal settlements, through the toolkit developed in Output 2.3, will support the development of structures and infrastructure that are more appropriately located, better constructed and more resilient in the face of severe storms. This will result in reduced loss of life and damage to property, and reduced costs to the state for abortive development work.

Building on a recent successful pilot initiative in the UMDM, a small farmers' cooperative will be established in Swayimane and provided with support to enable emerging farmers to access markets to sell their produce. This will foster increased sales by small scale farmers, with associated livelihood benefits. Farmers will also benefit from shared resources (such as tractors and labour), resulting in shared learning, higher productivity and increased sales of produce.

Through the introduction of climate-resilient legumes (such as dry bean, bambara groundnut and cowpea) and cereal crops (such as sorghum and millet) that are drought tolerant, and taro that is tolerant to water logging, and by introducing improved climate-smart farming techniques (including terracing and soil conservation measures), small scale agricultural activities will be more resilient to changes in rainfall and heat stress. This will support sustained and resilient crop yields throughout the year. In addition to improve food security, livelihood benefits such as additional income through sales will be increased.

The project will install farm-based small scale infrastructure to improve water security and protection of livestock and harvests against storms. Post-harvest storage equipment (including the construction of a pack-house in Ward 8 of Swayimane) will protect harvested crops, ensuring food security and improving livelihoods through conserving surpluses for later sale.

A number of short-term employment opportunities will be provided by the project at community level, focusing on alien bush clearing, grassland rehabilitation and community development works such as improving stormwater drainage, strengthening homes and public buildings, and building low-cost pedestrian bridges. In association with the national EPWP, further employment opportunities may be created. Where possible, people from the project areas will be employed so as to enhance short-term benefits associated with the project.

Each of the components of the project will be implemented taking gender considerations into account and with a strong focus on training and capacity building, which will have direct and indirect economic benefits for vulnerable communities and which will contribute to the project investments being sustained and scaled up. For instance, small scale farmers (both men and women) in Swayimane and Vulindlela will be provided with training, interpretation and assistance by agricultural extension officers, giving them a better understanding of the climate change adaptation strategies available to them (for example, farm planning in terms of seasonal forecasting, planting crops which are flood and drought resistant). The effect of this will be more successful farming, higher agricultural productivity and surplus production, together with improved livelihoods and food security. Likewise, training and capacity building measures around EWSs will increase community preparedness, ensuring that early warnings are heeded and appropriate action is taken. Through training, the capacity of the various players (including community members, farmers, officials) to adapt to climate-induced variability will be increased and the economic benefits set out above will be realised. Effective gender planning will ensure that men and women receive comparable social and economic benefits. Furthermore, through learning platforms and policy processes that support replicating and scaling up activities, these economic benefits will also become available to vulnerable communities at a broader scale.

Social benefits

The project will deliver social benefits to vulnerable communities and groups, officials and other public stakeholders, fostering community resilience to the impacts of climate variability and change. This will be realised by saving lives, improving livelihoods and building community cohesion through the introduction of EWSs in vulnerable communities, fostering the participation of women in project activities, strengthening of rural dwellings, infrastructure and public buildings, improvements in farming techniques and capacity building programmes.

During times of extreme disaster events, such as floods, severe storms and wildland fires, early warnings issued to communities including those in Vulindlela, Nhlazuka and the selected low-lying high-density settlement will increase safety and prevent loss of life, homes and property and decrease risks to public agencies.

Strengthening of rural dwellings and public buildings against storm and lightning damage in Nhlazuka and Vulindlela (as described in the previous section) will prevent loss of life and shelter. Improvements to stormwater drainage in Vulindlela and Nhlazuka will reduce flooding during periods of extreme weather, with associated health and safety benefits. At least five low-cost pedestrian bridges constructed over watercourses and improvements to 10 km of stormwater channels in Vulindlela and Nhlazuka will ensure safe access to homes, schools, clinics, shops and work during floods, leading to reduced loss of life.

To improve food security and associated health benefits, a combination of agriculture-related initiatives will be introduced in Swayimane, Vulindlela and Nhlazuka. These include seasonal forecasting and farm planning, introducing climate-resilient crops and climate-smart farming techniques, grassland rehabilitation, erosion control, preventing bush encroachment, constructing post-harvest storage equipment and preventing predation by bushpigs in community homegardens.

Important social benefits of the project will result from the capacity building and knowledge generating activities, which are designed to facilitate the meaningful participation of beneficiary communities and vulnerable groups in the fine-scale design of project interventions. This participatory approach will encourage a sense of ownership, supporting the sustainability of project interventions and strengthening community cohesion, the empowerment of women and gender equity.

Capacity building activities will focus on working with communities, municipalities and traditional authorities to explore and identify a range of adaptation options and strategies, such as responding to early warnings, changing which crops are planted, using more effective building methods, and locating dwellings away from areas prone to flooding. At the same time, the project's participatory approach will capacitate local communities including vulnerable groups such as women, youth and the elderly to participate in detailed plan development, and facilitate the integration of local and traditional knowledge with scientific/technical knowledge, ensuring that solutions are relevant to local conditions, usage and cultural practices.

Gender equity will be fostered by the inclusion of a Gender and Social Expert in the Component 2 team (see Section III.A). Project training and capacity building activities will help to ensure meaningful opportunities for women and other vulnerable group's participation in project planning, implementation and community decision making structures. Gender-sensitive targets for the project have been established (see Section III.E) for appropriate interventions, to account for the fact a large proportion of rural households in the target area are led by women.

Case studies of climate change adaptation interventions will be encouraged, particularly by students from the UMDM. Increased public awareness of the benefits of adaptation projects will be created through media releases, project newsletters and web posts.

The awareness, knowledge and technical expertise of policy makers, traditional authorities, officials and technical experts regarding the design and implementation of adaptation activities, particularly for vulnerable communities, will be enhanced. Technical and managerial capacity to implement climate change adaptation projects will be strengthened through learning-by-doing. The likelihood of scaling up and replication of the project will be fostered through sharing of lessons learned at workshops and conferences and policy improvements addressing adaptation concerns.

Environmental benefits

The project will deliver a range of environmental benefits. These include reducing adverse impacts associated with poor and inappropriate agriculture, land management practices, land allocation and infrastructure placement processes, and investments in ecological infrastructure.

The project will enable better wildland fire management including community fire management planning, prescribed burning, improved early fire detection and suppression in Nhlazuka. This will help to restore ecosystem function and protect the integrity of the natural environment.

The project will promote the integration of climate change risks into spatial planning and land allocation processes in the District and in so doing will reduce the impacts of built infrastructure on environmentally sensitive areas and ecosystem support areas. Improvements associated with investments in improved stormwater drainage systems will result in decreased erosion from rural and urban settlements, resulting in improved soil conservation, improvements in the ecological functioning of wetlands and streams and improvements in water quality and quantity.

Through its investments in ecological infrastructure, the project will support the rehabilitation and restoration of 200 ha of grasslands, 12 km of riparian environment and 100 ha of natural bushland. In Vulindlela, the grassland restoration and rehabilitation interventions will increase species diversity, reduce soil erosion (with associated carbon benefits), reduce riverine corridor degradation and improve water quality, flood attenuation and the availability of grass for livestock. In Nhlazuka, invasive alien plant removal and associated rehabilitation of bushland will increase species diversity, and improve ecological functioning with associated benefits for fire management and agriculture.

The project's ecological infrastructure pilot projects will form part of a body of evidence that is being compiled in South Africa to make the case for investments in natural systems that support social and economic wellbeing, and that collectively promote the concept of ecosystem based adaptation (see Section II.F for details of the Ecological Infrastructure Partnership Programme).

The project will reduce erosion on steep slopes in Nhlazuka through the introduction of terracing and associated soil conservation measures. Through its investments in climate-smart agriculture, the project will support low tillage farming, soil conservation and sustainable, wise water use practices.

By capturing best practices and lessons, the capacity building activities of the project will demonstrate how investments in the natural environment can deliver co-benefits in climate change adaptation interventions, and the importance of ecosystem based adaptation as part of an integrated approach to building resilience to climate induced risks.

In order to ensure that any potential impacts are timeously identified and appropriately mitigated, an Environmental and Social Risk Management plan has been developed for the project in accordance with the AF ESP – see Annex V.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project.

Explanation of the selected approach

The uMngeni Resilience project proposes an integrated set of measures that are embedded in local processes and institutions, and that seek to deliver a suite of cost-effective co-benefits to vulnerable communities across multiple sectors. The approach to the project is informed by five principles, which are the source of its cost-effectiveness and sustainability. The approach: i) is holistic and integrated; ii) is participatory and gender-sensitive; iii) integrates local knowledge; iv) builds on existing initiatives; and v) is deliberately designed to be replicable and scalable. These principles are elaborated on below. The rationale is that by designing the project so that it is implemented according to these principles, it will inherently be cost-effective.

Holistic and integrated approach:

The project will demonstrate that a holistic, integrated approach to climate variability and change can impact positively on communities. The project focuses on pilot sites in the Greater uMngeni catchment where, to date, adaptation responses to climate variability and change and its impacts on settlements and production processes have been fragmented, uncoordinated and largely reactive. Consolidating a

range of adaptation-related initiatives that address different aspects of vulnerability into a single integrated whole, the project will demonstrate to stakeholders the multi-faceted nature of climate change adaptation and the need for a holistic, integrated response which provides early warnings to extreme events, enhances local response capacity and builds local resilience.

The project's adaptation interventions focus firstly on enhancing and scaling up the capacity and reach of existing EWSs to alert vulnerable communities to impending risks, enabling them to take preventive action timeously to avoid injury and loss of life and property in extreme storms, floods and wildland fires. In support of this, community response capacity will be strengthened through the project's training and capacity building activities.

Closely linked to this, the project will undertake a range of activities designed to build the resilience of communities and small scale farmers who are vulnerable to the impacts of climate variability and change. These activities are no-regret[24], low-cost and concrete with tangible adaptation benefits and may include strengthening homes and public buildings against heavy rain, installing lightning conductors, building stormwater detention ponds, improving roads, building low-cost pedestrian bridges over watercourses prone to flash flooding, undertaking CBFiM planning, providing seasonal forecasts to farmers, encouraging the use of climate-resilient crops, building storm-proof harvest storage facilities and restoring ecological infrastructure such as wetlands.

Working with officials from the UMDM, the DAEA and others, the project will ensure that downscaled (localised) climate projections are understood in relation to environmental and socio-economic sector priorities and development processes, and integrated into the development agenda and priorities of UMDM and the DAEA.

The integrative nature of the approach will also facilitate co-operative governance networks. For example, the establishment of a cross-sectoral Project Coordinating Committee (PCC) will foster collaboration and support alignment between existing institutions who have committed to sustaining the programme beyond the AF investment period (see letters of support in Annex IV).

Participatory and gender-sensitive approach:

A participatory approach is essential to sustainability. It creates a sense of ownership and buy-in, involves all sectors of the community, enables integration with ongoing activities, provides access to local knowledge and ideas, facilitates consensus and increases the credibility of the project. Although participatory processes are not uncommon in South Africa, there is sometimes a tendency for project management to become expert-driven and top-down in its approach. The project will actively promote a participatory, gender-sensitive approach.

The project will work in partnership with community members in a selected low-lying high-density settlement (see Activity 1.2.1), in Ward 8 of Vulindlela, Ward 8 of Swayimane and in Ward 5 of Nhlazuka, as well as with government officials at provincial and local level, scientists, NGOs and CBOs, to undertake detailed design, implementation and management of the project. Capacity building activities will support communities to participate in these processes, so that they understand the climate-related risks, participate in risk assessments, and help to develop and implement relevant and sustainable responses to protect life, property and livelihoods. Project initiatives will focus, where appropriate, on inexpensive and accessible technologies, to ensure for example that vulnerable communities have access to early warnings and can contribute to project information flows.

Participatory multi-partnership approaches have been used in the UMDM by partner NGOs such as the BESG, through their Greener Pastures and Housing Support Centre projects. WESSA has undertaken training programmes for government officials, NGOs and CBOs, focusing on building resilience to climate change. The project will build on the experience, capacity and knowledge of these organisations and programmes, integrating them into a coherent set of capacity building initiatives that will equip communities with tools to anticipate and respond timeously to climate induced stresses.

[24] No-regret options are those that are justified by current climate conditions and further justified when climate change is considered, e.g. pollution reduction in water supplies will be beneficial if water supplies decrease as a result of climate change. Lim. B, and E. Spanger-Siegfried. 2004. Adaptation policy frameworks for climate change: developing strategies, policies and measures. Cambridge University Press, Cambridge, UK pp 253.

To foster the participation of women in project activities, gender concerns have been factored into project indicators and targets. A Gender and Social Expert experienced in working in rural communities in KwaZulu-Natal will be appointed, to ensure that there is equitable representation of women and other vulnerable groups as project beneficiaries, in training and capacity-building programmes, and in project decision-making structures at all levels. The Gender and Social Expert will form part of the Component 2 team – see Section III.A for further details and a list of indicative responsibilities.

Integrating local knowledge:

Local knowledge is essential to the efficacy and sustainability of response measures. Without it, projects are expert-driven and often out of touch with realities on the ground, realities that can undermine implementation and sabotage sustainability. A project that incorporates local knowledge meaningfully is more grounded, richer, has a much greater chance of achieving the desired outcomes and impacts, and is more sustainable. Benefits that are sustained increase the cost-effectiveness of the investments.

In all interventions, and building on engagements that were held during the project design period, the project inception phase will include meetings with beneficiaries and other stakeholders to build capacity to engage with the project, and to develop a platform that ensures that local and scientific knowledge are integrated at all levels. Some of the key ways in which this will take place will be through: i) providing early warnings of anticipated flood, storm and fire events to communities and officials, working in communities to develop bottom-up, site-based responses to early warnings; ii) involving local communities in undertaking risk assessments and developing responses, generating plans at local level to buffer key aspects of the built environment against climate-related extreme events, and implementing these plans; iii) providing top-up bursaries for local students who select the project sites as the focus of their studies and placing post-graduate students in project villages to develop relationships with small scale farmers, enabling them to gather local knowledge of the landscape and what has worked in the past, and ensure that this knowledge is integrated into climate change adaptation strategies at farm level; iv) working closely with traditional leaders at the local level, to integrate their knowledge and to mainstream climate change adaptation into their decision making on land allocation; and v) placing a community liaison officer in the project areas to provide a 'point person' in the community, responsible for coordinating climate change responses and integrating local and traditional knowledge into project activities.

These measures and others will facilitate the integration of scientific and local knowledge, increasing the likelihood of sustaining benefits. Integrating local knowledge and involving local community members in the ongoing management of interventions will instill a sense of ownership and accountability for the project within communities, further enhancing sustainability. The participatory approach adopted in project design is testament to the commitment of the UMDM to ensuring that local knowledge is incorporated in the project.

In addition to building on the experience and knowledge found among various actors, the project will further ensure cost-effectiveness by making use of and building on to available data and systems. In support of this, and as described above, various practical South African experiences will provide important guidance for working with integrating risk reduction and climate change responses into local planning and development processes.

Building on existing systems and initiatives:

Rather than develop new initiatives from scratch, the project will build on, strengthen and scale up relevant existing initiatives to facilitate adaptation. The cost of adding climate change adaptation interventions is relatively low when compared to the costs of building the proposed project interventions *de novo*.

There are a number of examples of existing initiatives that will be enhanced and/or scaled up by the project. The project's EWS for flooding will scale up and expand the flood forecasting work currently being undertaken by UW. Similarly, the project will augment and extend the existing provincial disaster management system, strengthening the partnership between the UMDM and CoGTA's disaster management division, rather than setting up a standalone municipal disaster management function. The project's investment in EWSs will facilitate a shift towards a proactive approach to

disaster management by existing authorities, and a move from a wholly technology-based approach to one that meshes technology with a grounding in local structures that is led by local champions. The existing fire detection and suppression work of the FPAs and the WoF programme will be extended beyond their current focus on commercial forestry areas to include vulnerable local communities. This will take place in conjunction with the introduction into Nhlazuka of a CBFiM programme, (i.e. a FireWise Community Programme) that currently operates in two other areas in the province. The project will build on and scale up existing successful climate change adaptation programmes piloted by the UKZN SAEES, bringing these to a new area (Ward 8 of Vulindlela) and linking them with the priorities of the DAEA. The project will form links with the provincial agricultural extension service and provincial Food Security project, seeking to expand the reach of the system of agricultural seasonal forecasting piloted by the project. Improvements to environmental infrastructure will be implemented through the national EPWP. The EPWP has committed to sustaining this adaptation work, as demonstrated through their envisaged incorporation of project pilot sites as part of their flagship programme in terms of the Climate Change Policy White Paper.

The project will build on an ongoing government-funded programme to upgrade informal settlements, piloting a process of mainstreaming the consideration of climate change adaptation interventions into these programmes. In addition, the project will mainstream climate change adaptation into existing UMDM land use planning processes (in particular, SDFs and local area plans), settlement upgrade and building standards.

Replicability and scalability:

The project will serve as an adaptation pilot, providing an important opportunity to demonstrate the efficacy of replicable adaptation measures that can be scaled up to the UMDM and beyond, and to promote this scaling up and replication. Project interventions relating to the use of EWSs, climate-proofing settlements and supporting climate-resilient small scale agriculture were selected specifically for their ability to be replicated and scaled up. Some of these have already been mentioned above, in relation to scaling up of existing initiatives. Examples of other adaptation measures developed by the project, that will be replicable and can be scaled up in similar conditions elsewhere in the UMDM and beyond include: i) the design of sustainable operating plans for processing/packaging, transmitting, receiving and reacting to information and warnings to relevant officials and communities; ii) the development of climate-proofing measures for buildings and infrastructure; and iii) the identification of climate-resilient crops, climate-smart agricultural practices and appropriate physical infrastructure to mitigate the impacts of climate variability and change for small scale farmers.

To facilitate replication and scaling up within the UMDM, and through the creation of the PMU for the project, climate change adaptation will be more prominently positioned within the UMDM organogram. The project has also been flagged as a municipal priority. These measures will support mainstreaming and replication of adaptation measures in all UMDM departments, in particular, disaster management, stormwater management, land use planning, settlement upgrading and building control.

The project will support replicability and scaling up of adaptation successes at the level of UMDM and beyond (including national sectoral departments such as Water, Environmental Affairs and Agriculture), through capacity building of officials, production of development of guidelines, protocols and handbooks based on the lessons learned and framing of policy recommendations and best practices. For example, the project will develop policy recommendations for the inclusion of climate-proofing and adaptation interventions into building regulations, infrastructure standards and planning at the municipal level, which would be applicable to all municipalities in the country. Other policy recommendations will focus on including adaptation considerations into South Africa's EPWP, in relation, for example, to ecosystem restoration, and into the extension services of DAEA. Replication will also be facilitated through post-graduate bursary opportunities, policy conferences and learning platforms. Lessons learned will influence policy makers, facilitate the allocation of budget provisions for adaptation activities, and ultimately benefit stakeholders beyond the direct beneficiaries of the project, cost-effectively mainstreaming climate change adaptation activities at a district, provincial and ultimately national scale.

Similarly, to facilitate the replication of successful initiatives, project areas were deliberately selected to be typical for KwaZulu-Natal and for many other parts of the country in terms of their vulnerability to climate change-related extreme storms, flooding and wildland fire, their ecological environments, their land tenure, land use patterns and settlement types (see Section I: Site selection and description). This approach was taken to ensure that lessons that emerge from the project sites are transferable.

Alternative options

Three alternative options were considered in the project design process, as follows:

- to invest in a programme of work with a **focus on a single sector**, rather than adopting an integrated cross-sectoral approach;
- to adopt an **expert-driven, technology-intensive approach,** rather than an approach that acknowledges and places an emphasis on integrating science and technology with local and traditional knowledge and action; or
- to develop a **purpose built intervention** that does not build on existing interventions, institutions and programmes of work

These alternatives are discussed more fully below.

Alternative 1: To **focus on a single sector**, rather than adopting the proposed integrated cross-sectoral approach. Investing in a single sector would not enable the cross sectoral integration between sectors and the co-benefits that arise from this. It could also result in mal-adaptation whereby project interventions build climate resilience in one area whilst compromising or eroding it in another. The consequences would be limited impact of initiatives, high costs per beneficiary, and limited or no mainstreaming, scaling-up and replication.

Alternative 2: To base the project on an **expert-driven, technology-intensive approach**, rather than on an approach that integrates local and expert knowledge. Such an approach is characterised by sophisticated technology, with low levels of involvement and learning by residents and other stakeholders, and does not address existing gender relations. It also fails to tap into local knowledge and latent adaptive capacity. The consequences of this approach would be: i) limited buy-in and ownership, and therefore limited, if any, change in local practices and methods; ii) implementation possibly being constrained and even obstructed by residents, farmers and officials; iii) women's contributions not being sought, resulting in the project benefits being unequally distributed, the contribution of women being sidelined, and climate change impacts on women not being alleviated (and possibly even being aggravated); and iv) little or no sustainability after the project ends.

Alternative 3: To design the project as a **purpose built intervention**, rather than building on existing initiatives and processes. This would fail to take advantage of the opportunity presented by the existing initiatives, where a relatively small investment is required relative to the number of beneficiaries assisted by the project. The consequences of this approach are: i) likely duplication with existing initiatives and the associated wasteful expenditure; ii) limited impact to a small number of beneficiaries; iii) high cost per beneficiary; and iv) low sustainability. This alternative was considered by stakeholders to be generally less cost-effective, not resulting in the preferred outcomes and thus less desirable.

D. Describe how the project is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

The uMngeni Resilience project is strongly aligned to national and sub-national policies, plans and priorities for sustainable development and adapting to climate change, including the following:

- South Africa's Second National Communication on Climate Change (SNC) (2011);
- National Climate Change Response Policy: White Paper on Climate Change (2011);
- National Development Plan (NDP) Vision for 2030;
- Spatial Planning and Land Use Management Act, Act No. 16 of 2013 (SPLUMA);
- Long-Term Adaptation Flagship Research Programme (LTAS);
- South African National Biodiversity Institute (SANBI) NIE Investment Strategy;
- National Department of Agriculture, Forestry and Fisheries (DAFF) Strategic Plan for 2013/14-2017/18; National Food Security Production Programme; KwaZulu-Natal Empowerment for Food Security Programme;
- Breaking New Ground, Comprehensive Housing Plan for the Development of Integrated Sustainable Human Settlements (2011);
- Let's Respond Toolkit (2012);
- KwaZulu-Natal Provincial Growth and Development Plan (2013);
- KwaZulu-Natal Climate Change and Sustainable Development Council;

- UMDM Municipal Climate Change Response Strategy, Draft Disaster Management Plan, Strategic Environmental Assessment (SEA) and Strategic Environmental Management Plan (SEMP);
- UMDM Integrated Development Plan (IDP) and Spatial Development Frameworks (SDFs);
- Msunduzi Local Municipality Informal Settlement Upgrade Strategy and Programme, linked to the Local Municipality SDF; and
- FireWise Communities Programme.

At national level, the **SNC** identifies future challenges anticipated due to climate change effects. The SNC expresses concerns about increasing wildland fire risks, and identifies wildland fire management as a key adaptation response strategy. The SNC also embraces the proactive disaster risk reduction approach that is founded on early flood and storm warning systems. Component 1 of the project addresses the need for wildland fire management and EWSs. The SNC indicates that water will be the primary medium through which people, ecosystems and economies first experience the impacts of climate change. Reducing the vulnerability of marginalised communities to the impacts of flooding is a priority, along with ensuring that water infrastructure is adapted to cope with increased risks from flooding. Climate-proofing vulnerable settlements through better spatial planning, improved drainage, the use of higher quality building materials and the restoration and management of ecological infrastructure are recommended as key adaptation activities. Component 2 of the project comprises concrete adaptation interventions to address these concerns.

The **National Climate Change Response Policy White Paper on Climate Change** highlights the multi-dimensional nature of climate change. This requires the mainstreaming of climate change considerations and adaptation into all planning activities to achieve integration and create an environment where informed decision making, co-operative governance and partnerships flourish between various state and non-state parties. The project integrates science and local knowledge in formulating and testing an integrated, synergistic and forward-looking adaptation strategy. It supports the mainstreaming of climate change into land use and disaster management planning, and fosters cooperative governance and partnerships, in line with the White Paper.

The **NDP Vision for 2030** recognises that natural resource management, economic growth and poverty alleviation are closely intertwined. The NDP proposes adequate support for the most vulnerable communities, significant investments in conserving and restoring ecological infrastructure, and adaptation technologies in the water and human settlement sectors. Furthermore, the NDP supports the development of EWSs, mainstreaming adaptation planning into all planning activities and the creation of sustainable work opportunities through undertaking adaptation activities. The project will benefit vulnerable communities through investments in ecological infrastructure, flood detection and response, built environment, EWS and mainstreaming interventions, and is thus in line with NDP.

The recently approved national **SPLUMA** addresses the current fragmentation and ineffectiveness of land use legislation. The objectives SPLUMA include: i) providing for a uniform, effective and comprehensive system of spatial planning and land use management; ii) ensuring that this system promotes social and economic inclusion; iii) providing for the sustainable and efficient use of land; and iv) redressing the imbalances of the past and ensuring that there is equity in the application of spatial development planning and land use management. The project will review spatial planning in the UMDM and land allocation processes in communal areas, and develop best practice guidelines to address adaptation and sustainability concerns. In focusing efforts in the most vulnerable communities, it will contribute to redressing the imbalances of the past. The project is therefore strongly aligned with the objectives of the Act and will support its implementation.

The **LTAS** responds to the South African National Climate Change Response White Paper by undertaking climate change adaptation research and scenario planning for South Africa and the Southern African sub-region. DEA is leading the process in collaboration with technical research partner the SANBI as well as technical and financial assistance from the Gesellschaft für Internationale Zusammenarbeit (GIZ).

SANBI was accredited as **South Africa's NIE to the AF** in September 2011. The NIE Secretariat is housed within SANBI's Climate Change Adaptation Division. The operations of the NIE Secretariat are governed by SANBI's policies and procedures. The NIE is supervised by the NIE Steering Committee, which is chaired by the CEO of SANBI. Other members of the Steering Committee include representatives from DEA, Treasury, National Planning Commission (NPC) of the Presidency

and the civil-society lead Adaptation Network. Through efforts to build a coordinated adaptation response that delivers tangible outcomes, the NIE will work with project proponents to build integrated projects that support learning and demonstration objectives. Projects that are supported must align with the AF results framework and will need to meet eligibility criteria that include: i) outcomes that have concrete and tangible results; ii) outcomes that have co-benefits and focus on vulnerable communities; iii) linkages with national and local policies, plans, priorities concerning climate change and related climate and other initiatives; iv) partnerships between government, communities and individuals; v) interventions that are cost-effective, sustainable and replicable; and vi) outputs that contribute to knowledge management and learning. The project is designed according to these eligibility criteria.

The **DAFF Strategic Plan 2013/14–2017/18)** recognises the threat to South Africa's food security status posed by climate change. The plan further identifies "establishing and maintaining effective early-warning and mitigation systems" as one of its strategic goals. Flowing from this, the national **Food Security Production Programme** is aimed at ensuring food availability at local and household levels with implementation taking place through the provinces. In KwaZulu-Natal, the provincial DAEA has established the **KwaZulu-Natal Empowerment for Food Security Programme**, the objective of which is to improve livelihoods of poor families in four districts of KwaZulu-Natal, through improved food security. Within the UMDM, the programme operates in the Richmond and uMsunduzi local authority areas. In promoting food security, the project is aligned with and supports this programme.

Breaking New Ground, the national **Comprehensive Housing Plan for the Development of Integrated Sustainable Human Settlements** (2011) aims to *inter alia* eradicate informal settlements in South Africa in the shortest possible time. Implementation is supported by the **NUSP**. The project will contribute to upgrading informal settlements in the project areas in order to increase resilience to climate change, and is therefore aligned with the Breaking New Ground programme.

The **Let's Respond Toolkit** is a guide to integrating climate risks and opportunities into municipal planning, developed and piloted by the DEA, CoGTA and the South African Local Government Association (SALGA), in cooperation with GIZ. The project will make use of and therefore enhance the mainstreaming the Let's Respond Toolkit, through interventions that integrate climate risks and opportunities into municipal planning, in Components 1 and 2 of the project.

In terms of national policy with regard to adaptation, each province must incorporate anticipated climatic changes into sectoral policies and plans, relating to water, agriculture, health, biodiversity, and human settlement. **The KwaZulu-Natal Provincial Growth and Development Plan 2013** includes *Strategic Objective 5.4: Adaptation to climate change* that focuses primarily on disaster risk reduction and management, and the need for EWSs. The project supports the enhancement and extension of existing EWSs to serve vulnerable communities. It also supports more effective disaster management services, particularly through proactive disaster risk reduction and management.

In 2012, the Province of KwaZulu-Natal established the **KwaZulu-Natal Council for Climate Change and Sustainable Development** (KZNCCCSD) which is tasked with shaping provincial government policy on climate change. The Council has set up three Working Groups: i) Policy and Regulatory Alignment Working Group; ii) Adaptation and Mitigation Working Group; and iii) Renewable Energy Working Group. The Province is developing a provincial Climate Change Response and Sustainable Development Plan guided by, among others, the national strategy and the Provincial Growth and Development Plan 2013. The Knowledge Management component of the project (Component 4) will contribute to this provincial Climate Change Response and Sustainable Development Plan.

At a district level, the UMDM has established a multi-stakeholder Environmental Management Forum. This forum has convened regularly for the past two years and has provided a platform for collaborative planning, implementation and learning. The UMDM has recently developed a **Climate Change Response Strategy** and a **Draft Disaster Management Plan.** The plans seek to protect and sustain the UMDM's fragile ecological infrastructure. UMDM has also undertaken a **SEA** which, together with and extensive consultative processes with local stakeholders, has informed the development of the **SEMP**. Sustainable resource management, including of water, waste, biodiversity and climate change risks, are all priorities in the UMDM. The Knowledge Management component of the project (Component 4) will inform the revisions to the strategy, assessment and plans, and will be used by the Environmental Management Forum to inform key strategic decisions related to municipal planning in the environmental sector.

The **2013/2014 UMDM IDP**, outlining deliverables in seven Key Performance Areas (KPAs) for the next five years, highlights climate change as one of the key threats to the UMDM. Securing funding for climate change adaptation projects is listed as a target under the Climate Change Mitigation and Adaptation Programme of the Basic Service Delivery and Infrastructure Development KPA. The project therefore contributes to this target, and indeed exceeds the budget indicator (USD 75,000). Furthermore, the project is aligned with the UMDM Climate Change Response Strategy, the implementation of which is a second target listed in the KPA.

As per the NDHS NUSP, the UMDM has developed the **Msunduzi Local Municipality Informal Settlement Upgrade Strategy and Programme**. This strategy, which is linked to the MLM SDF, outlines the programme for the upgrade and/or relocation (where necessary) of the 70 informal settlements within the MLM. To date, rapid assessments and characterization of all 70 have been undertaken all were undertaken, and a broad project plan has been developed to apply to for government funding. Once funding is approved, detailed planning, geotechnical analyses and EIAs will be undertaken.

Linked to the international FireWise programme, the FireWise South Africa community-based fire management programme is operated by Kishugu Public Benefit Organisation, associated with the WoF programme. The **FireWise Communities Programme** seeks to protect people and property from wildfire risks by encouraging local solutions for wildfire safety, involving residents, community leaders, planners and firefighters, and forming strong links with FPAs. The overall goal is to enhance the sustainability and protection of life, livelihoods and the environment through integrated fire management in order to contribute to economic empowerment, skills development, social equity and accelerated service delivery. The FireWise Communities Programme will be introduced into at least three communities in one of the project areas (Nhlazuka), to support more effective wildland fire management in the area.

E. Describe how the project meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The uMngeni Resilience project is compliant with the following legislation and associated standards, and will seek to strengthen these by mainstreaming climate change adaptation guidelines into them:

- National Environment Management Act, Act No. 107 of 1998 (NEMA) and its suite of associated Acts viz. NEM: Protected Areas Act, 2003; NEM: Biodiversity Act, 2004; NEM: Air Quality Act, 2004; NEM: Integrated Coastal Management Act, 2008; NEM: Waste Act, 2008;
- Environmental Impact Assessment (EIA) regulations as stipulated within NEMA (see discussion below);
- Environment Conservation Act, Act No. 73 of 1998;
- National Housing Code of 2009, including the National Building Standards and Regulations (see discussion below);
- Disaster Management Act, Act No. 57 of 2002: National Disaster Management Framework, 2005;
- Water Services Act, Act No. 108 of 1997: Norms & Standards for Quality Water Services;
- National Heritage Resources Act, Act No. 25 of 1999;
- Municipal Systems Act, Act No. 32 of 2000;
- Spatial Planning and Land Use Management Act, Act No.16 of 2013 (SPLUMA);
- KwaZulu-Natal Planning and Development Act, Act No. 6 of 2008;
- Extended Public Works Programme (EPWP), norms and standards for restoration of wetlands and riparian zones; and
- Standards Act, Act No. 8 of 2008; and associated South African National Standards, SANS 1-1:2012 (Edition 3).

The national technical standards most relevant to the project are those relating to EIAs and the National Housing Code and associated National Building Standards and Regulations. These are elaborated on below:

Environmental Impact Assessments:

Project activities are not expected to cause any significant adverse impacts on the environment.

South Africa's EIA legislation is clear on the process that must be followed in identifying and mitigating possible impacts, through conducting EIAs. Listing Notices 1, 2 and 3 (within Government Notice No. 805) identify listed activities, for which an EIA or a Basic Assessment are required[25].

The activities that may trigger a Basic Assessment are the stormwater drainage channels of Outcome 2.1 (rural built infrastructure), the construction of low-cost pedestrian bridges upstream of low-level community river crossing points that are vulnerable to flash flooding (Outcome 2.1) and the restoration of riparian areas (Outcome 2.2). Ecosystem restoration, and particularly wetland restoration (Outcome 2.2), may involve measures such as building gabion structures in erosion gulleys and stone packing on eroded slopes.

Project activities that require a Basic Assessment or full EIA as per the national EIA regulations will not be supported, due to administrative costs and potential delays. At this stage, it is envisaged that the only exception to this will be where provincial authorisations can be obtained through South Africa's Working for Wetlands Programme. Precedents are in place for the provision of such provincial authorisations to the Working for Wetlands Programme for riparian zone activities, such as the rehabilitation or restoration of wetlands, rehabilitation and the restoration of river banks (including erosion control and the construction of low river crossings). Such provincial authorisations will need to be provided in writing before the above mentioned rehabilitation and restoration activities can take place, and are approved by the NIE.

It is noted that during the project detailed design processes, additional listed activities, as set out above and in Box 9, may be identified. Should the EE and sub-Executing Entities wish to proceed with these activities, they will need to be explicitly approved by the NIE in accordance with the project's Environmental and Social Risk Management Plan. In this regard, the proponents will need to show how the required assessment can be achieved with thin projects times frames and budgetary constraints. If this cannot be done, alternative activates will need to be identified.

Box 9: EIA Regulations that may be relevant to certain project activities.

Listing Notice No. 1 Activity 9: The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or stormwater -
(i) with an internal diameter of 0,36 metres or more; or
(ii) with a peak throughput of 120 litres per second or more, excluding where:
(a). such facilities or infrastructure are for bulk transportation of water, sewage or stormwater or stormwater drainage inside a road reserve; or
(b). where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.

Listing Notice No. 1 Activity 11: The construction of: … (iii) bridges… where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

National Housing Code and National Building Standards and Regulations:

In line with the Constitution's imperative to provide South African citizens with adequate housing, the National Housing Code 2009 sets the fundamental policy principles, guidelines, norms and standards which give direction to all the various housing assistance programmes which government has established since 1994. The purpose of the National Housing Code 2009 is to simplify the implementation of housing projects by providing clear guiding principles and outlines of housing subsidy tools that can assist low income households to access adequate housing. The NUSP conforms to the National Housing Code and associated National Building Standards and Regulations. The project will develop a tool for mainstreaming climate change adaptation considerations/standards into informal settlement upgrade planning in the UMDM, focusing on mainstreaming adaptation interventions into the design and location of services and dwelling units. Recommendations will be developed on how this tool could be incorporated into relevant municipal, provincial and national

[25] See Amended EIA regulations promulgated in terms of Chapter 5 of NEMA (Government Notice No. R. 543, R. 544, R. 545, R. 546 and R. 547 in Government Gazette No. 33306 of 18 June 2010).

building codes, regulations, infrastructure standards, planning and associated budgeting processes. Similarly, in rural areas, the project will develop best practice guidelines on incorporating measures to address climate risks in land allocation processes in communal areas. These guidelines will include steps on how to ensure climate resilience is prioritised in the design and maintenance of infrastructure, as well as in infrastructure standards.

Environmental and Social Policy of the Adaptation Fund:

The project activities will comply with all environmental and social principles of the AF. This process will be managed through the Environmental and Social Risk Management Plan that has been developed for the uMngeni Resilience project (see Annex V).

F. Describe if there is duplication of project with other funding sources, if any.

The project does not overlap with or support activities that are already supported with other funding sources. Furthermore, the project will complement, build on and learn from a number of ongoing projects. These include:

Mainstreaming Biodiversity into Land Use Regulation and Management at the Municipal Scale (GEF funded, United Nations Development Programme (UNDP) implemented project): Municipalities play an important role as centers of economic growth and service delivery; they regulate land use at local scale, and are also important users and managers of biodiversity and ecosystem services. However, Municipalities are often faced with many burgeoning and often conflicting tasks, with poverty alleviation, local economic development and service provision justifiably occupying top priority on most local council agendas. Awareness amongst decision makers of the positive links between improved biodiversity management, human well-being and sustainable development is often low, as are levels of capacity for meaningful incorporation of biodiversity priorities into integrated development planning and land use management. Since less than 7% of land in South Africa is formally protected, critical biodiversity is under threat from degradation and transformation. There is thus a need to strike a balance between development and job creation, and conservation and sustainable use of biodiversity. This GEF project is designed to address these challenges by: i) strengthening cooperation, coordination and capacity of municipal and other regulatory authorities that regulate land use decisions to incorporate criteria to avoid/prevent, minimise and/or offset impacts on biodiversity, and improve compliance monitoring and enforcement; and ii) introducing mechanisms in collaboration with private and communal land owners to better protect critical biodiversity areas and manage land, while demonstrating the potential of biodiversity to create jobs and contribute to economic growth. The GEF project will work in four district municipalities in global biodiversity hotspots and national biodiversity priority areas, with very high rates of habitat degradation and conversion, high levels of poverty, and other pressing needs for action: Amathole, **uMgungundlovu** and Ehlanzeni District Municipalities are located in the *Maputaland-Pondoland-Albany* hotspot; and the Cape Winelands District Municipality is located between the *Succulent Karoo* and the *Cape Floristic Region* hotspots. The uMngeni Resilience project will build on and learn from the engagements and capacity developed within the UMDM through the GEF project, particularly related to land use planning, and the inclusion of biodiversity consideration (spatial layers) in decision making.

Ecological Infrastructure Partnership Programme (EIPP): When functional, ecological infrastructure plays a critical role in buffering communities from climate change impacts and provides a range of ecosystem services. Such services include, inter alia, flood attenuation, water quality maintenance, fresh water provision, soil stabilization, food provision including non-timber forest products (NTFPs), nutrient dispersal and cycling, crop pollination, provision of livestock feed, provision of housing material and micro-climate regulation.

The UMDM, the eThekwini District Municipality, UW, UKZN and SANBI are currently developing a conceptual framework to underpin an EIPP that will seek to improve water security within the Greater uMngeni catchment, to address of severe water quality and supply challenges in the catchment. The ecological infrastructure interventions of the uMngeni Resilience project and the EIPP will not overlap spatially, however lessons learned will be shared and used mutually to improve the planning for, implementation of ecological infrastructure interventions.

The EIPP project focuses on water resources originating from the UMDM, which provide: i) drinking water to 45% of the provincial population; and ii) water for economic use in the second largest economic region, by Gross Domestic Product (GDP), in South Africa. Increasing demands for water in

the region cannot be met by the current supply. To increase the quantity and quality of water in the catchment, the following pilot ecological infrastructure interventions are planned at the indicated sites:

- Midmar Dam in UMDM: restoration and maintenance of degraded wetlands, riparian zones and grasslands, creation and maintenance of water resource buffer zones and educating water users on the importance of conserving critical ecological infrastructure within the Mthinzima River, the Lions River, the upper uMngeni catchment, and the Mooi River.
- Bayne's Spruit in MLM: restoration of existing areas of ecological infrastructure, such as wetlands and floodplains, through: i) identification of strategic sites for construction of artificial wetlands; ii) re-vegetation of stream banks to control erosion; iii) establishment of riparian forests; and iv) control of listed alien invasive plants; and
- Palmiet River in eThekwini District Municipality: the pilot aims to: i) construct artificial wetlands at strategic positions along the Palmiet River to restore watershed services along the river and act as bio-filters; ii) remove alien plants and re-vegetate the river banks with indigenous plants to stabilise the riparian zones; iii) "clean-up" the river to remove solid waste and debris before construction of the artificial wetlands; and iv) provide an awareness campaign and education materials on illegal dumping to the informal settlements living along the river banks.

Greener Pastures Programme: BESG has recently completed a three-year climate change awareness raising programme in vulnerable communities in UMDM. The project is an integral component of the BESG programme of building sustainable human settlements. Funded by the National Lottery Distribution Trust Fund (NLDTF), it aims to develop awareness of the reasons for increasing natural disasters and strategies to mitigate their impact, and to develop the resilience of vulnerable households through training and demonstration projects. The project is targeted at vulnerable households in areas within UMDM that are prone to severe weather patterns and food insecurity: Msunduzi, Richmond, Impendle, and Mpofana. It involves participatory learning in water conservation and management, rainwater harvesting, grey water recycling, effective control of stormwater to prevent soil erosion and property damage, recycling of waste materials (e.g. plastic, shale and old tyres) to support household livelihoods, food security and plot protection, healthy nutrition, food gardening including growing edible and palliative wild plants as a food and health supplement, and energy conservation. It also involves demonstration projects in tree planting as a source of shade and food, and eliminating invasive aliens that may cause structural damage and/or unnecessary loss of water table. The Greener Pastures Programme has been undertaken mainly through street theatre, and complements the project. There is no duplication or overlap with it as both the project areas and activities are different. However, the uMngeni Resilience project will incorporate lessons learned from the Greener Pastures Programme into the design of Output 2.1. In turn, information generated through this output will be incorporated into development projects implemented by BESG and other service providers locally, provincially and nationally, through the sharing of lessons learned in Component 4.

FAO Food Security Thematic Programme: This international programme, where FAO has partnered with the University of Pretoria and the South African government, has as its overall objective "*Improving and sustaining household and national food security in southern Africa through better management of climatic risks by smallholder farmers*". The programme aims to develop and promote smallholder farmer innovative techniques, methods and approaches to managing risks to crop production and post-harvest handling associated with drought, floods and cyclones, and to strengthen regional knowledge and institutional arrangements on risk management for crop production and post-harvest handling in areas in Southern Africa prone to climatic hazards. The programme supports and is aligned with the South African government's Food Security Programme, which focuses on food policy adjustments, building grain reserves, increasing access to markets for small scale farmers, boosting production, improving food distribution systems to increase the supply of food and bringing down prices. Traditional authorities and local government assist with providing land and encourage communities to increase food production. Activities include the revitalisation of food processing plants that support mass production of food, encouraging productivity and building up local and national food stocks. The programme supports small scale and emerging farmers with inputs, including seeds, fencing and rainwater harvesting infrastructure, training and mentoring. Households are supplied with seeds to produce food for consumption in their households through the 'One Home One Garden' campaign that has encouraged food gardens. Tractors are made available to plough land for larger projects. A fresh produce market has been established in the Ugu District of KwaZulu-Natal, to facilitate the distribution of food and to encourage sales of produce from small scale farmers in the area. Lessons learned from the uMngeni Resilience will be incorporated into the

food security programme, particularly related to the use of seeds for climate-resilient crops in the inputs provided to emerging farmers.

Collectively these various interventions will enable the project to form linkages and partnerships rapidly, and learn lessons from projects that are already being implemented in the catchment that aim to reduce vulnerability in rural communities, protect and restore degraded natural infrastructure and limit poverty and unemployment within vulnerable communities. Such interventions include the work of UW, the FireWise Communities Programme, BESG, UKZN SAEES and WESSA, all of which are being used as baselines on which the uMngeni Resilience project will build. This enabling environment, however, lacks large-scale and dedicated climate change adaptation interventions. The project will allow many of the partners already involved in the catchment to in turn use lessons learned and guidelines from the project to further build the social capital they have created in vulnerable communities in the catchment. This will ensure smooth project implementation and increased prospects for maximizing the impact of the project. A Project Managers' working group will be established, comprising managers from the ongoing projects/programmes, to coordinate efforts, avoid overlap between similar endeavours and ensure that projects deliver complementary and mutually reinforcing outcomes. It is anticipated that the working group will meet during the inception phase and biannually during project implementation. The head of the group will be changed every 6 months.

In addition to ongoing projects, the implementation of the project will act as a catalyst for increased investments in the green economy and environmental infrastructure by the UMDM and other partners. The link between early investment in planning and policy processes, and the associated benefits, will be demonstrated, and the political will generated and expressed during the project development phase will be solidified. Other partners within the UMDM will also be inspired to forge partnerships to leverage additional investments to address ongoing climate change challenges, including environmental and social challenges, facing the Greater uMngeni catchment.

Note for reviewers: The UMDM had planned to implement a small scale project to test the viability of undertaking disaster risk reduction activities, primarily to reduce flooding, in vulnerable communities. This project was specifically mentioned in the project concept document. The project was planned as a once-off six month pilot project to test if the construction of sustainable permeable drainage systems in a steep informal settlement would result in reduced flooding. The project was due to start in June 2013 and be completed by December 2013. However, the funding for the project was never released. The project was therefore not implemented.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Component 4: "*Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication"* comprises the learning and knowledge management component of the project. This component focuses on learning as well as generating and managing knowledge (see Section II.A for specific activities and a detailed description), and will include the formulation of specific learning objectives and indicators. This knowledge will be shared as lessons learned and policy recommendations, to facilitate adaptive management, scaling up and replication of successful project interventions. The sharing of knowledge will also strengthen the ability of local government and vulnerable communities to respond to the impacts of climate variability and change. Where capacity building is a direct enabler of implementation, the project's capacity building activities have been deliberately placed with the activities they are designed to enable (i.e. within Components 1, 2 and 3). Component 4 has been designed to strengthen municipal links with the target communities, enable effective participation in the project, to capture learning and to support the sustaining, scaling up and replication of project successes, and will be implemented through a range of tools and media.

Output 4.1: "*Community champions, officials and authorities are empowered to participate in the project's activities"* focuses on building the capacity of community champions, municipal officials and managers, traditional authorities and councillors to enable them to participate meaningfully in the detailed design and implementation of the project. Building the capacity of councillors and officials to mainstream climate change adaptation responses into planning, budgeting and policy development processes will serve also to sustain the project's outcomes.

Capacity building and training methods will be designed specifically for target audiences, including both informal and formal training and awareness-raising methods, appropriate to the educational levels and language capabilities of the target groups, particularly the community champions. Methods

will also take into account differential access to media, including social media. These methods will include formal accredited training courses such as those relating to the built environment, climate change risks and small scale agriculture development delivered in the province by WESSA and BESG, both project partner organisations/sub-Executing Entities.

A range of informal capacity building initiatives will be undertaken to raise awareness and promote behaviour change in relation to climate change adaptation. Orientation workshops for councillors, community leaders and community members will create awareness of and support for the project. These will be undertaken through Components 1, 2 and 3. Processes to enable full participation of local communities and unlock local and traditional knowledge and beliefs will be implemented at local level. Training, through Components 1, 2 and 3, will be undertaken prior to the development of the detailed, site specific project implementation plans, to allow stakeholders to participate in and contribute to plan development. Besides instilling a sense of ownership and accountability, which will enhance the sustainability of project interventions, this training will enhance the inclusion of traditional knowledge into project outputs and lessons learned. Training will focus initially on the pilot sites with the project target wards, but lessons learned will be shared with the wider community within the ward, thereby increasing the number of vulnerable people benefiting from the project. These project experiences, shared during and at the end of implementation through Component 4, will build on and enhance this knowledge gained at the start of and over the course of the project lifetime.

The project will use social media and information portal management to communicate with stakeholders, tapping into low-cost technologies that can reach large numbers of people in vulnerable communities. Awareness raising and educational materials about climate change adaptation will be produced and disseminated, together will materials publicising the protocols, guidelines and lessons that emerge over the life of the project. Some of these materials will be produced and shared using innovative mechanisms such as performance art (street theatre in support of climate change awareness has been effectively used in the UMDM) and school art competitions.

Output 4.2: "*Project outputs and experiences are captured and support integrated learning*" encompasses an important thrust of the project i.e. monitoring progress and capturing lessons learned, with a view to scaling up and replication. This output will thus also serve to "enrich the global, national and local knowledge on climate change adaptation, and accelerate understanding about what kinds of adaptation interventions are most effective".

A Knowledge Management Strategy will be developed at project inception, as per the guidelines outlined in the AF Results Framework and Baseline Guidance (Section 3). This Knowledge Management Strategy will include aspects of adaptive management, and a means to incorporate existing knowledge – that has been used to inform the design of the project – and knowledge generated by other sources into the project. This strategy, and the measures outlined above to generate and share knowledge, will considerably expand the benefits of the project.

The project will not duplicate existing embedded knowledge management systems such as those operated by the UMDM, CoGTA, UW and the EIPP, but will build on them where appropriate, to ensure that their reach extends to vulnerable communities. The technical coordinator for learning will be responsible for the development and implementation of the project's Knowledge Management Strategy, and quarterly updates on project progress and learning will be disseminated by the PMU.

Key adaptive management activities will include the establishment of component Task Teams, including representation from all project partners, as part of the governance structure of the project. These task teams will oversee the work of the project and will serve as forums for project learning and adaptive management. This approach has been used effectively by SANBI in South Africa's bioregional programmes.

The project will also convene reflection workshops in each of the project sites and between communities and policy-makers, capturing lessons learned, and sharing tools emerging from the project with stakeholders beyond the project sites, so these may be integrated in approaches to climate change adaptation elsewhere in the UMDM and beyond. Processes to capture lessons will be designed to ensure that community members are supported to share emerging lessons and that local knowledge and the experiences of vulnerable communities are integrated in outcomes and recommendations. Lessons learned throughout the life of the project will be captured in publications, case studies and as policy recommendations. Locally, presentations on progress and lessons learned will be made at existing forums including District multi-stakeholder climate change adaptation forums,

which have already achieved a great deal in the UMDM region. Lessons learned will also be shared nationally and internationally through national learning exchanges and participation in NIE and AF learning events.

Box 10: Existing platforms through which knowledge generated through the project can be shared.

In order to ensure that the emerging knowledge and lessons learned from this project are shared from the local through to the national and international level, the UMDM will build on the experience of and its relationship with a number of actors and, wherever possible, aim to work through and strengthen existing platforms and fora. WESSA, whose headquarters are in the UMDM, has a long history of working on projects across South Africa that seek to enhance human capacity development through sharing evidence and lessons learned from groundbreaking projects. WESSA has already developed learning courses on building resilience to climate change for government officials, NGOs and CBOs. WESSA has also produced numerous handbooks to share learning from various environmental protection projects, and is thus an important actor in advising UMDM on sharing of lessons learned.

The UKZN, through SAEES and the School of Hydrology, is very active in sharing lessons on climate change. The Climate Vulnerability Atlas of South Africa is an example of the work they undertake. Both learning centres are based within the UMDM, and can provide local and relevant experience.

Internationally, the NGO called Evidence and Lessons Learned from Latin America (ELLA) has undertaken numerous highly effective lesson learning projects on climate change, using web based approaches, and the UMDM has established strong links with the organisation in order to develop its own human capacity in the field of climate change. ELLA is willing to share approaches used and lessons it has learned from trying to support replication through sharing evidence and lessons learned.

Post-graduate top-up bursary opportunities will be provided for students who are from the UMDM to engage with the development and implementation of the project, and work with beneficiaries to distil lessons learned through case studies, which will be shared locally, nationally and internationally.

Other knowledge-sharing tools will be used to regularly report on project progress, lessons, plans, milestone events and other aspects of the project that enable implementers to simultaneously engage in knowledge sharing and publicity/communications. A dedicated project website will be established, linked to both the UMDM and SANBI existing websites. Alignment with the existing UMDM Communication Strategy (2012-2016) will be explored at project inception. The Communication Strategy aims to, *inter alia*, establish communication platforms where the community needs are communicated to the UMDM and vice versa. Communication channels to relay information include: i) Asakhe News (Quarterly Newsletter); ii) public notice boards; iii) public and council meetings; iv) community events; v) Ward Committee meetings; vi) community newsletters; vii) UMDM's website; viii) bulk SMS; ix) face-to-face, direct communications with communities and community structures; and x) national and international event celebrations e.g. National Women's Day, Human Rights Day, Youth Day, Day of Disabled and 16 Days of Women and Child Abuse.

Finally, this output will also support processes and provide platform for project lessons to be shared locally, nationally and internationally, and will aim to ensure that some of this sharing is delivered by local project partners so that the voices of vulnerable community members may be heard directly. This may include participation in NIE and AF learning events.

Output 4.3: *"Policy recommendations support sustaining, scaling up and replicating project successes"* will focus on sharing policy recommendations and best practices that emerge from project implementation. Sharing will take place at District and Local Municipal level, to facilitate take-up by other communities in the area. Each component will be governed by a Task Team consisting of all relevant players. This team will review progress and serve as an adaptive management forum, which will influence ongoing work both within and beyond the project. Provincial and National Policy conferences will be convened to share outcomes of the project and promote linkages between these and relevant national policy processes. The project will convene a national agriculture and climate change policy conference, and a national human settlements, disaster management and climate change policy conference to share outcomes of the project and promote linkages between these and relevant national policy processes. Other initiatives to promote replication and scaling up of project outcomes include workshops to facilitate the uptake of outputs in institutional planning and budgeting cycles of relevant departments and public entities.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The uMngeni Resilience project preparation process has been participatory in that a range of key stakeholders, who work on climate change issues or are highly vulnerable to climate variability and change impacts, have been consulted. At the outset, a wide range of stakeholders – including government, public entities, private associations, NGOs and stakeholder forums – were invited to participate in preparing and defining the project intervention and outcomes.

The UMDM's project consultation and preparation process was initiated through consultations on the development of the uMgungundlovu Adaptation Plan, which formed part of the development of its Climate Change Response Strategy. Meetings were held with stakeholders from government, business, civil society in the disaster management, agriculture, infrastructure, municipal services, human settlements, environment and organised business. Representatives of CBOs from rural/urban communities, women, the aged and youth were included. An emphasis was placed on capturing the views of these vulnerable groups.

Project preparation itself commenced with a multi-stakeholder forum to develop an integrated Project Concept for submission to the NIE. The UMDM invited key stakeholders from government, business and civil society from all the sectors impacted upon by climate variability and change. This forum convened on two occasions to prepare the submission, and was supported by specialist consultants currently developing the District SEA Process and the Climate Change Response Strategy of the District.

Once the Project Concept was shortlisted by the NIE, the forum met on two further occasions to discuss refinements to the Project Concept and possible sites where the project could be implemented. The UMDM undertook a preliminary assessment of vulnerable areas for project interventions, through desktop mapping and ground-truthing processes, with NGOs and CBOs working in the most vulnerable communities within the UMDM. The UMDM then convened a meeting of key stakeholders and NIE representatives to review the proposal and consult stakeholders on the preliminary site selection process.

In developing the full project proposal, the UMDM led a range of workshops, site visits and one-on-one meetings between specialist consultants, project partners, national, provincial and local government authorities, and representatives of civil society in the disaster management/early warning, agriculture, infrastructure and environment sectors. In April 2013, an inception workshop was facilitated by UMDM and SANBI (as the NIE), to refine the project outcomes and outputs, and to short-list project sites based on a combination of stakeholder feedback and vulnerability to the impacts of climate variability and changed, as informed by vulnerability assessments undertaken earlier in the project development period. Based on the inception workshop, and on subsequent planning and refining sessions, a series of sites visits was undertaken in September 2013. These were used to confirm the sites selected by UMDM as target areas of the project. Once the sites had been confirmed, a series of sector-specific workshops, focussed on each of the first three components of the project, was held in October 2013. These were used to develop relationships with project partners and gather further specialists insights to inform the design of the project interventions.

Between November 2013 and April 2014, seven trips were undertaken by SANBI representatives to assist UMDM project personnel with continuing stakeholder consultations. These included one-on-one meetings with local government, project partners and relevant stakeholders, and numerous site visits to the project target sites to refine the design of the interventions and meet with on-the-ground project partners and stakeholders. In January 2014, a series of UMDM-led meetings at the selected project sites were held with local government authorities and traditional leaders, as representatives of the respective vulnerable communities. These meetings were used as an opportunity to engage with local stakeholders to explore the range of possible adaptation interventions per site, and to incorporate existing traditional knowledge into the design of the interventions. All local government authorities and traditional leaders expressed support for the project, and stressed the importance of the anticipated economic, social and environmental benefits to the vulnerable communities in their respective wards. This support is documented by endorsement letters, presented as Annex IV.

In March 2014, the UMDM Municipal Manager (MM) convened a Management Committee meeting as well as a Special Disaster Management Advisory Forum meeting, to give UMDM and SANBI representatives the opportunity to present the project to senior UMDM officials and other project partners. Those present at the two meetings, led by the UMDM, re-confirmed their support of and commitment to the project. This UMDM support, as well as that of numerous other project partners, is documented by endorsement letters, presented as Annex IV.

In addition to the UMDM-led consultations, SANBI (as the NIE) engaged stakeholders at a national level. This engagement has resulted in support for the project from the following national departments: i) SAWS; ii) DAFF; iii) National Disaster Management Centre; iv) SALGA; v) Flagship Programme under the National Climate Change Response White Paper; and vi) the Monitoring & Evaluation, Biodiversity Conservation and Climate Change Adaptation Divisions of DEA.

The table below lists the meetings held during the project preparation process, and is supported by attendance registers and meetings lists presented in Annex II.

Table 5: Stakeholder meetings during the project preparation process.

Date	Participants and Purpose	Location	Attendance Register
December 2012 – January 2013	UMDM multi-stakeholder consultations for preparation of Project Concept	Pietermaritzburg	n/a
10 April 2013	UMDM, project partner and SANBI representatives: meeting to plan Inception Workshop	Pietermaritzburg	See Annex II.2
11 April 2013	UMDM, project partner and SANBI representatives: Inception Workshop	Pietermaritzburg	See Annex II.3
9 September 2013	UMDM and project partners: workshop to plan field visit itinerary	Pietermaritzburg	See Annex II.4
17-19 September 2013	UMDM, project partners and SANBI representatives: field visits to identify project interventions sites	Impendle, Umngeni, Mpofana, Richmond, Mkhambatini, uMshwati and Msunduzi Municipalities	See Annex II.5
2 October 2013	UMDM, agriculture project partner and SANBI representatives: technical workshop	Pietermaritzburg	See Annex II.6
3 October 2013	UMDM, built environment/ecological infrastructure project partner and SANBI representatives: technical workshop	Pietermaritzburg	See Annex II.7
17 October 2013	UMDM, EWS project partner and SANBI representatives: technical workshop	Pietermaritzburg	See Annex II.8
19 November 2013	UMDM and SANBI representatives: meeting to plan itinerary	Pietermaritzburg	See Annex II.9
19 November 2013	UMDM and SANBI representatives: site visits to potential project pilot sites	uSwapo, Subanto, Simero and Snating River Valley	See Annex II.9
20 November 2013	UWS and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.9
20 November 2013	UMDM, RLM and SANBI representatives: site visits to potential project pilot sites	Siyathuthuka and Nhlazuka	See Annex II.9
21 November 2013	UMDM and SANBI representatives: technical component meeting	Pietermaritzburg	See Annex II.9
21 November 2013	UMDM and SANBI representatives: site visits to potential project pilot sites	Lidgeton, Swayimane and Vulindlela	See Annex II.9
22 November 2013	UMDM and SANBI representatives: site visits to potential project pilot sites	Siphumalele and Shiyabazali	See Annex II.9
22 November 2013	UMDM and SANBI representatives: debriefing	Pietermaritzburg	See Annex II.9
9 December 2013	Shack Dwellers International, Community Organisation Resource Centre, UMDM and SANBI representatives: field visit to informal settlements	Cape Town, Landsdowne, Langrug and Franschoek	n/a
6 January 2014	UMDM and SANBI representatives: meeting to plan itinerary	Pietermaritzburg	See Annex II.10

7 January 2014	UMDM, MLM and SANBI representatives: meeting to discuss built environment component	Pietermaritzburg	See Annex II.10
8 January 2014	UMDM and SANBI representatives: GIS meeting	Pietermaritzburg	See Annex II.10
8 January 2014	Swayimane Ward 8 traditional authority, UMDM and SANBI representatives: meeting to discuss interventions in Swayimane	Swayimane Ward 8	See Annex II.10
8 January 2014	uMshwati Mayor, UMDM and SANBI representatives: meeting to discuss interventions in Swayimane	Swayimane Ward 8	See Annex II.10
9 January 2014	Vulindlela Ward 8 councillor, UMDM and SANBI representatives: meeting to discuss interventions in Vulindlela	Pietermaritzburg	See Annex II.10
9 January 2014	FireHawks and SANBI representatives: stakeholder meeting	Lions River	See Annex II.10
10 January 2014	UKZN SAEES, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.10
10 January 2014	Richmond traditional and local authorities, UMDM and SANBI representatives: meeting to discuss interventions in Nhlazuka	Nhlazuka Ward 5	See Annex II.10
27 January 2014	UMDM and SANBI representatives: meeting to plan itinerary	Pietermaritzburg	See Annex II.11
27 January 2014	UWS and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.11
28 January 2014	UKZN SAEES, KZN Wildlife, UMDM and SANBI representatives: site visit	Vulindlela Ward 8	See Annex II.11
28 January 2014	UKZN SAEES, KZN Wildlife, RLM, UMDM and SANBI representatives: site visit	Nhlazuka Ward 5	See Annex II.11
29 January 2014	UKZN SAEES, KZN Wildlife, UMDM and SANBI representatives: site visit	Swayimane Ward 8	See Annex II.11
5 February 2014	FireWise/Kishugu Public Benefit Organisation and SANBI representatives: stakeholder meeting	Cape Town	n/a
12 February 2014	UKZN SAEES and SANBI representatives: stakeholder meeting	Cape Town	n/a
3 March 2014	DEA-NRM Programme: EPWP and SANBI representatives: stakeholder meeting	Cape Town	n/a
11 March 2014	WoF and SANBI representatives: stakeholder meeting	Cape Town	n/a
17 March 2014	UMDM Management Committee and SANBI representatives: presentation of project to Management Committee	Pietermaritzburg	See Annex II.12
17 March 2014	UMDM Disaster Management Forum and SANBI representatives: presentation of project to Disaster Management Forum	Pietermaritzburg	See Annex II.12
17 March 2014	MLM and SANBI representatives	Pietermaritzburg	See Annex II.12
18 March 2014	UWS and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.12
18 March 2014	UMDM and SANBI representatives: meeting to discuss organogram restructuring	Pietermaritzburg	See Annex II.12
18 March 2014	Provincial and local FPA, WoF, FireHawks and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.12
18 March 2014	BESG and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.12
18 March 2014	WoF and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.12
26 March 2014	UMDM and SANBI representatives: meeting to plan itinerary	Pietermaritzburg	n/a
26 March 2014	BESG, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	n/a

27 March 2014	WESSA, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	n/a
27 March 2014	CoGTA, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	n/a
9 April 2014	UMDM, DAEA and SANBI representatives: meeting to discuss implementation arrangements	Pietermaritzburg	See Annex II.13
9 April 2014	DAEA and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.14
23 April 2014	Sector Department meetings	Pretoria	n/a
24 April 2014	UMDM and SANBI representatives: planning meeting	Pietermaritzburg	n/a
24 April 2014	CoGTA, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.15
24 April 2014	MLM, UMDM and SANBI representatives: stakeholder meeting	Pietermaritzburg	See Annex II.16

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

South Africa is a country where the Gini coefficient (an indicator of the degree to which income distribution is skewed) is amongst the highest in the world[26]. Since 1994, the South African government has striven to overcome this inequality, which is characterised not only by extremes of wealth and poverty, but by massive differentials in access to resources, infrastructure, knowledge and technology by both individuals and communities. Highly developed systems and capacities protect and support sectors such as commercial agriculture and forestry in the former "white" areas of the country, while poor, unskilled communities in informal and traditional housing, and small scale/subsistence farmers, eke out an existence in townships and former "black homelands", without access to the resources, systems and knowledge available to the wealthy. The province KwaZulu-Natal comprises a mosaic of such areas, as does the UMDM. Highly developed sectors and wealthy areas have relatively lower levels of vulnerability to the risks of climate variability and change, as well as the resources, technologies and tools to generate adaptation processes. Poor communities, on the other hand, have higher levels of vulnerability together with limited capacity, resources and linkages to enable the development of adaptive capacity. The systems and technologies serving commercial production sectors and wealthy areas are currently not designed to provide protection for vulnerable poor, rural communities.

South Africa's climate response is guided by the NDP, and supported by sectoral legislation and the IDPs on a municipal level. Implementation of the NDP emphasises socio-economic development, providing low income housing and job-creation among other addressing pressing challenges that the country is facing. The response to extreme climate events has been fragmented and reactive, focusing mainly on disaster relief and disaster risk reduction and to address incremental change. Public policies and programmes (such as housing and development planning) do not take into account the effects of climate variability and change processes, and do not incorporate adaptation measures. A number of initiatives focusing on aspects of climate change adaptation have been implemented on a small scale in the Province, driven mainly by NGOs and universities. These have lacked coordination and are without the means to be scaled up and replicated. The provincial Climate Change Council has yet to produce a provincial strategy for adaptation to anticipated climate variability and change.

The project will enhance and extend existing EWSs that currently serve primarily commercial forestry, agriculture and regional water supply provision, to reach vulnerable communities living in flood and fire-prone areas. Hydrological forecasting services will be enhanced to provide more specific flood warnings, transmitted through appropriate, accessible technologies (e.g. text messages), to relevant vulnerable communities. Recipients will be trained to understand these early warning messages, and appropriate responses will be developed jointly, incorporating both local and scientific knowledge.

Weather services will provide longer-term seasonal forecasts appropriate for small scale farmers in the UMDM, and extension officers will be trained to understand and advise on how these forecasts should be used. Appropriate responses will be developed in conjunction with local farmers, once again combining local and expert knowledge.

[26] See: en.wikipedia.org/wiki/List_of_countries_by_income_equality. Accessed 3 May 2014.

Within vulnerable rural communities, the project will strengthen and stabilise critical settlement infrastructure, community facilities and homes, to buffer vulnerable communities against anticipated climate-induced stresses. Ecosystem resilience will be restored and protected in critical ecosystems, buffering local communities downstream from climate change impacts, and contributing to improved fresh water quality. Climate change adaptation will be mainstreamed into relevant planning frameworks and settlement upgrade planning, to buffer vulnerable communities against anticipated climate-induced stresses.

The project will support climate-resilient agricultural practices and invest in physical infrastructure at the farm level, to mitigate the impacts of climate variability and change for small scale farmers. Adaptation learning will be mainstreamed into the extension services and farmer support programmes of the DAEA.

At the outset, the learning and knowledge management component of the project will empower communities and vulnerable groups, including women, and officials to participate in the project's activities. Project outputs and experiences will be captured and used to support integrated learning and the formulation of policy recommendations. Methods such as learning events, policy conferences and social media will be used to disseminate and mainstream the learning from the project, supporting the sustaining, scaling up and replication of project successes.

The project will facilitate horizontal and vertical integration of activities, allowing for comprehensive synergistic response strategies, taking long-term climate scenarios into account and anticipating future additional climatic stressors, while supporting sound sustainable development across sectors. This capacity development effort will also allow more integrated approaches in other areas and could become the basis of pro-active governance – anticipating instead of simply responding to complex problems. Coordination structures set up as part of the project could potentially be a vehicle for further integrated responses in not only climate-related fields, and could thus have a far wider reach and persist beyond the duration of the project. The integration of local and scientific knowledge and the capacity that the project will build in the course of the accompanying learning process will further strengthen the synergistic character of the response strategies developed.

As illustrated above, the project design complements and builds on existing programmes of work being undertaken by government agencies, public entities and NGOs, bringing a stronger focus on climate change adaptation, and providing the integration that is currently lacking. Elements of the project will build on the experiences and lessons learned from past and ongoing initiatives and inform ongoing policy and learning processes, both within the UMDM and beyond. There are many such ongoing environmental and agricultural interventions which will have a complementary effect on the project. These will not pose a risk of duplicating activities, because these complementary interventions are largely not aimed at mainstreaming climate change adaptation activities, and do not overlap spatially with the project. The project will thus be able to impact on in other parts of the UMDM and beyond, through sharing lessons and best practices for vulnerable communities, and through mainstreaming adaptation approaches.

The total funding required for this project is USD 7,495,055 including project management and project execution fees. The cost of implementing the four integrated components is justified in more detail below.

Component 1: Early warning systems

Baseline:
At present, the UMDM Disaster Management Unit is responsible for reacting to disasters, climate and non-climate driven, in the UMDM. The Unit adopts a reactive approach, mostly delivering food parcels and blankets to those affected by disasters. There are various EWSs currently operational that are available to inform the Unit, but these are largely not used and the responses not coordinated. Furthermore, there is poor capacity to respond to climate-driven disasters at the local level.

UW manages the WRM-DSS system for the UMDM. At present this system is designed to predict and inform management of flood events related to bulk water infrastructure, such as weirs and dams. Flood warnings are generalised and specific warnings are not provided to communities. District-wide information, such as that provided through the SAWS Flash Flood Guidance System, is available to the UMDM Disaster Management Unit, however this information is coarse and not readily suitable for

conveying to vulnerable communities in the form of warnings. The Unit thus adopts a reactive approach, addressing flooding disasters after the event has occurred.

A wildland fire detection and suppression system in the UMDM is currently operational, focusing on commercial forestry plantations. The system involves various players, including:

- FPAs at provincial and local level – there are six FPAs in the UMDM;
- Fire Hawks who detect wildland fires based on cameras feeding imagery back to Control/ Operation Rooms – based at the Lions River and Richmond FPAs;
- WoF teams who assist with suppression of wildland fires; and
- Municipal Fire Services based within the UMDM's Fire & Rescue Department (mainly structural fire fighting).

The Kishugu Public Benefit Organisation, which is linked to the WoF Programme, runs the South African FireWise Communities and FireWise Wage Incentive Programmes. FireWise is a community-based approach aimed at the prevention of fires through fire management planning, local fire risk assessments and prescribed burning. Each area where a FireWise Community Programme operates is run by a local FireWise Committee, linked to the FPA, with support from Kishugu in the form of training, technical advice, equipment and certification. Kishugu runs a number of FireWise Community Programmes in KwaZulu-Natal, including in RLM.

The DAEA provides support to small scale farmers within the UMDM. Whilst agricultural extension officers are active in the UMDM, they do not convey agro-meteorological information to vulnerable farmers. This is partly because such information is not routinely generated, and partly because where such information is available, it is not in a format that is understandable to extension officers and small scale farmers.

With-project scenario (adaptation alternative):

The first component of the project will develop and consolidate information generation and early warning dissemination and response strategies. The first phase in each of the first three outputs (i.e. flood/storm, fire and agro-meteorological EWSs) will be a launch and assessment phase, to convene all the relevant stakeholders, including vulnerable community members with a focus on women. This will be used to develop and understand roles and responsibilities, strengths and weaknesses and strategic positioning of all role players. The next phase will be the development of information generation and dissemination systems, models and agreements, driven by communication protocols and standard operating procedures. In the water sector this will include refining the current system to incorporate SAWS rainfall prediction data to generate flood and storm warnings for the whole district, and fine-scale mapping of flooding hotspots along the prioritised rivers. In the fire sector this will include consolidating communication protocols for the area under current surveillance (shown in blue in Figure 9), and installing the necessary equipment to expand the area of surveillance to include un-monitored rural areas vulnerable to wildland fire risks (shown in yellow in Figure 9). In the agricultural sector this will include developing integrated models to combine climate scenarios, short-term and seasonal forecasts, and crop models through a GIS-enable framework to generate information of relevance to small scale farmers.

The next phase will involve the training of community members to allow input into the design of fine-scale implementation plans. The plans will be rolled out in a number of pilot areas, targeting the communities most vulnerable to the increased threat of climate-induced floods/storms, wildland fires and drought. The UMDM Disaster Management Unit will be capacitated so as to enable a coordinating role and a proactive approach to managing climate-induced disasters in the UMDM.

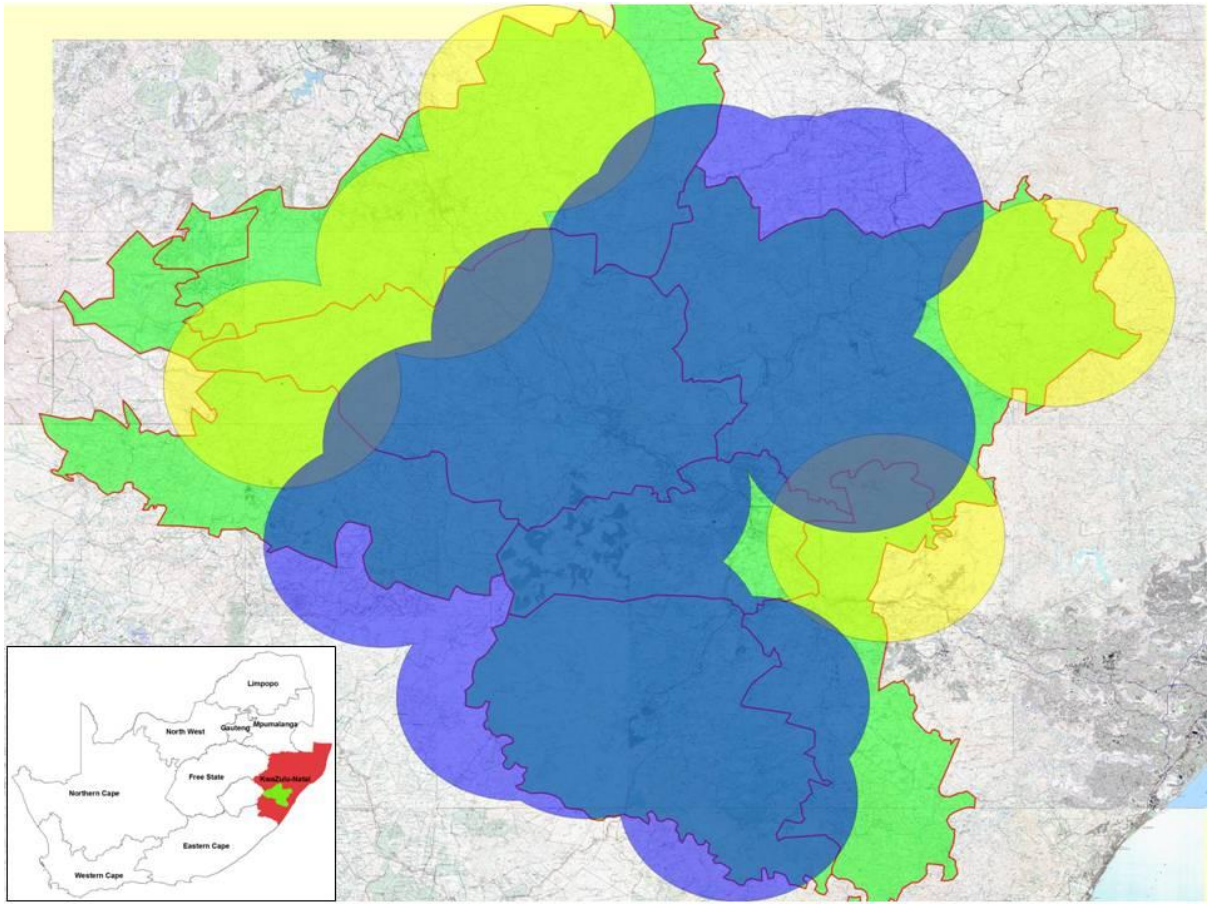


Figure 9: Current area under surveillance to detect fires (blue), and proposed area of surveillance of additional cameras to be installed through the project (yellow). The UMDM is shown in green on the inset image, as well as on the map.

Component 2: Climate-proof settlements

Baseline:
Ad-hoc, localised efforts to build the climate resilience of rural communities have been implemented in the past, but the benefits have not been sustained and any infrastructure that was provided has largely not been maintained. Examples include retaining walls and road drainage, constructed through government and NGO-driven projects.

Within MLM, upgrades are planned for all 70 informal settlements in terms of the Msunduzi Local Municipality Informal Settlement Upgrade Strategy and Programme. However, these upgrades are not being planned or designed with climate change adaptation considerations in mind. Whilst the upgrades will no doubt benefit vulnerable communities living in the peri-urban environment, the impacts of increased floods and storms, in particular, could undermine the benefits and result in damage to infrastructure at high cost to the government.

At local municipal level, MLM has an Environmental Monitoring Framework (EMF) that should inform the design of the upgrades. However, this EMF does not incorporate the latest climate scenarios and information, and is not routinely consulted when informal settlement upgrade plans are developed. Municipal IDPs and SDFs at local and district levels do not incorporate adaptation concerns.

With-project scenario (adaptation alternative):
The second component of the project will climate-proof rural infrastructure and restore ecological infrastructure in the target areas of Vulindlela and Nhlazuka, and develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant processes. The first phase in each of the three outputs will be a launch and capacity building phase, to convene all the relevant stakeholders, including vulnerable community members with a focus on women. These stakeholders will be trained on the importance of

climate-resilience, and on different options available that are specific to each of the pilot sites. For the rural and ecological infrastructure sites, training will include traditional authorities responsible for land allocation, so as to raise awareness on permitting development in areas prone to or vulnerable to the impacts of climate variability and change. For the interventions in low-lying high-density settlements, training will focus on UMDM and relevant Local Municipality officials, local community members, community leaders and community champions.

The next phase will involve the development of detailed implementation plans for the piloting of adaptation interventions in the various sites. This will include restoring and rehabilitating critical ecological infrastructure to reduce vulnerability and improve the capacity of ecosystems to mitigate effects of climate induced disasters. The capacity built in the previous phase will allow for community participation, generating a sense of ownership and accountability in the interventions, increasing the likelihood of sustained benefits. Guidelines and handbooks will be developed based on the lessons learned, for sharing through Component 4. These guidelines will focus on: i) the installation of low-cost pedestrian bridges in rural areas that are prone to flash flooding; ii) the allocation of land in rural areas; and iii) tools to mainstream climate change adaptation considerations and building standards into informal settlement upgrade plans in the UMDM, as well as the rest of KwaZulu-Natal. This will be an important output of the project as it will have the potential to support climate-proofing of a great deal of investment in housing projects, including the location and design of services and dwelling units, across the country. Recommendations will be developed and capacity building provided on how this tool could be incorporated in relevant provincial, national and municipal building codes, regulations, infrastructure standards, infrastructure planning and associated budget provision processes, including into the National Housing Code, municipal IDPs and SDFs. This process will be linked to ongoing interventions that aim to develop environmental layers for the UMDM SDF in terms of SPLUMA.

Component 3: Climate-resilient agriculture

Baseline:
Since UKZN SAEES has been working with the farmers in Ward 8 of Swayimane, in the area under Chief Gcumisa, new crops such as bambara groundnut and maize landraces have been introduced. Project staff are in the process of introducing sorghum. UKZN SAEES will also soon be evaluating alternative cropping practices such as intercropping. These efforts are designed to bolster resilience of the farmers' cropping system through addition of drought tolerant crops and promotion of sustainable as well as resilient cropping practices such as intercropping. To date, the UKZN SAEES research has evaluated agronomic practices such as planting date selection. Climate change has resulted in seasonal shifts, which farmers have not yet responded to. Results have shown that contrary to indications by farmers that they grow crops all year round, the risk of crop failure during the winter period is now very high. Currently, UKZN SAEES has 3 MSc students conducting trials in the Swayimane. Their work is focused on drought tolerance and quantifying water use. Over a period of two years an amount of about USD 95,000 has been spent on crop trials, transport and other requirements for students at the site.

Vulindlela is a rural community near Pietermaritzburg where agriculture is practiced for subsistence. Here, community homegardens predominate as areas for vegetable production in summer. The area is dominated by grazing land that is vulnerable to soil erosion. Rainfall is low (~500 mm/annum), but severe storms occur in summer. Similar to Swayimane, the intensity of these storms is predicted to increase. The area is also characterised by dry spells. Rainfall from storms is generally of limited value to agriculture as much of the rainfall ends up being lost to run-off also resulting in erosion. The approach here would be generally the same as that used at Swayimane, but there will be an emphasis on grassland sciences and potential for animal husbandry in the next five years. As part of climate change adaptation, the project will also evaluate alternative crops that are resilient and can be used both as human and animal feed. Such crops include legumes such as bambara groundnut, cowpea as well as cereal crops such as sorghum and millets among others.

UKZN SAEES is not currently working in in Nhlazuka, and there has been no focus on climate-smart agriculture in this area to date.

With-project scenario (adaptation alternative):
The third component of the project will improve the resilience of small scale farmers and community members in the target areas of Swayimane, Vulindlela and Nhlazuka. The first phase of implementation will involve capacitating DAEA agricultural extension officers, so that they can interact

with and advise small scale farmers in the target areas. This is an important adaptation response that can be mainstreamed into extension support beyond the target areas, at a district, provincial and national level. In parallel with this, the work of UKZN SAEES will be scaled up to farm level in Swayimane and replicated in Vulindlela, where small scale farming is occurring on marginal agricultural land. As with the previous components, the first phase of the output will include launch and capacity building activities, to convene all the relevant stakeholders including vulnerable community members, with a focus on women. These stakeholders will be trained on the use of climate-smart agriculture and climate-smart techniques that are specific to each of the agricultural areas. For Swayimane and Vulindlela, detailed farm plans will be developed and implemented, whilst activities at Nhlazuka will focus on community homegardens using climate-resilient crops, in locations that are not vulnerable to erosions. This may include terracing if steep sided locations are most appropriate. The community homegardens will be appropriately fenced with a concrete slab footing laid beneath the fence, to prevent damage by bushpigs. The next phase will involve the development of long-term monitoring stations and training materials for small scale farmers beyond the immediate target areas of the project. This will increase the number of beneficiaries, and broaden the climate change adaptation influence of the project. The final phase will include the establishment of cooperatives in Swayimane, linking these to markets. This will provide a sustained flow of income which can be re-invested in climate-resilient agriculture, and is thus an important adaptation intervention. Guidelines and handbooks will be developed based on the lessons learned, for sharing through Component 4.

Component 4: Capacity building and learning

Baseline:
Many climate adaptation innovations have been developed in the UMDM region and are now being applied in the province and in other parts of South Africa (e.g. in Sol Plaatjie and Chris Hani District Municipalities) and in other parts of the South African Development Community (SADC) region. This history and extensive consultation provides building blocks for the project. WESSA has piloted innovative environmental education programmes to increase knowledge amongst municipal officials and vulnerable communities on environmental protection and climate change issues. These are relevant to the capacity needs in the UMDM, and include Environment Practices courses accredited by the South African Qualifications Authority (SAQA), addressing issues relating to water, waste management, biodiversity loss and climate change risks. Practice-based, SAQA accredited, courses in small scale agriculture have been successfully implemented in the UMDM. WESSA also holds orientation workshops for community leaders and incoming councillors. The Local Government Sector Education & Training Authority (LGSETA), established in terms of the Skills Development Act (Act No. 97 of 1998), has appointed WESSA as an Intersectoral Centre of Occupational Excellence (ISOE) to lead capacity development for environmental sustainability in local government and with other key stakeholders. The ISOE is based within the UMDM and has developed courses in small scale agriculture and climate change for municipal managers, supervisors and workers.

BESG has developed capacity-building programmes focusing on climate change adaptation in informal settlements. BESG has recently completed a three-year climate change awareness raising programme in vulnerable communities in UMDM. The project is an integral component of the BESG programme of building sustainable human settlements, and aims to develop the resilience of vulnerable households through training and demonstration projects. The project is targeted at vulnerable households in areas within UMDM that are prone to severe weather patterns and food insecurity.

Ezemvelo KZN Wildlife and the DAEA have worked on numerous support programmes within the catchment for the small and subsistence farming sector aimed at improving irrigation and agricultural practices. Permaculture training is currently being provided by Ezemvelo KZN Wildlife and African Conservation Trust in the Lower Mkuze catchment. Integrated wildland fire management, implemented by WoF, FPAs and FireWise Community Programmes, are practiced through much of the province. Finally, EWSs are operated by various agencies, including SAWS and UW. Many involve participatory processes and capacity building and some incorporate lessons-learned processes.

Other participatory and capacity-building programmes piloted or implemented in the UMDM include: i) the Hand-print: Action towards Sustainability, where various resources (many relating to indigenous knowledge processes) have been produced and shared; ii) biomonitoring for base-line data through the Stream Assessment Scoring System (miniSASS) which is now able to provide citizen science data

through non-smart phones on a public access Google Earth platform[27]; iii) the Regional Centre of Expertise (RCE) concept, which is now widespread in southern Africa, iv) Enviro-Champs: widely applied in UMDM, this programme provides support, training and air-time to unemployed community members participate in 'flash-point' areas across the UMDM; and v) street theatre in support of climate change awareness, water and sanitation action for sustainability.

With-project scenario (adaptation alternative):
Component 4, the capacity building and knowledge management component of the project, builds on the extensive history of and capability in capacity building in the UMDM, to support the first three components through: i) building the capacity of community champions, so as to be able to assist UMDM and Local Municipality officials during and after project completion, and officials/authorities to empower them to participate effectively in project activities; ii) disseminating educational and awareness raising materials about climate change adaptation; iii) providing opportunities for reflection during and at the end of the project where best practices and lessons learned can be captured and shared, and policy recommendations formulated; and iv) providing mechanisms and platforms for sharing the outcomes of the project at local, provincial and national levels, and mainstreaming these into relevant national policy, sustaining, scaling up and replicating project outcomes. All three aspects are critical to the success of the project, ensuring buy-in and ownership by communities and officials, the capturing of learning and the mainstreaming of project outcomes. (For more details, see Section II.G).

J. Describe how the sustainability of the project outcomes has been taken into account when designing the project.

The project has been designed from the outset with sustainability in mind. The participatory approach adopted through gender-sensitive engagement and local level capacity building, to include vulnerable community members, groups and associations in the development of detailed implementation plans will engender a sense of ownership in project interventions. This in turn will sustain the impacts of the beneficial outcomes. Furthermore, the project has been designed to be fully integrated with existing and ongoing programmes of work in the UMDM. Strategies to scale up successful project interventions to other high risk areas locally and nationally will be developed, and project lessons and outcomes will be shared through a suite of mechanisms at municipal, provincial and national levels to facilitate scaling up and replication beyond the project pilot sites.

The project's sustainability measures are set out in the table below.

Table 6: Sustainability measure per project output.

Project Components	Expected Concrete Outputs	Sustainability Measures
1. Early warning and response systems improve preparedness and adaptive capacity of local communities and small scale farmers, drawing on and integrating scientific and local knowledge.	1.1 Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials. *1.1.1 Augment the Umgeni Water Decision Support System to provide early warning system information into a form that is useful for municipal officials and local communities.* *1.1.2 Develop appropriate partnerships and enhance the effectiveness of fire detection and suppression.* *1.1.3 Strengthen Municipal Disaster Management systems to enable a proactive response to flood, storm, fire and agro-meteorological climate information and warnings.*	• The project will build on and augment the existing UW hydro-climatological DSS with coarse and fine-scale modeling that enables real time hydro-climatological information to be generated and distributed. This investment will be maintained by UW as part of its ongoing programme of work beyond project end. Project investments are seen as an opportunity to pilot an approach that can be scaled up across the UMDM and beyond, to other areas where UW is the water authority • The project will supply additional fire towers when the UMDM is able to fully operationalise Fire and Rescue Services, ensuring that the receiving environment has the capacity to sustain and use these facilities. • The project will contribute to making the existing system effective through alignment and vertical integration of EWS

[27] This project recently won a United Nations University global award as a 'Flag-ship Service Delivery Project'. It also won the Water Research Commission's Community Empowerment Award for 2013.

		information in the UMDM, which will then be scaled up by CoGTA to 10 other districts in the province
	1.2 Early warning systems empower municipal officials and local communities to respond timeously to seasonal forecasts and potential disaster events. *1.2.1 Pilot a Ward-Based Disaster Management Response System for floods and storms in a low-lying high-density settlement.* *1.2.2 Pilot a Ward-Based Disaster Management Response System for floods, storms and fires in Vulindlela and Nhlazuka.* *1.2.3 Develop and operationalise community-based fire risk management plans in Ward 5 of Nhlazuka.*	• The project will pilot low-tech, ward-based disaster management responses in a selected low-lying high-density settlement, Vulindlela and Nhlazuka, making use of existing technologies, infrastructure, networks and systems, including Ward Committees. • The FireWise Communities Programme supports voluntary FireWise Communities, providing training, equipment, certification, and technical advice on an ongoing basis, as long as the local FireWise Committee is active in a community.
	1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability. *1.3.1 Develop and implement a farm-based agro-meteorological information generation and dissemination system, using Swayimane as a pilot.* *1.3.2 Mainstream agro-meteorological early warning systems into Agricultural extension services across the Province.*	• Mainstreaming the farm-based agro-meteorological information generation and dissemination system technology into the extension service of the provincial Agriculture Department supports sustainability of outcomes.
2. A combination of ecological and engineering solutions helps local communities to reduce vulnerability to the existing and anticipated impacts of climate variability and change.	2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities. *2.1.1 Develop and implement plans to climate- proof built infrastructure and shelter in vulnerable rural communities.* *2.1.2 Develop guidelines and policy recommendations for the inclusion of climate-proofing and adaptation mechanisms into rural settlement and municipal land use planning processes.*	• The participatory approach will ensure that communities themselves identify risks and priorities, supporting legitimacy and sustainability of project outcomes. Hard infrastructure will persist for a considerable period after project end. Where relevant, the project will ensure that the municipality has committed to ongoing maintenance of such infrastructure. • Guidelines and policy recommendations support scaling up and sustainability.
	2.2 Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream. *2.2.1 Restore and rehabilitate critical ecological infrastructure to improve its capacity to mitigate effects of climate induced disasters.* *2.2.2 Develop policy recommendations for including adaptation considerations into South Africa's Expanded Public Works Programmes and national sectoral adaptation response strategies.*	• Investments in ecological infrastructure will include hard infrastructure such as gabion structures in erosion gulleys, stone packing on eroded slopes, wetland rehabilitation using engineered structure in addition to focusing on management practices. • Policy recommendations support scaling up and sustainability.
	2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development	• Sustainability is built into the mainstreaming approach. • The project will ensure that adaptation

	plans and frameworks. *2.3.1 Develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant planning and infrastructure development plans/frameworks and municipal land use planning processes.* *2.3.2 Build the vulnerability mapping and adaptation planning capacities of relevant officials to facilitate mainstreaming of the tool developed in 2.3.1.*	concerns are built into the environmental layers of the UMDM SDF, promoting sustainability in relation to the land use planning role of the UMDM
3. Small scale farmers have improved resilience and reduced vulnerability to existing and anticipated impacts of climate variability and change.	3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers. *3.1.1 Increase agricultural yields through climate-smart farming in small scale farms and community homegardens.* *3.1.2: Link farming cooperatives to existing and new markets.*	• The project will support the scaling up of farm-based pilots where these are producing surpluses and providing benefits to people, linking them to markets to improve returns. This bottom-up approach which rewards successes with economic benefits will be self-sustaining.
	3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation practices into its extension services and farmer support programmes. *3.2.1 Enhance the capacity of DAEA staff to mainstream climate change considerations into their activities.* *3.2.2 Mainstream climate-smart agricultural practices into ongoing farmer support programmes.*	• Mainstreaming adaptation practices into the existing systems of the DAEA supports scaling up and sustainability.
4. Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication.	4.1. Community champions, officials and authorities are empowered to participate in the project's activities. *4.1.1 Build the capacity of local champions (including selected community members, councillors, traditional authorities and officials) to mainstream climate change adaptation responses into planning, budgeting and policy development processes.* *4.1.2 Produce and disseminate innovative educational and awareness raising materials about climate change adaptation.*	• Capacity building activities will use the Action Learning approach, which is tied to practical implementation. This will extend the reach of the project beyond its own activities, as all who participate will be empowered to take climate change adaptation into their own work. • The project will design innovative education and awareness materials that will be educational, desirable, and re-useable.
	4.2 Project knowledge outputs and experiences are shared and captured. *4.2.1 Create partnerships with tertiary institutions that support students to study project interventions.* *4.2.2 Convene reflection workshops and learning exchanges where best practice approaches can be observed and captured.*	• Investment in tertiary students is a lifelong investment. Partnerships created between with institutions will persist beyond project end. • Providing platforms for lessons-sharing will catalyse learning, sharing and networking, investing in the development of a culture that supports adaptation. This will support learning beyond the project.

	4.2.3 Provide platforms for project stakeholders to share experiences nationally and internationally.	
	4.3 Policy recommendations support sustaining, scaling up and replicating project successes. *4.3.1 Convene national policy conferences to share outcomes of the project and promote linkages between these and relevant national policy processes.* *4.3.2 Develop a plan to sustain, scale up and replicate project outcomes.*	• Policy recommendations support scaling up and sustainability. All components will have task teams and will culminate in policy conferences, creating and strengthening networks and communities of practice. For instance, the policy conference on disaster response will mainstream climate change adaptation into disaster management at national level.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project.

In accordance with the AF ESP, the project has been screened for environmental and social impacts against the stipulated principles. The results of the screening are presented in Table 7 below. The project is adjudged to be in **Category B** i.e. a project with possible but limited anticipated adverse environmental or social impacts. Whilst limited to no adverse impacts are anticipated, an Environmental and Social Risk Management Plan (see Annex V) has been developed to ensure that any unintended adverse impacts are avoided, and that, where this is not the case, they are timeously detected and appropriately mitigated. See Section III.C, III.D and Annex V for further details. Particular attention will be given to ensuring that activities do not impact adversely on any priority biodiversity areas or ecosystem support areas, and that there are no negative impacts on local communities, including vulnerable groups and indigenous people.

Project activities that pose social or environmental risks will not be approved during the detailed quarterly forecasting process.

As described in Section II.E, project activities that require a Basic Assessment or full Environmental Impact Assessment (EIA) as per the national EIA regulations (see Section II.E) will not be supported, due to administrative costs and potential delays. The only exception to this will be where provincial authorisations can be obtained through South Africa's Working for Wetlands Programme. Precedents are in place for the provision of such provincial authorisations to the Working for Wetlands Programme for riparian zone activities, such as the rehabilitation or restoration of wetlands, rehabilitation and the restoration of river banks (including erosion control and the construction of low river crossings). Such provincial authorisations will need to be provided in writing before the above mentioned rehabilitation and restoration activities can take place, and are approved by the NIE.

Table 7: Predicted environmental and social impacts.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	X – All Project interventions will be compliant with South African and international laws.	
Access and Equity	X – The project will adopt an approach that capacitates vulnerable communities to enable active participation in the project. This will enable fair and equitable access to project benefits to all participants, including marginalised and vulnerable groups.	
Marginalised and Vulnerable Groups	X – The project will benefit marginalised and vulnerable groups living in the project target areas, including women, children, the elderly, indigenous people, people living with disabilities and people living with HIV/AIDS.	
Human Rights	X – The project will respect and promote human rights, including, *inter alia*, equality, freedom of expression and association, housing, education and access to information,	

	as stipulated by the Constitution of South Africa, 1996.	
Gender Equity and Women's Empowerment	X – The project will engage a gender expert to ensure that, during implementation, both men and women: i) are able to participate fully and equitably (see Section III.A); ii) receive comparable social and economic benefits (see Section II.B); and iii) do not suffer disproportionate adverse effects during the development process (no such effects are anticipated).	
Core Labour Rights	X – The project will meet the applicable core labour standards identified by the International Labour Organization, as well as national standards outlined in the Department of Labour's Strategic Plan 2014-2019. This places emphasis on job creation for local people, with a focus on women. At a minimum, the stipulated proportion of jobs will be awarded to people with disabilities.	
Indigenous Peoples	X – The project will not contravene the rights and responsibilities set forth in the United Nations Declaration on the Rights of Indigenous Peoples. Indeed, there are no indigenous or vulnerable ethnic groups in the project areas.	
Involuntary Resettlement	X – No involuntary resettlement will occur as a result of the project interventions, and no activities that could require compensation are envisaged, in particular, with regard to modified grazing regimes.	
Protection of Natural Habitats	X – Project intervention sites, where the rehabilitation and restoration activities will happen in Component 2, do not include any Protected Areas or nature reserves. In addition, project interventions, particularly those aimed at restoring ecological infrastructure and reducing erosion from rural infrastructure, will reduce the negative impacts of climate variability and change on natural habitats. In the low-lying high-density settlement that is still to be identified (Component 1, Activity 1.2.1), no negative effects on natural habitats are anticipated. Activities will be limited to the piloting of a flood and storm response plan and associated capacity building.	
Conservation of Biological Diversity	X – Project interventions will restore and enable improved management of natural habitats, thereby supporting the conservation of biological diversity. In accordance with national EIA legislation, once detailed designs for relevant interventions are finalized (see Section II.E), these will be assessed against the EIA regulations to ascertain if a Basic Assessment is required or not. Should a Basic Assessment be required, this will be used to inform the design of the relevant interventions. No significant impacts on natural habitats or biological diversity are anticipated. Rather, through the ecological infrastructure and related interventions, biological diversity will be conserved.	
Climate Change	X – The project will build resilience to climate change, and will not result in an increase in greenhouse gas emissions or in other drivers of climate change.	
Pollution Prevention and Resource Efficiency	X – The project will not produce excessive waste, or release pollutants, and will seek to minimise material resource use and be energy efficient where appropriate.	
Public Health	X – Negative impacts on public health are not expected as a result of the project.	
Physical and Cultural Heritage	X – The project will adopt an inclusive approach, and cultural sites identified by the communities in the target areas will not be altered, damaged or removed.	
Lands and Soil Conservation	X – The project will seek to conserve land and soil through restoring of grasslands and adjacent riparian environments, through reducing bush encroachment thereby reducing the fuel load and threat of wildland fires, and through the promotion of conservation agriculture techniques that conserve topsoil.	

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project implementation.

INSTITUTIONAL ARRANGEMENTS

This uMngeni Resilience project will be implemented at the level of the District Municipality and in target wards located in local municipalities within the UMDM. Implementation will involve stakeholders from government, traditional authorities, local communities, business and civil society. The management arrangements of the project have been designed to provide for coordination and close collaboration among project partners and key stakeholders, and wherever possible, alignment with other ongoing initiatives and programmes of work.

Regular feedback and communication on progress with project implementation will be maintained through the Project Coordinating Committee (PCC), Project Management Unit (PMU) reporting structures, and through the task teams that are established at ward and component level.

Executing Entity

The UMDM has been assigned as Executing Entity (EE) for the project with overall responsibility for project implementation over the five year period and will thus stand accountable for both project and financial management.

The UMDM was established in 2000 as the largest district municipality in KwaZulu-Natal with numerous functions to be carried out in cooperation with is related local municipalities, including Mpofana, uMngeni, Msunduzi, Richmond, uMshwathi, Mkhambathini and Impendle Local Municipalities. The most important of these functions is as a Water Services Authority, macro-level responsibility for development, environment, economic and disaster management planning and macro-level infrastructure development. The UMDM is governed by the Municipal Structures Act No. 117 of 1998, the Municipal Systems Act No. 32 of 2000 and the Municipal Finance Management Act No. 56 of 2003, and has received a clean audit for the previous five years.

As EE, the UMDM will sign the grant agreement with the NIE and will be accountable to the NIE for the disbursement of funds and the achievement of the project objective and outcomes according to the approved work plan. In particular, the EE will be responsible for the following functions: i) coordinating activities to ensure the delivery of agreed outcomes; ii) certifying expenditures in line with approved budgets and work-plans; iii) facilitating, monitoring and reporting on the procurement of inputs and delivery of outputs; iv) approval of Terms of Reference for consultants and tender documents for sub-contracted inputs; v) reporting to the NIE on project delivery and impact; vi) and monitoring compliance with the AF ESP.

Project implementation will however be managed in close collaboration with project sub-Executing Entities, who will act as Component and sub-Component Leaders, as follows:

Component 1:
1.1.1 Umgeni Water (USD 263,810)
1.2.3 Kishugu Public Benefit Organisation (USD 28,571)
1.3.1 and 1.3.2 UKZN SAEES (USD 206,667)

Component 2:
2.1.1 BESG (USD 1,522,998).
2.2.1 DEA-NRM (USD 823,810)

Component 3:
UKZN SAEES (USD 1,410,476)

Component 4:
4.1.1 and 4.1.2 WESSA (USD 276,189)

Oversight, Governance and Coordination

Oversight of project activities will be the responsibility of the PCC. This will include a focus on social and environmental risk management.

The UMDM will take responsibility for establishing and maintaining the PCC on the basis of a Terms of Reference which will be negotiated at project launch. It is envisaged that the MM, or his or her delegate, will serve as the Chair for the PCC.

The PCC will include key partner institutions, DEA and SANBI (as NIE) and four Task Teams that will be established to support project governance and ensure coordination and integration across relevant partners. As a matter of principle, the project will work with and strengthen existing coordination, decision support and learning structures where these exist.

The EE will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to the NIE via the PCC, together with a proposed risk management plan that shows how these risks will be mitigated. In response to this, the NIE and PCC may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed.

Project stakeholders will be made aware of the project's grievance procedures should they wish to raise any issues and concerns, including those related to project risk management (see below).

At the ward and component levels, Task Teams will be established to support local-level coordination and governance (for the former), and technical integration across partner organisations and with related initiatives and ongoing programmes of work (for the latter).

The ward-level Task Teams will be as follows:
- Vulindlela Adaptation Forum;
- Swayimane Adaptation Forum; and
- Nhlazuka Adaptation Forum.

The Task Teams will be as follows:
- Early Warning and Response Task Team;
- Human Settlements and Ecological Infrastructure Task Team;
- Climate-Smart Agriculture Task Team; and
- Capacity Building and Learning Task Team.

The PCC, PMU and Task Teams will ensure that the project is appropriately linked to local, District, Provincial and National structures.

Strategic and operational oversight will be ensured by the NIE.

The NIE is governed by the NIE Steering Committee, which includes SANBI as the accredited National Implementing Entity for South Africa, the Department of Environmental Affairs (DEA) as the Designated Authority, National Treasury, the National Planning Commission and the Adaptation Network. The Steering Committee is chaired by SANBI with DEA as Deputy Chair.

The Steering Committee has the following functions:
- Supporting SANBI to ensure overall compliance with the spirit, policies and procedures of the AF.
- Supporting the NIE to build a coordinated adaptation response that delivers tangible outcomes.
- Guiding the development of and endorse the NIE investment strategy, ensuring optimal linkages with the policy environment and that projects are driven by country needs
- Setting up and oversee the project review process, including guiding the development of terms of reference for reviewers, setting up the review panel, and considering the recommendations of reviewers.
- Endorsing projects for submission to the AF, ensuring appropriate linkages with AF criteria and facilitating appropriate consultation with and, where necessary, endorsement from relevant spheres of government. From time to time this may involve promoting agreement on the roles of relevant institutions in implementing AF projects and facilitate the resolution of disputes among project partners.

- Promoting cooperation between relevant South African Institutions and funding agencies to enhance synergy and avoid duplication between adaptation efforts, to leverage additional resources where appropriate, and to support information management and flows between and feedback between the NIE and the NCCC and IGCCC and contribute towards climate finance and climate change adaptation policy development.

One of the main objectives of the NIE is to draw lessons and experiences from the NIE project development and implementation processes. This will support Climate Change Adaptation planning, decision making and monitoring and evaluation with a view to enhancing the benefits of adaptation responses both nationally and internationally. This process will be supported by both DEA and SANBI.

Grievance Procedures

During project inception workshops and component launch workshops, stakeholders will be informed that any concerns relating to the design or management of the uMngeni Resilience project, including social and environmental risks, should be raised with the EE. Where these are not adequately addressed, these may be escalated to the project PCC and if necessary the NIE Steering Committee.

Project Management

The project will be administered by a PMU that is housed within the UMDM and that reports to the UMDM Development Planning Manager. The PMU will be responsible for providing technical leadership to the project, managing and coordinating project activities, reviewing quarterly forecasts and risk assessments and providing oversight on the day to day operations of the project including procurement, financial management and reporting, communications, monitoring and evaluation of project performance, reporting and serving as secretariat for the PCC.

The PMU will include the following positions:
- Project Director; and
- Financial and Procurement Manager (part time).

Indicative Terms of Reference for the Project Director:
- Provide strategic leadership to the implementation of the uMngeni Resilience Project.
- Ensure management of all programme processes, deliverables, finances, procurement and contracting of service providers.
- Ensure compliance with NIE and AF requirements, including ensuring effective procurement, administration, reporting, disbursement and financial management procedures.
- Ensure the coordination and effective implementation of project activities, through effective governance structures.
- Build relationships with government departments in order to sustain and replicate project outcomes, and to capture these in ongoing and future policy processes.
- Manage relationships with a diverse range of partners and stakeholders (private sector, public sector, NGOs and academic), resulting in their continued mobilisation and support of the programme.

The implementation of **Component 1** will be supported by a EWS Programme Manager, who will be appointed competitively.

The implementation of **Component 2** will also be supported by a Technical Advisor. As part of their assignment, BESG will appoint two Community Liaison Officers who will support local-level coordination in each of Vulindlela and Nhlazuka.

A Gender and Social Expert will form part of the Component 2 team, and work closely with the sub-Executing Entities and other project partners to ensure that there is equitable representation of women and other vulnerable groups as project beneficiaries, in training and capacity-building programmes, and in project decision-making structures at all levels. The Gender and Social Expert will be responsible for:
- developing a Gender and Social Action Plan (GSAP). This will include: i) a rapid assessment undertaken in beneficiary communities; ii) indicators and targets regarding the inclusion of vulnerable groups in project activities, training, representation on project structures and receipt of

project benefits; iii) measures to ensure transparency, fairness and equity in selection processes for project benefits; and iv) measures to encourage and support the participation of identified vulnerable groups and individuals in the various project activities;
- training/building the capacity of implementing partners to incorporate gender and social concerns into their work on the project;
- playing an ongoing advisory role to these partners during the 5 years of project implementation;
- ensuring compliance with the project's Environmental and Social risk Management Plan; and
- monitoring the progress on achieving project targets relating to gender and social indicators.

Component 3 will be led by UKZN SAEES, who will appoint a part-time Project Leader and a full time Component Coordinator. As part of their assignment, UKZN SAEES will also appoint two agricultural extension officers who will be seconded to the DAEA.

The part-time Project Leader will provide overall guidance on the activities of the component. This includes:
- provides strategic leadership, setting of goals, objectives and timelines;
- establishing relationships with communities;
- developing project material for training and workshops in consultation with the Component Coordinator; and
- mentoring of Field Assistants and line manager for the Component Coordinator.

The responsibilities of the full-time Component Coordinator include:
- strategic project planning and management (managing budgets) and negotiating with stakeholders;
- procurement of project equipment; maintain an inventory of project equipment and maintenance were possible;
- day-to-day management of Field Assistants;
- liaising with staff of NIE, EE and other project partners on project implementation;
- design, implement, monitor and evaluate field trials at all project sites;
- work with the Project Leader in synthesising data and assisting in writing project deliverables/reports;
- preparing scientific publications based on agronomic and economic information collected from implementation of Component 3 activities;
- provide project backstopping and support for the Project Leader; and
- lead component of seasonal forecasting and crop-climate activities and develop associated training and workshops material.

The implementation of **Component 4** will be supported by a Learning Network Officer, who will be appointed competitively.

Most project staff will be contracted for a period of 4 or 5 years. The Project Director and Financial and Procurement Manager will be employed for a longer period to allow for project closure. The Project Director will report directly to the Development Planning Manager within the UMDM, who will be responsible for providing day-to-day supervision of the Project Director. The UMDM will provide suitable office space for all UMDM project staff on full-time service contracts, as well as the necessary office furniture and support services.

The appointment of the Project Director and Financial and Procurement Manager will be a pre-condition of grant effectiveness between the NIE and the EE. Core project staff will also be provided with training to ensure compliance with SANBI and AF policies and procedures. As detailed in Annex V, focus will be placed on ensuring that the EE and other project partners are able to competently detect environmental and social risks in future project planning, monitoring, evaluation and reporting processes. All project staff will be selected on a competitive basis according to SANBI and local government procurement and human resource policies.
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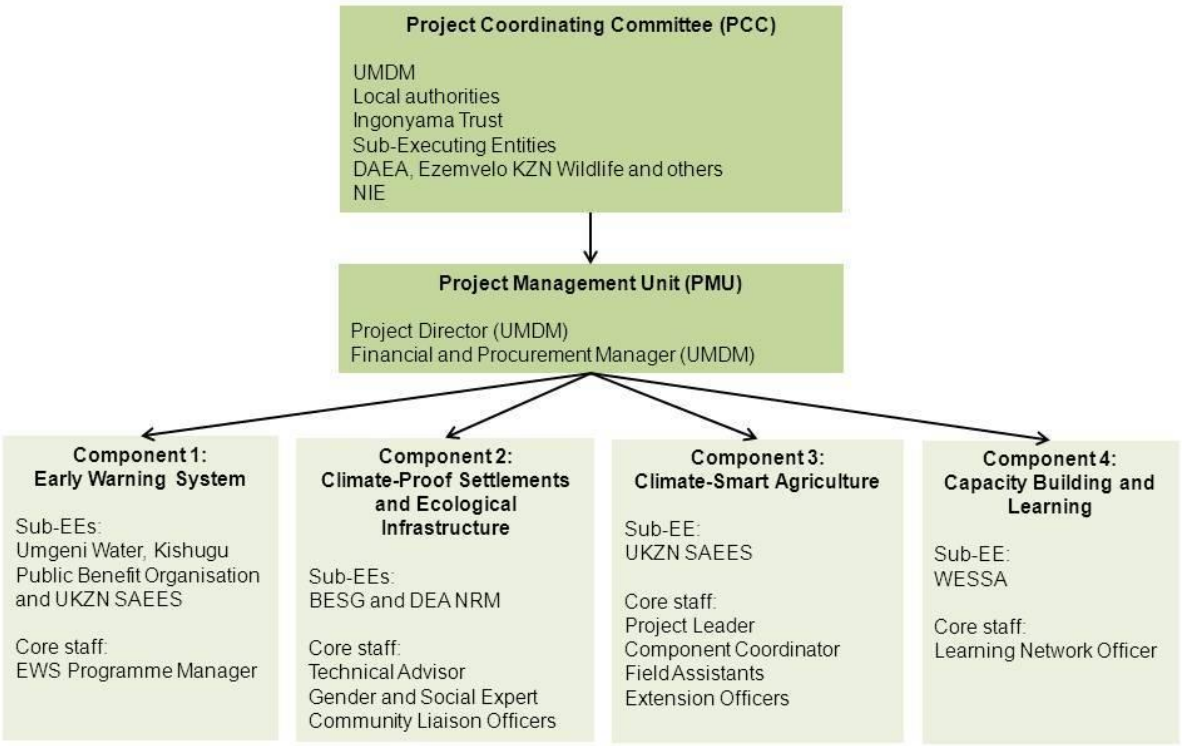


Figure 10: Project organogram.

Project accounting and procurement processes

As EE, the UMDM will be responsible for undertaking the fiduciary responsibilities of the project. Some of the partners may operate different accounting systems, but they shall maintain sound financial records in accordance with applied accounting standards acceptable to the UMDM. A separate project account in South African Rands (ZAR) will be opened. During the detailed design phase of the project, a meeting was held on 18 June 2014 between the SANBI Financial Manager and the UMDM Chief Financial Officer. The meeting was held to establish a common understanding between the NIE and EE of what will be required during project implementation, and included discussion on *inter alia*: i) financial management systems and financial flows; ii) AF reporting requirements; iii) audits and revenue management; iv) Standard Chart of Accounts and AF account categories; v) sub-Executing Entity agreements; and vi) capacity requirements (financial, processing and procurement capabilities). The discussion will be continued during the project inception phase.

The UMDM must comply with South African public finance legislation (Municipal Finance Management Act 56 of 2003) and procurement procedures and will adhere to the relevant requirements under this Act.

B. Describe the measures for financial and project risk management.

Financial and project risks and associated management measures will be assessed as an ongoing process throughout the project. The primary financial, project and institutional risks, their significance and associated response measures are described in Table 8 below.

Table 8: Financial, project and institutional risks.

Risk			Response measure
Financial	Fluctuations in exchange rate (USD: ZAR) which could affect the funding available for implementation and lead to budgetary constraints.	Medium	The Financial and Procurement Manager will closely monitor the USD: ZAR exchange rate and communicate any implications to the Project Director so that project management can be adaptive. The PMU and UMDM officials will collaborate closely with the NIE should exchange rates fluctuate to the extent that budget reallocations are required. In this event, budget reallocations shall be made in such a way that the achievements of project outcomes are compromised as little as possible.
	Ineffective management of project funds affects project implementation.	Low	A Financial and Procurement Manager will be appointed to strengthen the PMU, and ensure appropriate management of project funds. In addition, NIE oversight and account audits will ensure that there is no ineffective use of project funds.
	Delays in the disbursement of funds, procurement and institutional inefficiencies (e.g. lengthy approval processes) result in delayed recruitment of project staff and hence project implementation.	Low	The NIE, PMU and UMDM will work closely to ensure optimum conditions for timely disbursement of funds contracting, monitoring and financial reporting. The Project Director and Financial and Procurement Manager will develop and regularly update a Procurement Plan in line with UMDM guidelines. Key project staff will be in place prior to the project inception meeting.
Project	Difficult access to the sites results in logistically challenging implementation of project interventions.	Low	Access to target areas was considered as one of criteria when selecting project sites. Whilst the terrain is steep in Ward 5 of Nhlazuka, numerous site visits during the project preparation period have confirmed that there is a low risk of challenging access affecting project implementation. The terrain is less steep in the other project sites, and all sites can be accessed by an existing road network.
	Failure to involve adequate representation of vulnerable communities, particularly women, and therefore failure to create ownership of the project at the community level at project sites.	Low	The project will avoid a 'top down' approach and create community ownership of the project interventions by building the capacity of community members at an early stage in the project. Engagement and capacity building will adopt a gender-sensitive approach, as guided by the Gender and Social Expert. The development of detailed implementation plans will be undertaken in a participatory manner, encouraging input from all community members, including women. This will also assist with the inclusion of traditional knowledge. This participatory approach has been adopted in the design phase, when traditional authorities were consulted.
	Lack of incentives for local farmers to participate and cooperate in interventions that do not yield immediate financial value or reduce incomes in the short-term, but aim at longer-term resilience. This may reduce stakeholder engagement and participation.	Low	UKZN SAEES field workers have established relations ships with the small scale farmers in the target area of Ward 8 of Swayimane. Farmers have already seen the benefits of the on-farm crop trials on a limited portion of their lands, and have expressed an interest in expanding the area of climate-resilient crops. Small scale farmers from Ward 8 of Vulindlela and community home gardeners from Ward 5 of Nhlazuka will visit the Swayimane crop trial sites and speak to farmers, as part of the training provided through the project. This community exchange, as part of a broader capacity building programme, will highlight the benefits of climate-resilient crops, and increase the likelihood of farmer participation and support.
	Communities are incapable of managing and maintaining assets and structures built through the project.	Low	Capacity building programmes will include training on maintenance and management techniques. This is particularly relevant to the restored grasslands in Ward 8 of Vulindlela (Output 2.2), where management of grazing livestock will be an important aspect of grassland restoration.

Institutional	Low capacity, awareness and acceptance of the need to tackle the impacts of climate change among key stakeholders limit the support for the project and limit likelihood of project outputs being mainstreamed into plans and budgets.	Low	The project includes a capacity building programme for community members, councillors, traditional authorities and district and local municipal officials on the importance of mainstreaming adaptation responses into planning, budgeting and policy development processes. This capacity building programme will build on the awareness generated and the support already raised amongst municipal and district officials, who have been involved in the design of the project.
	Poor coordination with other climate change projects in the District and Province limits the potential to learn from and build on the experiences of related projects.	Low	Lessons from related projects have been incorporated into the design of the project. During implementation, a Project Managers' working group will be established, comprising managers from the ongoing projects/ programmes, to coordinate efforts, avoid overlap between similar endeavours and ensure that projects deliver complementary and mutually reinforcing outcomes.
	Poor coordination and information sharing structures/agreements between project partners and other meteorological and agricultural institutions limits the effectiveness off the flood/storm, fire and agro-meteorological EWSs.	Low	The relevant institutions will be invited to the inception workshops for the relevant components, and the PMU and UMDM, with assistance from the NIE where necessary, will facilitate the signing of the required data sharing agreements at the inception phase of the project. This engagement will build on the consultations undertaken during the design of the project, e.g. with SAWS.
	Limited capacity of project partners to coordinate and deliver project outputs.	Low	Project partners all have experience in coordinating, implementing and delivering outputs in their relevant spheres of expertise, as demonstrated by the successful implementation of previous projects. Additionally, the NIE will play an oversight role, providing further expertise if required.
	Staff turnover within the UMDM and Local Municipalities, project partners and within the PMU may hamper progress.	Low	Institutional rather than individual relationships will be built with UMDM and Local Municipalities and with project partners, limiting the negative impact of staff turnover. Where appropriate, contracts will be signed with the beneficiaries of training provided through the project. For example, DAEA agricultural extension officers trained through the project will sign contracts to ensure that they remain committed to the project and the DAEA for a stipulated period. For the PMU, the recruitment process will ensure Terms of Reference meet human resource requirements to deliver quality outputs, are widely advertised and offer competitive remuneration to ensure the necessary quality of candidates are selected. Particular attention will be given to the key role of Project Director who will be required to have exceptional team building and management skills.

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

Based on a screening against the stipulated principles in the AF ESP, the project is adjudged to be a **Category B** i.e. a project with possible but limited anticipated adverse environmental or social impacts. Indeed, the project is anticipated to have numerous economic, social and environmental benefits (see Section II.B for a summary of such benefits).

An Environmental and Social Risk Management Plan has been developed (see Annex V) to ensure that risks are avoided, and that, where this is not the case, they are timeously detected and appropriately mitigated.

As described in Section III.D, the plan will ensure that:

- adequate capacity building for risk management is provided at project start-up, including empowerment of local communities to: i) create an understanding of the intentions of the project; ii) facilitate local contribution to the design of sub-component activates accordingly; iii) ensure communities know their rights; and iv) are aware of the recourse they may have for raising any risk-related issues should these arise;

- activity forecasts (see Section III.D) are screened for potential environmental and social risks according to the AF ESP and National legislation, and that associated disbursement is not approved where significant risks arise;
- project reporting processes have a particular focus on detection of environmental and social risks;
- where minor risks that can easily be mitigated are detected, the EE or sub-Executing Entities develop a sub-Environmental and Social Risk Management Plan, commensurate with the severity of the risk associated with the relevant sub-component activity;
- the project oversight and governance processes are designed to ensure that risks are avoided where possible and appropriately mitigated in the unlikely event of these occurring; and
- stakeholders are aware of a mechanism to raise concerns relating to risks with the project PCC and the NIE Steering Committee should concerns relating to risks not be adequately addressed by the EE.

The EE will be responsible for collating all information pertaining to social and environmental risk screening and reporting. The PCC will be responsible for monitoring social and environmental risks and for guiding the EE and sub-Executing Entities to take remedial action where required. As the entity that is ultimately responsible for the assessment and management of such risks, the NIE will play a close oversight role.

In this regard, the EE, with support from the Gender and Social Expert, will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to the NIE via the PCC, together with a proposed risk management plan that shows how these risks will be mitigated. In response to this, the NIE and PCC may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed.

The following issues were considered in the formulation of the project's Environmental and Social Risk Management Plan:

- The uMngeni Resilience project will focus on the identified areas and communities at risk from the impacts of climate variability and change. These communities include people from the most vulnerable groups and sectors, such as women, the elderly, youth, children, the unemployed, and people living with HIV/AIDS. There are no indigenous or vulnerable ethnic groups in the project areas. In spite of historical records of occupation, in the form of cave paintings, there are currently no Khoi or San people/communities living a traditional lifestyle in the KZN Province.

- The project has been designed and will be implemented in a participatory manner. No involuntary resettlement will occur as a result of the project interventions, and no activities that could require compensation are envisaged, in particular, with regard to modified grazing regimes. Communal grazing areas in the project sites are extensive. It would appear that there are many options for relocating livestock during restoration periods, and future restrictions on grazing in ecologically sensitive areas (such as river corridors and wetlands) would have little if any impact on livestock access to water and food.

  The purpose of developing a restoration and management plan for grazing areas in the in Ward 8 of Vulindlela is to increase livestock access to food and water. The proposed restoration and rangeland management has strong support from the local Induna (Chief), who commented that he could see the impacts of overgrazing practices in some areas and wanted to prevent this from happening elsewhere. In order to verify that no farmers are compromised as a result of the proposed activities of the project, the management plans that emerge from these participatory processes will be screening for environmental and social risks, as elaborated in the project's Environmental and Social Risk Management Plan.

- Regarding the protection of natural habitats, the project intervention sites, where the rehabilitation and restoration activities will happen in Component 2, have all been identified and there are no Protected Areas and nature reserves in these areas. Activities in these areas that are listed in terms of South Africa's EIA legislation will not be approved unless provincial authorisations can be obtained, as outlined in the project's Environmental and Social Risk Management Plan.

  In the low-lying high-density settlement that is still to be identified (Component 1, Activity 1.2.1), no negative effects on natural habitats are anticipated. Activities will be limited to the piloting of a

flood and storm response plan (i.e. sending information to community members who then respond accordingly), and associated capacity building to ensure communities know how to interpret the received information, and how to respond when warnings are issued. The only infrastructure that may be associated with these activities is sirens and signboards, and these are not anticipated to cause adverse environmental impacts on the natural environment. In order to verify this, once sites are selected, detailed activity forecasts will be screened according to the project's Environmental and Social Risk Management Plan. Listed activities that are not provided with provincial authorisations will not be permitted.

D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The project will be monitored through the following Monitoring and Evaluation (M&E) activities. The M&E budget is provided in the table below.

Forecasting, Reporting, Monitoring and Evaluation activities

Project Start-up
A project Inception Workshop will be held within 2 months of project start with those with assigned roles in the project organisation structure, the as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues, including those listed below.

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of NIE staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework, finalise the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting and M&E requirements. The M&E work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Agree on the Terms of Reference for the PCC and plan and schedule the PCC meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first PCC meeting should be held within the first 12 months following the Inception Workshop.

An Inception Workshop report will be prepared and shared with participants to formalise various agreements and plans decided during the meeting.

As described in Annex V, during the start-up phase, the NIE will engage directly with the EE and other project partners on the operating procedures that will apply to the management of the project, and that will be necessary to ensure compliance with SANBI and AF policies and procedures. An Operating Procedures Manual will be developed to support this process.

Focus will be placed on the AF ESP, and a dedicated capacity building session will be help to ensure that the EE and other project partners are able to competently detect environmental and social risks in future project planning, monitoring, evaluation and reporting processes. In this regard, attention will be given to ensuring that activities do not impact adversely on any priority biodiversity areas or ecosystem support areas, and that there are no negative impacts on local communities, including vulnerable groups and indigenous people. No such adverse impacts are anticipated.

Empowerment of local communities
During the participatory planning processes that are described throughout the project, local communities will be empowered to detect and mitigate environmental and social risks, as set out in the AF ESP and the project's Environmental and Social Risk Management Plan. Processes to build local community capacity to do this will be integrated in the capacity building activities that are envisaged during the early stages of each project component, and will be essential in ensuring that local communities understand the intentions of the project and can contribute to the design of sub-component activates accordingly, know their rights and are aware of the recourse they may have for raising any risk-related issues should these arise.

Quarterly Forecasting and Screening

Progress will be monitored quarterly via quarterly reports that are submitted to and collated by the PMU and submitted to the NIE. These will align with the agreed annual project work plan and will include qualitative, quantitative and financial information. The PMU will develop a quarterly reporting template that will be used by internally and by all sub-Executing Entities.

The project's forecasting and risk management framework is set out in Figure 11 and described below.

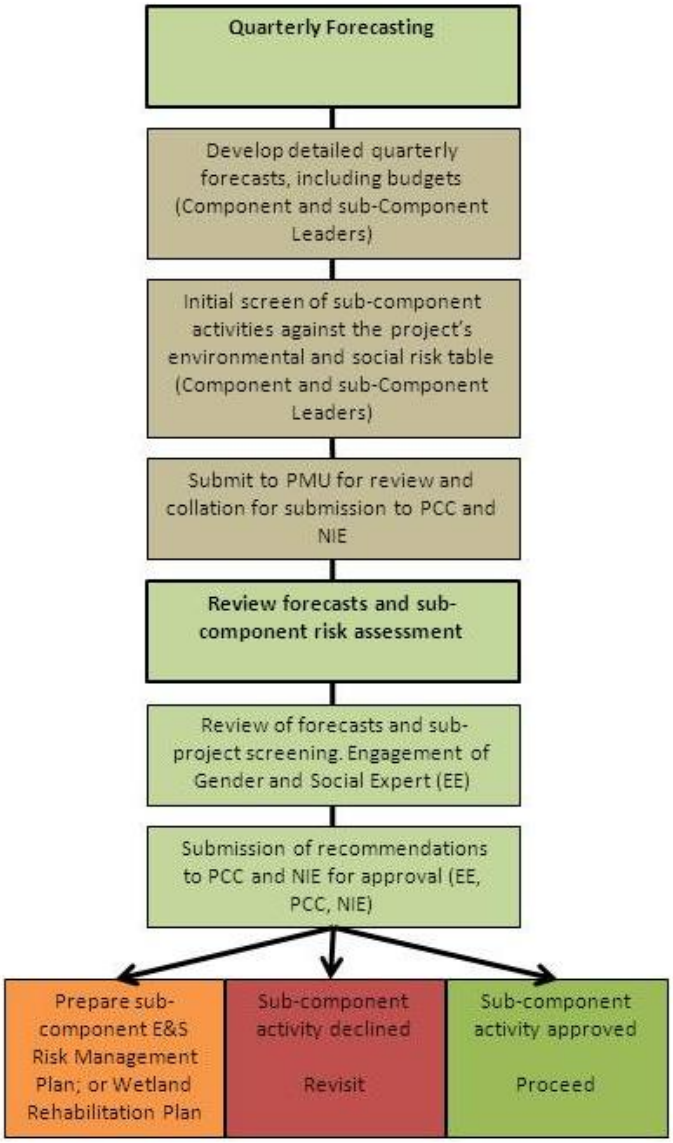


Figure 11: uMngeni Resilience project sub-component risk assessment framework.

In order for funds to be disbursed, the EE will need to submit detailed quarterly forecasts to the NIE that are built up from anticipated project activities. All Component and sub-Component Leaders will be expected to do the same for the EE.

In an effort to strengthen risk screening, and to ensure that no unintended negative impacts are caused or not mitigated, all Component and sub-Component Leaders will be required to submit a basic environmental and social risk table with their forecasts. These tables will need to be submitted to the PMU as part of the forecast approval process.

In the lead up to project inception, the NIE will modify the AF's ESP table for this purpose. All risks will be included, but the table will be elaborated upon to create a set of clear and easy to understand activities that will need to be cross checked.

This risk screening process will ensure compliance with the principles of the AF ESP and National legislation.

Project activities that pose social or environmental risks that are not easily mitigated will not be approved during the detailed quarterly forecasting process.

Quarterly forecast review and risk assessment
All quarterly forecasts, including risk assessments, will be reviewed by the PMU with support of the Gender and Social Expert. These reviews will be tabled with recommendations to the PCC and NIE for approval.

Risk Management
Where minor risks that can easily be mitigated are detected, the EE or sub-Executing Entity may be required to develop a sub-Environmental and Social Risk Management Plan, commensurate with the severity of the risk associated with the relevant sub-component activity. The EE and/ or sub-Executing Entity will need to show that costs associated with this can be provided within the project budget, and this will need to be approved by the NIE.

Project activities that require a Basic Assessment or full Environmental Impact Assessment (EIA) as per the national EIA regulations (see Section II.E) will not be supported, due to administrative costs and potential delays.

At this stage, it is envisaged that the only exception to this will be where provincial authorisations can be obtained through South Africa's Working for Wetlands Programme. Precedents are in place for the provision of such provincial authorisations to the Working for Wetlands Programme for riparian zone activities, such as the rehabilitation or restoration of wetlands, rehabilitation and the restoration of river banks (including erosion control and the construction of low river crossings). Such provincial authorisations will need to be provided in writing before the above mentioned rehabilitation and restoration activities can take place, and are approved by the NIE.

This provision will only apply to activities that are envisaged in Component 2. All of these activities will be implemented through DEA-NRM, and in partnership with Working for Wetlands in particular, who have described the procedure associated with obtaining such provincial authorisations as follows:

Annual applications for provincial authorisations to work in identified catchments:
On an annual basis, provincial authorisations are applied for from the Department of Environmental Affairs (DEA) on a Provincial level in terms of the requirements of the National Environmental Management Act (Act 107 of 1998), as amended. This process involves the submission of Basic Assessment Reports (one per Province) to obtain a provincial level authorisation for a number of new wetland systems. Once this provincial authorisation has been received, wetland rehabilitation can be undertaken in any wetland occurring within the approved wetland systems.

The Working for Wetlands Programme Manager, Mr Umesh Bahadur, has agreed to include the uMngeni wetland system in the 2014-2015 Basic Assessment Reports for KwaZulu Natal.

The sites that will be targeted by the uMngeni Resilience Project will be included in this annual submission for the 2015/16 year, provided the project is approved by the Adaptation Fund Board. This process usually takes between 6 – 8 months. There are no costs associated with this as the process will be undertaken as part of the Working for Wetlands process.

Development of wetland rehabilitation plans for specific areas:
Once these wetland systems have been authorised via the provincial authorisation process as described above, project-specific wetland rehabilitation plans (that contain a number of wetlands occurring within the authorised wetland systems) are developed and submitted to DEA for approval.

Once the precise locations of the rehabilitation and restoration activities are identified through the participatory process that is envisaged as part of Component 2, the EE will work with the Working for Wetlands Programme to ensure that the uMngeni wetland system is included in their annual provincial

authorisation process, as described above. Detailed wetland rehabilitation plans, that describe the anticipated restoration and rehabilitation activities for the duration of the uMngeni Resilience project, will then need to be developed for the targeted areas and submitted to the DEA for approval.

Where these sites are already approved as part of provincial authorisations as described above, the process for approving these plans usually takes 2 – 3 months.

The cost for the development and submission of these plans to DEA is estimated to be in the order of USD 28,500. These costs have been included in the project budget.

The NIE is confident that the above process is manageable and affordable within the project timeframes and budget.

Annual Reporting
Particular attention will be given to the monitoring of unanticipated environmental and social risks in the quarterly reporting process. The EE will be expected to scrutinize sub-Executing Entity reports for such risks, and to provide the PCC and NIE with their appraisals for verification.

The NIE will work closely alongside the EE to ensure that PMU staff have the capacity to undertake the required screening, and to provide the necessary scrutiny.

Annual Project Implementation Reports will be prepared by the PMU and submitted to the NIE in order to monitor progress made since project start and in particular for the previous reporting period.

The Annual Project Implementation Reports shall include, but not be limited to, reporting on:
- progress made toward project objective and project outcomes – each with indicators, baseline data and end-of-project targets (cumulative);
- project outputs delivered per project outcome (annual);
- lessons learned/good practice;
- expenditure reports; and
- risks and adaptive management, with a particular focus on environmental and social risks as identified in the AF ESP.

A report template for the Annual Project Implementation Report shall be prepared by the NIE in consultation with the AF Secretariat.

Periodic learning throughout the project
The project has designed to support learning platforms at various levels throughout the project implementation period. These will be used to track project progress and to adapt interactively as required. They will also form an important platform for formulating policy recommendations for sustaining, replicating and scaling up positive project outcomes.

Periodic Monitoring through site visits
The NIE will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plans to assess first hand project progress.

Mid-term of project cycle
The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. The mid-term evaluation will include a focus on environmental and social risks, and ensure compliance with the AF ESP.

Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, Terms of Reference and timing of the Mid-Term Evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-Term Evaluation will be prepared by the NIE based on guidance from the AF.

End of Project

An independent Terminal Evaluation will take place three months prior to project closure and will be undertaken in accordance with NIE guidance. The Terminal Evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The Terminal Evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terminal Evaluation will include a focus on environmental and social risks, and ensure compliance with the AF ESP. It will provide recommendations for follow-up activities and will require a management response from the EE.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarise the results achieved (objectives, outcomes, outputs), risk management, lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Monitoring and Evaluation work plan and budget

Table 9: M&E activities, responsibilities, budget and time frame.

Type of M&E activity	Responsible Parties	**Budget USD** *Excluding project team staff time*	Time frame
Inception Workshop and Report, Component Launch Workshops	• Project Director • NIE	Indicative cost: USD 11,000	Within first two months of project start up
Verification of baselines	• Project Director • NIE	USD 5,206	In first year
Annual project implementation report	• Project Director and team • NIE	None	Annually
Periodic status/ progress reports	• Project Director and team	None	Quarterly
Mid-Term Evaluation	• Project Director and team • NIE • External Consultants (i.e. evaluation team)	Indicative cost: USD 26,072	At the mid-point of project implementation.
Terminal Evaluation	• Project Director and team • NIE • External Consultants (i.e. evaluation team)	Indicative cost : USD 35,595	At least three months before the end of project implementation
Project Terminal Report	• Project Director and team • NIE • local consultant	0	At least three months before the end of the project
Audit	• Project Director and team • NIE	Indicative cost per year: USD 4,762 Total: USD 23,809	Yearly
Visits to field sites	• NIE • Government representatives	Paid for with NIE fees	Yearly
Knowledge management	• Project Director and team • All sub project executants • Government representatives	USD 148,571 (Output 4.2 budget)	Throughout the project and at mid-point, at project termination
Project monitoring	• Project Director and team • All sub project executants • Government representatives	USD 71,426 (EE operating costs) Part of the operating costs from all Component budgets Contribution from NIE fees	
TOTAL indicative COST ***Excluding project team staff time and NIE costs***		**USD 321,679**	

*Note: Costs included in this table are part of the Total Budget and Workplan, and not additional to it.

E. Include a results framework for the project, including milestones, targets and indicators.

	Indicator	Baseline	Target	Means of verification
Objective: Reduce climate vulnerability and increase the resilience and adaptive capacity of vulnerable and small scale farmers in production landscapes in the uMgungundlovu District that are threatened by climate variability and change, through an integrated adaptation approach.	Number of people with reduced risk to climate change-driven floods, storms, fires and drought, as a result of project interventions.	**0 women** and **0 men**.	**13,414 women** and **12,226 men**.	Review of project training and implementation material; gender-sensitive field surveys undertaken with representative populations of the target areas.
Outcome 1.1: Local capacities and tools for guiding responsive action triggered by hydro-climatological information reduce vulnerabilities and strengthen adaptive responses.	Number of early warning systems benefiting vulnerable communities and small scale farmers.	**0** early warnings systems.	**3** early warnings systems; 1 each for flood/storm, wildland fire and agro-meteorological.	Review of relevant databases and dissemination protocols; gender-sensitive field surveys undertaken with representative populations of the target areas.
Output 1.1: Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials	1. Flood/storms: Area of the UMDM covered by improved monitoring network, to allow early detection of flooding threats to vulnerable communities. 2. Wildland fire: Number of PPPs in place between the relevant FPAs, the Ingonyama Trust Board and the Local Authorities.	1. 0% of the UMDM. 2. **0** PPPs.	1. High-level/course configuration: **100%** of the UMDM. Detailed configuration: **75 km** of the prioritised rivers in UMDM. 2. **1** PPP between the relevant FPAs, the Ingonyama Trust Board and the Local Authorities.	1. Review of WRM-DSS database; review of dissemination protocols. 2. Review of PPP agreement.
Output 1.2: Early warning systems empower municipal officials and local communities and small scale farmers to respond timeously to seasonal forecasts and potential disaster	1. Number of ward-based disaster management systems piloted in project target areas.	1. **0** ward-based disaster management systems	1. **3** ward-based disaster management systems; one each for the low-lying high-density site, Ward 8 of Vulindlela and Ward 5 of Nhlazuka.	1. Review of relevant databases, management plan and dissemination protocols.

events.	2. Number of community members benefiting from ward-based disaster management systems. 3. Number of community-based fire risk management programmes pilot in project target areas. 4. Number of trainees directly benefiting community-based fire risk management programme.	2. **0 women** and **0 men** in the low-lying high-density site; Ward 8 of Vulindlela; and Ward 5 of Nhlazuka. 3. **0** community-based fire risk management programmes. 4. **0 women** and **0 men** in Ward 5 of Nhlazuka.	2. At least: • **500 women** in the low-lying high-density site; • **7,962 women** in Ward 8 of Vulindlela; • **4,852 women** in Ward 5 of Nhlazuka; • **500 men** in the low-lying high-density site; • **7,327 men** in Ward 8 of Vulindlela; • **4,014 men** in Ward 5 of Nhlazuka. 3. **1** community-based fire risk management programme in Ward 5 of Nhlazuka. 4. **30 women** and **30 men** in Ward 5 of Nhlazuka.	2. Gender-sensitive field surveys undertaken with representative populations of the target areas. 3. Review of training material, risk assessments, management plan and protocols. 4. Gender-sensitive field surveys undertaken with representative populations of the target areas.
Output 1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability.	Number of small scale farmers in Ward 8 of Swayimane benefitting from improved agro-meteorological forecasts at the farm level.	**0 women** and **0 men** in Ward 8 of Swayimane.	**300 women** and **100 men** in Ward 8 of Swayimane.	Gender-sensitive field surveys undertaken with representative populations of the target area.
Outcome 2: Built and ecological infrastructure enhances resilience and reduces vulnerability to risks associated with climate variability and change.	1. Number of rural physical assets strengthened or constructed to withstand conditions resulting from climate change-driven floods, storms, fires and drought. 2. Area and type of natural resource assets maintained and improved to withstand conditions resulting from climate change-driven floods, storms, fires and drought.	1. See Output 2.1. 2. See Output 2.2.	1. See Output 2.1. 2. See Output 2.2.	1. See Output 2.1. 2. See Output 2.2.

	3. Number of policy revisions recommendations developed to include adaptation considerations as a result of knowledge gained through the project.	3. **0** policy revision recommendations.	3. At least **3** policy revision recommendations, for the inclusion of adaptation considerations into each of: • rural settlement planning processes/SPLUMA; • South Africa's Extended Public Works Programme; and • peri-urban and urban settlement design and upgrade processes/SPLUMA.	3. Review of policy revision recommendations.
Output 2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities.	Number rural structures with strengthened climate resilience in the target area, in direct response to participatory vulnerability mapping of the project.	• **0** houses; • **0 km** of stormwater drainage channels; and • **0** pedestrian bridges.	At least: • **300** houses; • **10 km** of stormwater drainage channels; and • **5** pedestrian bridges.	Field inspections, budget and quality control report review.
Output 2.2: Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream.	Area of target ecosystems within target areas with improved climate resilience.	In target areas: • **0 ha** of restored grassland; • **0 km** of rehabilitated riparian zones; • **0 ha** of alien vegetation removed to prevent bush encroachment; and • **0 km** of firebreaks.	In target areas, at least: • **200 ha** of restored grassland; • **12 km** of rehabilitated riparian zones; • **100 ha** of alien vegetation removed to prevent bush encroachment; and • **100 km** of firebreaks.	Field inspections, budget and quality control report review.
Output 2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development plans and frameworks.	1. Number of tools for mainstreaming climate change adaptation considerations/ standards into informal settlement upgrade planning in the UMDM. 2. Number of training sessions to build the capacity of relevant officials to mainstream climate change adaptation in policies and plans.	1. **0** climate change adaptation mainstreaming tools. 2. **0** training sessions.	1. At least **1** climate change mainstreaming tool, for the UMDM. 2. **15** output driven training and workshops with relevant officials	1. Review of mainstreaming tool document. 2. Review of records of training.

Outcome 3: Productive landscape resilience increased through the installation of farm-level infrastructure and the integration of climate change responses into agricultural practices.	1. Increase in yield from climate-resilient farms/community homegardens as a result of project interventions.	1. Average of **0.5-1 t/ha for maize** and **0.3-0.5 t/ha for dry beans** from current farms in target areas.	1. Average of at least **3-5 t/ha maize and 0.75-1.5 t/ha for dry beans** from climate-resilient farms/community homegardens in target areas.	1. Crop sampling/analysis from representative farms/community gardens in the target areas.
	2. Increase in access to markets for farmers in Ward 8 of Swayimane as a result of project interventions.	2. Limited current access to markets for farmers in Ward 8 of Swayimane.	2. **50-100 %** increase in access to markets for farmers in Ward 8 of Swayimane.	2. Gender-sensitive field surveys undertaken with representative populations of Ward 8 of Swayimane.
Output 3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers.	1. Number of farms/community homegardens in target areas on which climate-resilient project interventions are being implemented. 2. Area of farms/community homegardens in target areas in which climate-resilient project interventions are being implemented 3. Number of small scale farmers in target areas benefitting from climate-resilient agricultural practices introduced through the project.	1. **0** farms/community homegardens. 2. **0** ha. • Swayimane Ward 8: **0 women** and **0 men** farmers; • Vulindlela Ward 8: **0 women** and **0 men** farmers; and • Nhlazuka Ward 5: **0 women** and **0 men** farmers.	1. At least: • Swayimane Ward 8: **200** farms; • Vulindlela Ward 8: **200** farms; and • Nhlazuka Ward 5: **5** community homegardens. 2. At least: • Swayimane Ward 8: **2,000 ha** of farm land; • Vulindlela Ward 8: of 1**,000 ha** farm land; and • Nhlazuka Ward 5: **2.5 ha** of community homegardens 3. At least: • Swayimane Ward 8: **300 women** and **100 men** farmers; • Vulindlela Ward 8: **300 women** and **100 men** farmers; and • Nhlazuka Ward 5: **100 women** and **50 men** community home gardeners.	1. Review of farm/community homegarden-level resilience plans; field inspections. 2. Review of farm/community homegarden-level resilience plans; field inspections. 3. Gender-sensitive field surveys undertaken with representative populations of the target areas.
Output 3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation	1. Number of trained[1] extension officers placed in project target areas.	1. **0** trained extension officers in project target areas.	1. **2** trained extension officers (1 in each of Swayimane Ward 8 and Vulindlela Ward 8).	1. Review of learning material; pre-training and end-of-project assessment of extension officers.

practices into its extension services and farmer support programmes.	2. Number of trained[28] extension officers in UMDM.	2. **0** trained extension officers.	2. **100 %** of DAEA extension officers in UMDM trained[17].	2. Review of learning material; pre-training and end-of-project assessment of extension officers.
Outcome 4: Adaptation practices integrated in relevant climate variability and change policies at the municipal level, in targeted sectors and beyond.	1. Percentage of community members in target areas with increased awareness, as a result of the project, of climate change adaptation and options to enhance climate resilience. 2. Number of development strategies that incorporate adaptation considerations as a result of knowledge generated through the project.	1. **0** beneficiaries trained. 2. **0** strategy revision recommendations as a result of knowledge generated through the project.	1. **80 %** (for both women and men) of beneficiaries with increased knowledge on climate change adaptation and options to enhance climate resilience. 2. **3** development strategy revision recommendations: • agriculture; • human settlements; and • disaster response.	1. Pre-training and end-of-project assessment of representative sample of project beneficiaries 2. Review of development strategy revision recommendations.
Output 4.1. Community champions, officials and authorities are empowered to participate in the project's activities.	1. Number of project beneficiaries trained on climate change adaptation and options to enhance climate resilience. 2. Percentage beneficiaries with improved knowledge of climate change adaptation and options to enhance climate resilience.	1. **0** beneficiaries trained. 2. No improvement in knowledge.	1. At least: • community champions: **25 women** and **15 men** • councillors: **4**; • officials: **8**; and 2. **48** NQF certificates obtained.	1. Review of learning material; summary reports from training experts. 2. Review of NQF certificates.
Output 4.2: Project outputs and experiences are captured and support integrated learning.	Number of platforms to share project outputs and experiences.	**0** platforms.	At least: • **8** reflection workshops; • **3** learning exchanges; and • **3** conferences.	Review of proceedings/ summary reports from reflection workshops, learning exchanges and conferences.
Output 4.3: Policy recommendations support sustaining, scaling up and replicating project successes.	Number of national policy conferences and scaling up workshops based on project lessons learned.	**0** conferences or scaling up workshops.	At least: • **3** national policy conferences; and • **3** scaling up workshops.	Review of proceedings/ summary reports from reflection workshops and conferences.

[28] Training will include building capacity on use of climate-resilient crop species, climate-smart agricultural techniques and short-term and seasonal forecast information.

F. Demonstrate how the project aligns with the Results Framework of the Adaptation Fund

Project Objective	Project Objective Indicator	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Reduce climate vulnerability and increase the resilience and adaptive capacity of communities and small scale farmers in production landscapes in the uMgungundlovu District that are threatened by climate variability and change, through an integrated adaptation approach.	Number of people with reduced risk to climate change-driven floods, storms, fires and drought, as a result of project interventions.	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses.	2.2. Number of people with reduced risk to extreme weather events.	6,308,571
Project Outcomes	**Project Outcome Indicators**	**Fund Output**	**Fund Output Indicators**	**Grant Amount (USD)**
Local capacities and tools for guiding responsive action triggered by hydro-climatological information reduce vulnerabilities and strengthen adaptive responses.	Number of early warning systems benefiting vulnerable communities and small scale farmers.	Output 1: Risk and vulnerability assessments conducted and updated at a national level.	1.2. Development of early warning systems.	943,810
Built and ecological infrastructure enhances resilience and reduces vulnerability to risks associated with climate variability and change.	Number of rural physical assets strengthened or constructed to withstand conditions resulting from climate change-driven floods, storms, fires and drought. Area and type of natural resource assets maintained and improved to withstand conditions resulting from climate change-driven floods, storms, fires and drought. Number of policy revisions recommendations developed to include adaptation considerations as a result of knowledge gained through the project	Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability. Output 5: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability. Output 7: Improved integration of climate-resilience strategies into country development plans.	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types). 5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets) 7.1. No., type, and sector of policies introduced or adjusted to address climate change risks.	3,162,857
Productive landscape resilience increased through the installation of farm-level infrastructure and the integration of climate change responses into agricultural practices.	Increase in yield from climate-resilient farms/community homegardens as a result of project interventions. Increase in access to markets for farmers in Ward 8 of Swayimane as	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1. No. and type of adaptation assets (physical as well as knowledge) created in support of individual or community livelihood strategies	1,505,714

	a result of project interventions.			
Adaptation practices integrated in relevant climate variability and change policies at the municipal level, in targeted sectors and beyond.	Percentage of community members in target areas with increased awareness, as a result of the project, of climate change adaptation and options to enhance climate resilience Number of development strategies that incorporate adaptation considerations as a result of knowledge generated through the project	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level Output 7: Improved integration of climate resilience strategies into country development Plans.	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses 7.2. No. or targeted development strategies with incorporated climate change priorities enforced	696,190

Alignment with Adaptation Fund Core Impact Indicators:

Adaptation Fund Core Impact Indicators				
Date of Report				
Project Title	Building Resilience in the Greater uMngeni Catchment			
Country	South Africa			
Implementing Agency	South African National Biodiversity Institute			
Project Duration	5 years			
	Baseline	**Target at project approval**	**Adjusted target first year of implementation**	**Actual at completion**
"Number of Beneficiaries" (absolute number)				
Direct beneficiaries supported by the project	0	3,855		
Female direct beneficiaries	0	2,110		
Youth direct beneficiaries	0	384		
Indirect beneficiaries supported by the project	0	21,785		
Female indirect beneficiaries	0	11,304		
Youth indirect beneficiaries	0	1,694		
"Early Warning Systems"				
Adopted Early Warning Systems Flood/Storm EWS *(1) risk knowledge,* *(2) monitoring and warning service,* *(3) dissemination and communication,* *(4) response capability.*	 0 0 0 0	 4 4 3 3		

Fire EWS *(1) risk knowledge,* *(2) monitoring and warning service,* *(3) dissemination and communication,* *(4) response capability.* Agro-meteorological EWS *(1) risk knowledge,* *(2) monitoring and warning service,* *(3) dissemination and communication,* *(4) response capability.*	 3 0 0 0 2 2 0 0	 3 3 3 3 3 3 4 4		
Hazard Flood/Storm EWS Fire EWS Agro-meteorological EWS	 None None None	 Floods, severe storms Extreme temperatures Drought		
Geographical coverage (km^2) Flood/Storm EWS Fire EWS Agro-meteorological EWS	 0 0 0	 126 103 32		
Number of municipalities Flood/Storm EWS Fire EWS Agro-meteorological EWS	 None None None	 1 District and 1 Local 1 District and 1 Local 1 District and 1 Local		
"Assets Produced, Developed, Improved, or Strengthened"				
Sector	None	Rural development		
Targeted Asset	None	Physical assets - strengthened		
Changes in Asset	None	300 households 10 km stormwater channels 5 pedestrian bridges		
"Increased income, or avoided decrease in income"				
Income Source	sale of agricultural produce	sale of diversified agricultural produce		
Income level (USD/month)	76	228		
Number of households	200	200		
"Natural Assets Protected or Rehabilitated"				
Natural Asset or Ecosystem	None	Land asset (grassland and riparian environment) Biological asset (removal of alien invasive plants)		
Change in state	None	Restored (grassland riparian environment) Removed (alien invasive plants)		
Total number of natural assets or ecosystems protected/rehabilitated	None	200 ha grassland 100 ha of cleared alien invasive plants 12 km or riparian environment		

G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Project Components, Outputs and Activities	USD	Budget notes (USD)
1. Early warning and response systems improve preparedness and adaptive capacity of local communities and small scale farmers, drawing on and integrating scientific and local knowledge	**945,737**	
Coordination and technical support	**192,403**	
	192,403	*EWS Programme Manager. Including operating costs*
1.1 Hydro-climatological and fire information and warnings supplied timeously in an appropriate format for direct use by communities and relevant disaster response officials	**432,382**	
1.1.1 Augment the Umgeni Water Decision Support System to provide early warning system information into a form that is useful for municipal officials and local communities	263,810	*Activity launch workshop (1,905);* *EWS institutional capacity baseline assessment and institutional review, and strategy development, including high risk areas (19,048);* *Contract with service provider through Umgeni Water to improve course and fine scale modeling to allow the generation of flood warnings, including: risk and vulnerability assessments, rainfall runoff model setup, cross-sectional mapping and ground-truthing as selected hotspots to configure hydrological model, extreme event flow/runoff analysis, procurement and installation of required monitoring software, and set up of automations to generate warnings (238,095);* *Develop MOUs for flood and storm EWS (4,762).*
1.1.2 Develop appropriate partnerships and enhance the effectiveness of fire detection and suppression	97,143	*Activity launch workshop (1,905);* *Fire detection and response institutional capacity baseline assessment and institutional review and strategy development (28,571);* *PPP development;* *Install additional towers (66,667)*
1.1.3 Strengthen Municipal Disaster Management systems to enable a proactive response to flood, storm, fire and agro-meteorological climate information and warnings	71,429	*Disaster management detection and response institutional capacity baseline assessment and institutional review, strategy and SOP development. Include text messaging technologies (47,619);* *Capacity building for disaster management officials, material development and training (23,810).*
1.2 Early warning systems empower municipal officials and local communities to respond timeously to seasonal forecasts and potential disaster events	**114,285**	
1.2.1 Pilot a Ward-Based Disaster Management Response System for floods and storms in a low-lying high-density settlement	47,619	*Participatory risk assessment and response strategy development for selected low-lying high-density site, installation of equipment (47,619).*

1.2.2 Pilot a Ward-Based Disaster Management Response System for floods, storms and fires in Vulindlela and Nhlazuka	38,095	*Workshops and capacity building, undertaken in conjunction with Component 2, participatory response development, equipment installation (38,095).*
1.2.3 Develop and operationalise community-based fire risk management plans in Ward 5 of Nhlazuka	28,571	*Contract with Kishugu Public Benefit Organisation (28,571).*
1.3: Access to seasonal weather forecasting improves the resilience of small scale farmers to climate variability.	**206,667**	
1.3.1 Develop and implement a farm-based agro-meteorological information generation and dissemination system, using Swayimane as a pilot	206,667	*Contract with UKZN SAEES, support for training and capacity building processes, including: workshops, required software, database fees, crop-climate-GIS model set up and configuration, annual surveys/research trials, annual workshops (before growing season), identification and mentoring of local youth small scale farmers (206,667).*
1.3.2 Mainstream agro-meteorological early warning systems into Agricultural extension services across the Province	0	*To be implemented using project resources that are budgeted for elsewhere (i.e. Activity 1.3.1 and through the technical support for Component 1).*
2. A combination of ecological and engineering solutions helps local communities to reduce vulnerability to the existing and anticipated impacts of climate variability and change	**3,197,307**	
Coordination and technical support	**626,689**	
	120,975	*Specialist Technical support*
	71,428	*Gender and Social Expert*
	434,286	*Community Liaison Officer #1 Nhlazuka and #2 Vulindlela, including operating costs and goods*
2.1: Critical settlement infrastructure, community facilities and homes strengthened and stabilised to buffer vulnerable communities against anticipated climate-induced stresses in rural communities	**1,570,617**	
2.1.1 Develop and implement plans to climate-proof built infrastructure and shelter in rural communities	1,522,998	*Gender and Social Action Plan (19,048) Household level training: 300 households trained at 30 households at a time, for 5 training modules each (22,857); Strengthening/climate-proofing/constructing of: 300 rural houses, 10km of stormwater channels, and 5 low-cost pedestrian bridges (1,481,093).*
2.1.2 Develop guidelines and policy recommendations for the inclusion of climate-proofing and adaptation mechanisms into rural settlement and municipal land use planning processes	47,619	*Guideline development, workshop process and policy recommendation formulation (47,619)*
2.2 Restored and protected critical ecosystems that maintain ecosystem resilience, provide buffering from climate change impacts and provide freshwater to local communities downstream	**833,334**	
2.2.1 Restore and rehabilitate critical ecological	823,810	*Community engagement processes (9,524);*

infrastructure to improve its capacity to mitigate effects of climate induced disasters		*Sub-component Environmental and Social Risk Management Plans, including environmental management plans and wetland rehabilitations plan, as appropriate (76,190);* *Labour-intensive restoration/rehabilitation of 200 ha of grassland and 12 km of riparian environment, removal of 100 ha of alien invasive plants to prevent bush encroachment, and establishment of 100 km of fire breaks (738,096);*
2.2.2 Develop policy recommendations for including adaptation considerations into South Africa's Expanded Public Works Programmes and national sectoral adaptation response strategies	9,524	*Workshop and policy recommendations (9,524).*
2.3: Officials empowered to mainstream climate change adaptation into relevant planning and infrastructure development plans and frameworks	**166,667**	
2.3.1 Develop a mainstreaming tool and associated policy recommendations and training materials for the inclusion of climate-proofing and adaptation mechanisms into relevant planning and infrastructure development plans/frameworks and municipal land use planning processes	95,238	*Tool development including mainstreaming tool, policy recommendations and training materials (95,238)*
2.3.2 Build the vulnerability mapping and adaptation planning capacities of relevant officials to facilitate mainstreaming of the tool developed in 2.3.1	71,429	*Capacity building, operating costs and services to support the Mainstreaming Process (71,429).*
3. Small scale farmers have improved resilience and reduced vulnerability to existing and anticipated impacts of climate variability and change	**1,410,476**	
Coordination and technical support	**300,952**	
	105,714	*Project Leader*
	133,333	*Extension officer #1 Swayimane and #2 Vulindlela*
	61,905	*Supply of training material (including papers, photocopying, printing, brochures); Hiring of venues, transporting participants, catering; Short course and a workshop/symposium, including trainers and caterers*
3.1: Investments in climate-resilient agricultural practices and physical infrastructure at the farm level mitigate impacts of climate variability and change for small scale farmers	**1,047,619**	
3.1.1 Increase agricultural yields through climate-smart farming in small scale farms and community homegardens	914,286	*Component Coordinator, Field Assistants (295,238);* *Develop survey material, conduct participatory workshops to develop production plans, undertake participatory research trials and disseminate results (190,476);* *Convert, collaboratively with farmers, production plans into 5 year business plans, implement plans and establish resilient seed production and storage systems of identified climate-resilient crops (238,095);*

		Fencing and concrete, set up irrigation, labour, supplies (including hand hoes, garden forks), consumables, maintenance (142,858); *Farmer Training Days - develop training material, brochures, transport for participants (47,619).*
3.1.2: Link farming cooperatives to existing and new markets	133,333	*Purchase tractor, build a pack-house, develop marketing material, transport hire, register co-operative and open bank accounts (133,333);* *Monitoring and evaluation by Component Coordinator and Project Leader.*
3.2: The KZN Provincial Department of Agriculture and Environmental Affairs mainstreams adaptation practices into its extension services and farmer support programmes	**61,905**	
3.2.1 Enhance the capacity of DAEA staff to mainstream climate change considerations into their activities	61,905	*Supply of training material (papers, photocopying, printing, brochures) (28,571);* *Hiring of venues, transporting participants, catering (19,048);* *Short course and a workshop/symposium, including trainers and caterers (14,286).*
3.2.2 Mainstream climate-smart agricultural practices into ongoing farmer support programmes	0	*To be implemented using project resources that are budgeted for elsewhere (i.e. through services of Component Coordinator).*
4. Capacity building and sharing of lessons and policy recommendations facilitates scaling up and replication.	**698,116**	
Coordination and technical support	**144,784**	
	144,784	*Learning Network Officer*
4.1. Community champions, officials and authorities are empowered to participate in the project's activities	**276,189**	
4.1.1 Build the capacity of local champions (including selected community members, councillors, traditional authorities and officials) to mainstream climate change adaptation responses into planning, budgeting and policy development processes	122,856	*Capacity building needs analysis and design (8,571);* *Training of community champions (57,143);* *Training of officials (11,429);* *Training of councillors (4,762);* *Community of Practice establishment and support (40,951).*
4.1.2 Produce and disseminate innovative educational and awareness raising materials about climate change adaptation	153,333	*Information portal development and maintenance (36,190);* *Development and dissemination of awareness raising (38,095);* *Support to Eco-Schools at project interventions sites (79,048).*
4.2 Project knowledge outputs and experiences are shared and captured	**148,572**	
4.2.1 Create partnerships with tertiary institutions that support students to study project interventions	47,619	*Top-up bursaries for students (47,619).*
4.2.2 Convene reflection workshops and learning exchanges where best practice approaches can be observed and captured	53,334	*Reflective workshops at project sites x8 (30,477); Community-level learning exchanges x3 (22,857).*
4.2.3 Provide platforms for project stakeholders to share experiences nationally and internationally	47,619	*Bursaries and student and community member conference and symposium attendance (47,619).*

4.3 Policy recommendations support sustaining, scaling up and replicating project successes.	**128,571**	
4.3.1 Convene national policy conferences to share outcomes of the project and promote linkages between these and relevant national policy processes	90,476	*Agriculture, Human Settlements, Disaster Response conferences (85,714);* *Travel and operating costs (4,762).*
4.3.2 Develop a plan to sustain, scale up and replicate project outcomes	38,095	*Scaling up and replication workshops (19,048);* *Travel and operating expenses (19,047).*
Total Components Cost	**6,251,636**	
Project Execution cost (9.5%)	**656,249**	
	404,762	*Project Director*
	119,048	*Financial and Procurement Manager (part time)*
	38,128	*Operating costs, including Inception Workshop*
	3,810	*Goods for Project Staff*
	5,026	*Verification of baselines*
	26,072	*Mid-term evaluation*
	35,595	*Terminal evaluation*
	23,809	*Annual audit*
Total Project Cost	**6,907,885**	
Project Management Fee charged by the Implementing Entity (8.5%)	**587,170**	
Amount of Financing Requested	**7495,055**	

Implementing Entity budget

Category	Budget notes	Year 1	Year 2	Year 3	Year 4	Year 5	Total (USD)
Management	Staff salaries (or part thereof) for finance, procurement, admin and project management staff	70,462	70,460	70,460	70,460	70,460	**352,302**
Operating costs	Travel, S&T, workshop and catering costs associated with project oversight and governance activities	29,359	29,359	29,359	29,359	29,359	**146,795**
Equipment	Costs associated with the provision of equipment to the NIE secretariat including computers and associated peripherals	11,743					**11,743**
Auditing and consulting services	Costs for external consulting services, notably external audits and other technical support	8,220	8,220	8,220	8,220	8,220	**41,100**
Administration costs	Printing, photocopying, telecoms and other costs related to office operations	7,046	7,046	7,046	7,046	7,046	**35,230**

H. Include a disbursement schedule with time-bound milestones.

	Upon Agreement Signature	End of Year 1	End of Year 2	End of Year 3	End of Year 4	End of Year 5	Total (USD)
Schedule Date (Tentative)	Nov-14	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20	
Project Funds	130,243	520,969	520,969	1,041,940	2,083,878	1,953,637	**6,251,636**
EE Fee	31,385	125,539	119,929	145,895	116,800	116,701	**656,249**
NIE Fee	29,358	117,434	117,434	117,434	117,434	88,076	**587,170**

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government

Ms Nosipho Ngcaba, *Director General,* *Department of Environmental Affairs*	Date*: July 30 2014*

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (The National Climate Change Response Policy White Paper, the National Development Plan, South Africa's 2nd National Communication to the UN Framework Convention on Climate Change) and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
 Mandy Barnett Implementing Entity Coordinator	
Date: *August 1 2014*	Tel. and email: +27 21 7998875; m.barnett@sanbi.org.za
Project Contact Person: Gigi Laidler	
Tel. And Email: +27 21 7998766; g.laidler@sanbi.org.za	

ANNEXES

I. Vulnerability Analysis: Preliminary Prioritisation of Vulnerable Communities for Climate Change Adaptation in the uMgungundlovu District Municipality.

II. Stakeholder Consultations

Annex II.1 Organisations consulted during the project development period.
Annex II.2: Attendance register for meeting to plan Inception Workshop.
Annex II.3: Attendance register for Inception Workshop.
Annex II.4: Attendance register for workshop to plan field visit itinerary.
Annex II.5: Field visit itinerary to identify project interventions sites.
Annex II.6: Attendance register for technical agriculture workshop.
Annex II.7: Attendance register for built environment and ecological infrastructure workshop.
Annex II.8: Attendance register for technical EWS workshop.
Annex II.9: List of meetings from 18-22 November 2013.
Annex II.10: List of meetings from 6-10 January 2014.
Annex II.11: List of meetings from 27-29 January 2014.
Annex II.12: List of meetings from 17-18 March 2014.
Annex II.12.1: Attendance register from Management Committee meeting.
Annex II.12.2: Attendance register from Disaster Management Forum meeting.
Annex II.12.3: Attendance register from fire component meeting.
Annex II.13: Attendance register from UMDM/DAEA meeting.
Annex II.14: Attendance register from DAEA meeting.
Annex II.15: Attendance register CoGTA meeting.
Annex II.16: Attendance register from Msunduzi Local Municipality meeting.

III. Maps of the demonstration sites for the Adaptation Fund project.

Figure III.1: Ward 8 of Vulindlela showing position of households and traditional communities (2011).
Figure III.2: Ward 8 of Swayimane showing position of households and traditional communities (2011).
Figure III.3: Ward 5 of Nhlazuka showing position of households and traditional communities (2011).

IV. Endorsement Letters

Annex IV.1: Letter of Endorsement from uMgungundlovu District Municipality.
Annex IV.2: Letter of Endorsement from Vulindlela Ward 8 local authorities.
Annex IV.3: Letter of Endorsement from Swayimane Ward 8 local authorities.
Annex IV.4: Letter of Endorsement from Nhlazuka Ward 5 local authorities.
Annex IV.5: Letter of Endorsement from Vulindlela Ward 8 traditional authorities.
Annex IV.6: Letter of Endorsement from Swayimane Ward 8 traditional authorities.
Annex IV.7: Letter of Endorsement from Nhlazuka Ward 5 traditional authorities.
Annex IV.8: Letter of Endorsement from KZN Provincial Fire Protection Association.
Annex IV.9: Letter of Endorsement from Lions River Fire Protection Association.
Annex IV.10: Letter of Endorsement from Richmond Fire Protection Association.
Annex IV.11: Letter of Endorsement from Working on Fire.
Annex IV.12: Letter of Endorsement from UKZN School of Agriculture, Earth and Environmental Science.
Annex IV.13: Letter of Endorsement from LIMA Rural Development Foundation.
Annex IV.14: Letter of Endorsement from Built Environment Support Group.
Annex IV.15: Letter of Endorsement from Umgeni Water.

V. uMngeni Resilience Project Environmental and Social Risk Management Plan