REQUEST FOR PROJECT/PROGRAMME FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

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ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category	:	Small grant
Country/ies	:	Namibia
Title of Project/Programme:		Community-based Integrated Farming Systems for Climate Change Adaptation
Type of Implementing Entity	:	National Implementing Entity (NIE)
Implementing Entity	:	Desert Research Foundation of Namibia
Executing Entity/ies		Namibia University of Science and Technology (NUST)
Amount of Financing Requested	:	$750 000 (in U.S Dollars Equivalent)

Short Summary

The overall project objective is to ***implement priority adaptation actions and practices to strengthen the adaptive capacities and enhance resilience of vulnerable farming systems and communities to climate variability and climate change***. The goal will be achieved through (Component 1) Enhancement of crop farmers' adaptive capacity to temperature variability; (Component 2), adaptive crop production management systems and introduction of efficient irrigation technology systems; (Component 3): Sustainable bush thinning and re-seeding of degraded grazing areas; and (Component 4): Knowledge and skills management

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AF	:	Adaptation Fund
CBA	:	Community-Based Adaptation Programme
CBEND	:	Combating Bush Encroachment for Namibia's Development
CCA	:	Climate Change Adaptation Project
CONTILL	:	Conservation Tillage Project
CPP ISLM	:	Country Pilot Partnership for Integrated Sustainable Land Management
DRFN		Desert Research Foundation of Namibia
DRWS	:	Directorate of Rural Water Supply
DYET	:	Directorate of Youth Employment and Training
ENSO	:	El Niño-Southern Oscillation ()
ERB	:	Ephemeral River Basins
FIRM	:	Forum for Integrated Resource Management
GCM		Global Climate Models
GEF	:	Global Environment Facility
IFS	:	Integrated farming system
IPCC		Inter-governmental Panel on Climate Change
MAWF	:	Ministry of Agriculture, Water and Forestry
MET	:	Ministry of Environment and Tourism
NDP	:	National Development Plan
NIE	:	National Implementing Entity
NSA		Namibian Statistics Agent
SCORE		Scaling up Community Resilience (SCORE) to climate variability & climate change
SGP	:	Small Grants Programme
UNCCD	:	UN Convention to combat Desertification
UNCCD	:	United Nations Convention to Combat Desertification
UNDP	:	United Nations Development Programme
UNFCCC		United Nations Framework Convention on Climate Change

1. PROJECT / PROGRAMME BACKGROUND AND CONTEXT

1.1 Geographic, Environmental and Socio-economic Situation

Namibia, located in south-western Africa, covers land areas of 825,418 km^2, with a 1,500 km coastline stretching along the South Atlantic Ocean (MET, 2011a). It has 2.1 million people habitants (NSA, 2013; MET, 2011a).

Namibia is an upper middle income country with per capita GDP of US$ 4677.87 (trading economics, 2015); and about 70% of the population depend on agriculture. Despite, Namibia being classified as a middle-income country, it has one of the highest income inequalities in the world, with a Gini coefficient of 0.60 (ibid.). In addition to this, 27.6% of the population are classified as poor, with 13.8% severely poor (WHO, 2013). Poverty levels and unemployment rate are highest in rural areas, especially among women and youth. Such groups are also highly vulnerable to the impacts of climate change, thus suffering double and in severe cases triple effects (MET/UNDP SCORE Project Document, 2014).

Climatic conditions, both variability and change, in the form of high temperatures, heat waves, droughts and erratic low rainfall are amongst the main risks and impacts for food insecurity in the selected sites of project intervention.

The rainfall distribution shows a decrease from the north-eastern parts of the country (Zambezi region) towards the south and west, ranging from 700 mm to less than 50 mm annual rainfall (Desert Research Foundation of Namibia, 2015). Only 8% of the country receives more than 500 mm – the minimum rainfall considered viable for dryland cropping. Mean annual temperatures in the interior of the country are mostly between 20^oC and 25^oC, but range from below freezing in winter to above 40^oC in summer. The rate of evaporation is very high, causing water deficits in all regions of the nation (Ministry of Environment and Tourism, 1992). In the northern parts of the country evaporation on open water sources is estimated to be at 2.6 m (420% in excess of rainfall) and 3.7 m (1750% in excess of rainfall) in the south of the country (MET, 2014). Overall, 69% of the country is regarded as semi-arid (250 mm to less than 500 mm annual rainfall), 12% is hyper-arid (less than 50 mm), 16% is arid (above 50 mm to less than 250 mm) and only the remaining 3% in the north-east is semi-humid (Barnard, 1998; (Ministry of Environment and Tourism, 2014)).

Depletion of soil nutrients and soil degradation are common in the northern regions of the country (DRFN,2007). In the sites where the proposed project is located, dryland cropping is already very minimal, thus highly prone to climate risks due to high rainfall variability and climate related induced droughts (MET, 2014). Some of the practices adopted for pastoral production due to both anthropogenic pressures and climate factors contributed to bush encroachment, overgrazing and desertification (Mendelsohn, 2006). The rural livelihood-based economy has progressively become unreliable, vulnerable, and in some cases maladaptive as a result of climate risks and uncertainties (Ministry of Environment and Tourism (MET), 2014). Although droughts are known to be recurrent and severity has been expanding sporadically (Mendelsohn, Jarvis, Roberts, & Robertson, 2009), there is now consesus that the number of incidences and scope is largely due to climate factors. Some regions in Namibia have experienced drought conditions over the past four years (Namibia Early Warning and Food Information Unit (NEWFIU), 2015), which has worsened some of the impacts and effects of this natural variability. For example, the year 2013 was

Namibia's driest year over the past 30 years, while rainfall variability was the highest in 2015 rainfall season (ibid); global climate change remains arguably the most serious impediment to Namibia's development aspirations and limiting factor towards low emission carbon development (ibid).

1.2 The Climate Change-induced Problem

Climate change has been and will have profound impacts on peoples' livelihoods, economic growth, and ecosystems, particularly in developing contexts and economies (Turner, *et al.,* 2003). However, the effects and impacts of climate change on economies and societies will vary greatly over the world, and are country specific, such as initial climate, socio-economic situation, and growth prospects, which define and shape the extent of climate change effects on societies, both in economic and environmental terms (Stern, 2006). Developing countries are most vulnerable, particularly those in Africa, largely because of their geographic exposure, relatively small economies, prevailing low levels of household incomes, and greater reliance on climate sensitive sectors such as rain-fed agriculture and ecosystem or nature based production activities (e.g. tourism) (MET, 2014 (Namibia National Climate Change Strategy and Action Plan)). Observational data for Namibia's projections in rainfall are consistent with the contemporary understanding of how climate change will affect the southern African region and are captured in regional climate models, especially in that:

a) Increases in temperatures, heat waves and thermal heating, coupled with increases in regional atmospheric dryness, especially during mid to late summer, will increase over much of the country.

b) Winter rainfall is likely to be reduced in the southern and especially south-western parts of the continent, and by implication, southern Namibia (DRFN, 2009; MET, 2011).

c) In addition, both the rainfall and temperature in Namibia are very sensitive to the El-Niño Southern Oscillation (ENSO) effect, showing periods of much below rainfall averages (ibid).

d) The Inter-governmental Panel on Climate Change (IPCC) Third Assessment Report suggests that by 2050, temperatures over southern Africa will be 2-4 ^{0}C higher compared to the 1961-90 baselines (IPCC, 2001).

Although climates across Africa, including Namibia, have always been erratic, the continent is expected to face even greater droughts, floods, rising sea-levels, food insecurity, loss of biodiversity and depletion in the water supply. It has been predicted with a high degree of certainty, that Namibia will become hotter throughout the year (with an expected increase in temperatures of between 1°C and 3, 5°C in summer and 1°C to 4°C in winter in the period 2046-2065) (Dirkx et al., 2008).Maximum temperatures have been getting hotter over the past 40 years, as observed in the frequency of days exceeding

35°C (Dirkx et al., 2008; MET, 2011). Frequencies of days with temperatures below 5°C have been getting less, suggesting an overall warming (Dirkx et al., 2008).

The proposed project will seek to reduce the impacts and risks from combined effects of natural variability and increasing climate induced heats, temperatures and change on crop and livestock production cycles in two regions of Namibia. Particularly this project will address two aspects (i) impacts of increasing temperature and higher water evaporation on crop production and (ii) bush encroachment on land productivity (and livestock production) that are exacerbated by a combination of increasing atmospheric carbon dioxide and unsustainable land management (human) practices due to inability and limited capacity to adapt the past arid production practices to drastic and complex changes.

In Namibia, climate change affects both livestock and crop production under rain-fed conditions. Both crop and livestock play an important role in the livelihoods of local and indigenous agro pastoral communities. These have been declining by about 33% on average every year in the last few farming seasons (Namibia Early Warning and Food Information Unit (NEWFIU), 2015). This has been evident especially in the 2011/2012, 2012/2013 and 2013/2014 farming seasons, such declines are mainly attributed to high ambient temperatures and below normal rain throughout the country (MET, 3rd National Communication to the UNFCCC, 2015). The year 2014 recorded the worst drought situation in 30 years and the GDP contribution from agriculture recorded significant negative changes with livestock farming recording the highest decline of 37.6%. As a direct result of these climate induced vulnerabilities, household food security and nutrition situations are compromised compelling households to supplement food deficiencies with government drought relief. Drought relief while desirable as a relief measure in the short term it is not neither a sustainable option nor long-term adaptation option. Furthermore, relief measures are likely to cause maladaptation as farmers will lose skills to make their living and compromises the ability for proactive adaptation planning. As climate change is induced by the accumulation of carbon dioxide in the atmosphere in combination with natural variability in Namibia, this promotes ideal conditions for the growth of woody trees and shrubs, which negatively impact the productivity of the drylands (MET, 3rd national communication to the UNFCCC, 2015). As a result, those impacted by climate change in Namibia are unable to cope with existing conditions while trying to respond to the climatic changes.

Bush encroachment, which is a second element for support under this project, which is both being a climate stimulated process and additional stressor with huge implications on food insecurity. Bush encroachment, which causes a total loss to the environment and economic loss (that is land productivity). Climate induced bush encroachment interacting with other human stressors exacerbate prevailing natural problems like variable dry environment, limited arable land, and increasing heats and temperatures. These further affects food security and nutrition, limit efforts to maintain living standards and improve livelihoods, despite efforts by government to improve them. Losses related to increased drought events caused by newer climate risks, if included in the loss figure calculated above could be much bigger than the current projection, and will have a drastic negative impact on the entire country economy (Desert Research Foundation of Namibia, 2015).

Namibia, like any other dryland country, being a highly drought-prone country, already naturally vulnerable to climate impacts, thus cannot afford or cope with any other added climate stressors (e.g. global inadequacy to support adaptation needs and actions) (de Klerk, 2004; INDC, 2014).

Table 1 below summarises projected adverse effects of climate change on the inhabitants of Omaheke and Omusati regions of Namibia, where the proposed project specific sites are located.

Table 1 Adverse effects of climate change to crop and livestock farmers (adjusted from the MET, 2011; MET, 2014)

Specific Climate Change-related Changes	**Specific Adverse Effects**
Declining rainfall - Frequent droughts - Increased rainfall variability (spatial and temporal variability within one rainfall season)	- Decline in ecosystem productivity impacting livestock forage leading to lowering rangeland carrying capacity, causing livestock deaths and low livestock numbers further impacting food and livelihood securities; mainly loss of livelihoods and loss income - Increased migration of agro - pastoralists to regions that receive relatively higher rainfall in a particular rainy season, leading to in-country climate migrants, exacerbating social problems including gender based violence and inequities on access to land and productive assets - Increased resource conflicts and gender imbalances
Rising temperature - Prolonged dry spells between rainfall events	- Increased seedling mortality of crops and pasture following a prolonged dry spell. - Wilting of crops and pasture resulting in lowered yields - Decreased harvests/outputs - Loss of potential incomes (from selling crop surpluses) - Increased food insecurity due to inability to produce food during dry spell
Increased atmospheric CO_2 levels	- Increased growth rates of woody plants (primarily C3 photosynthetic pathway) compared to herbaceous plants (grasses, mainly C4 photosynthetic pathway), resulting in a landscape-level wave of bush encroachment and drastically reduced grazing capacity and meat production - Decreased food and livelihood safety nets provided by livestock, which are sold or traded to fill food gaps - Compromised natural (re-) vegetation and

Specific Climate Change-related Changes	**Specific Adverse Effects**
	cumulative losses for wildlife and livestock adaptation corridors
Land and soil degradation due to reduced plant cover (and soil organic matter) - Low plant cover due to insufficient growth - Reduced carrying capacity for livestock production - Low soil fertility - Low soil nutrients	- Increased erosion - Dune activation - Lowered crop and pasture production
	- All of these, if not addressed as proposed in this project, will result in a wide-ranging condition of DLDD (i.e. desertification, land degradation and drought) intertwining with and exacerbated by human factors, that are made ineffective due to complex climate factors, thus overall leading to increased vulnerability of the inhabitants of the two selected regions.

All three National Communications submitted to the UNFCCC by Namibia emphasised and highlighted the vulnerability of the following sectors: agriculture, water, tourism, health and coastal areas. Thus proposed strategies and options include those that support

(i) food security and the development of the sustainable resource base,
(ii) sustainable water management,
(iii) human health, and
(iv) issue of infrastructure adaptation.

Given the vulnerability assessment results, small scale rural farmers, both agro and pastoral, were assessed to be at high risk, thus adaptation actions that focus on them are amongst the highest. Hence this project is specifically selected to address the adaptation actions within the agricultural sector in two specific regions in response to:

- High temperatures and increasing heat waves in summer
- Severe exposure to frost (in winter)
- Rainfall decreases and water shortages
- By addressing explicit adaptation actions with options chosen from the vulnerability and adaptation assessment applicable to these geographical and agro-ecological zones and regions, which are:
- Adopting micro-drip irrigation to address water shortages and inefficient irrigation systems
- Implementing comprehensive conservation production practices to deal with low outputs and post-harvest losses

- Applying integrated farming to address declining land productivity due to high temperatures with favourable conditions for bush encroachment
- Implementing climate smart practices under integrating farming to improve livelihood and food insecurity -frequent droughts reduce soil cover by grasses and herbs which otherwise protect the soil from erosion. This increases vulnerability of ecosystem services (e.g. nutrient recycling, etc. and cause a decline in perennial component of pasture.

1.3 Analysis of Climate models and scenarios

IPCC findings indicate that Southern Africa is amongst the most vulnerable regions to climate variability and change, due to multiple climatic stresses and low adaptive capacity. It is now indisputable that climate change will have a grave effect on agricultural production; threatening the sustainability of agro pastoral farmers by reinforcing existing stressors such as poverty, HIV and AIDS, with increasing heat stress, droughts, and increasing temperature events which could lead to more reductions in livestock and crop productivity in the near future. The UNFCCC recognises that Namibia is one of the developing countries that are most vulnerable to the adverse impacts of climate change due to the followings:

Temperature changes: over the long-term Namibia has experienced a mean decadal temperature increase of 0.2ºC (Reid et al. 2007). This is estimated to be about three times the global mean (*ibid*). The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2014) states that climate change scenarios indicate a future warming of 0.2 to 0.5 °C per decade across Africa. This warming is greatest over the interior of semi-arid margins of the Sahara and central Southern Africa. Hudson and Jones (2002) predicted a 3.7°C increase in summer mean surface air temperatures and a 4°C increase in winter by the 2080s. In Namibia itself, predictions for temperature increases by 2100 range from 2 to 6°C (Drikx, 2010) (Figure 1).

Changes in precipitation: precipitation for Southern Africa is predicted in the next 100 years and most models project that by 2050 the interior of Southern Africa will experience significant decreases during the growing season (IPCC 2012). In Namibia, rainfall reductions are expected to be greatest in the northwest and central regions. Particularly strong reductions are expected in the central areas around Windhoek and surrounding highlands (Midgley*et al*. 2005). Both rainfall and temperature in Namibia are sensitive to the El Niño-Southern Oscillation (ENSO) effect, and rainfall is below average during El Niño conditions. Rainfall in the future is projected to become even more variable than at present (Government of Namibia 2002). The north-western part of the country has experience persistent droughts over the past four years, while the north-central parts have experienced both droughts and floods in recent years. 2013 was the driest year in the last 30 years, while rainfall variability was the highest in 2014-2015 rainfall seasons was January and February experiencing dry conditions. February is usually the wettest month. However, reading from 15 weather stations in Namibia indicated that an increase in three fold of the global mean for the 20th century (Drikx, 2010).

Changes in evaporation: an increase in evaporation rates due to temperature increases is expected. An increase in evaporation of about 5 per cent is expected per degree of warming (Government of Namibia 2002). Thus, Namibia is predicted to experience severe water deficit. This will affect dry-land crop production and livestock production – which are the main sources of livelihood for the poor rural population.

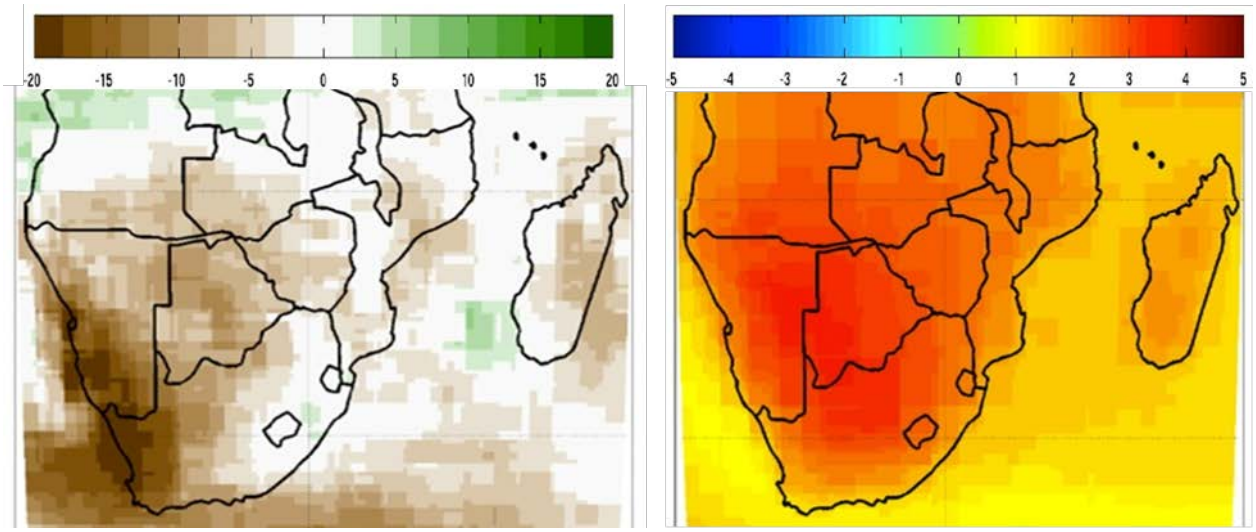

Figure 1 a) unpredictable precipitation b) Mid-Century (2040-2069) RCP 8.5, Compared to 1980-2009 period, Median of 20 CMIP5 GCMs

Hence the vulnerability of the country to the foreseeable adverse environmental and socio economic impacts of climate change that are outlined under the proposed adaptations for "food security and the development of the sustainable resource base" relates to practices that can improve nutrients in soils, soil and land management, and post-harvest production. Land management for livestock systems includes the need for fodder flow systems and bush thinning.

Below Figure 2 is extracted from Southern Africa Inter Crop Comparison project (2014) for Namibia at two weather locations, changes from the current climate (1980–2010) to near-future (2010–2040), mid-century (2040–2070) and end-of-century (2070–2100). Thus minimum and maximum temperatures baseline trends, both minima and maxima show an increasing trend over 1980–2010 (approx. 0.5◦C per decade).

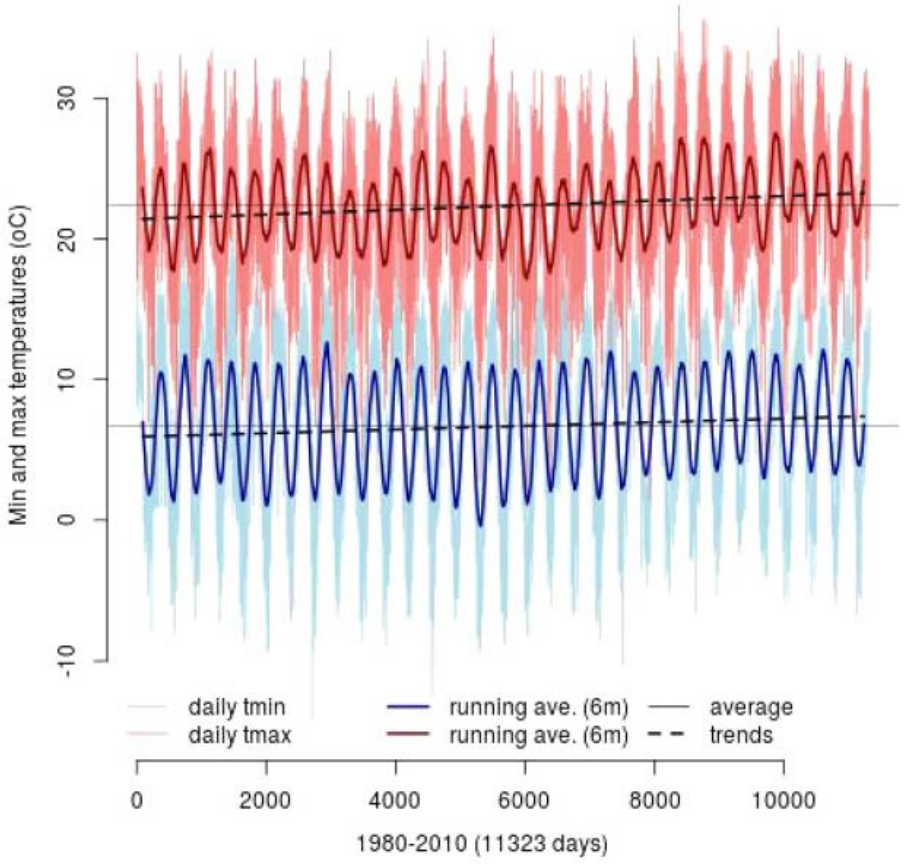

Figure 2: Long –term Projection of Temperature for Namibia

The uncertainty shown by the GCM rainfall rate (mm per day) projections emphasizes the need to consider the combined impacts of natural variability in the amount of rainfall received during each growing season for rain fed farming systems in semi-arid regions of southern Africa, show a very strong agreement for increased temperature projections (+1.5 to +3.5 C), whereas projected changes in precipitation are variable, with some GCMs projecting increases and others decreases.

1.4 Underlying Causes of the Climate Change-induced Problem:

Inherent physical vulnerability: Overall, 69% of the country is regarded as semi-arid (250 mm to less than 500 mm annual rainfall), 12% is hyper-arid (less than 50 mm), 16% is arid (above 50 mm to less than 250 mm) and only the remaining 3% in the north-east is semi-humid. Erratic rainfall situation complicated the issue of food security (Ministry of Environment and Tourism, Chapter for Namibia's 3rd National communication to the UNFCC, undated). Namibia is situated at the interface between different climate systems, its climate is mainly influenced by the country's proximity to the northward flow of the Benguela current associated with colder temperatures on its western shores, while the northern part of the country is influenced by the intersection of the warm tropical winds from Angola and the Benguela current from the southwest.

The southern part of the country lies at the interface between the Mid-Latitude high pressure zone and the temperate Zone (MET, 2011). As a result causes extra climatic stressors such as heat and recurrent droughts which are frequent further exacerbates food insecurity. Some regions of the country have experienced drought conditions over the past four years. Evident to the effect of climate change in the last three years (2013 to 2015) was the driest year over the past 30 years in Namibia, while rainfall variability was the highest in 2015 rainfall season.

Anthropogenic pressures on already fragile dryland ecosystems: Namibia has a total land area of approximately 825 000 sq. km and a population estimated at 2.1 million, with an annual growth rate of 3%. Namibia is the driest country south of the Sahara, with average rainfall varying from above 600 mm in the northeast to less than 25 mm in the Namib Desert to the west. Rainfall is erratic both temporally and spatially leading to large localised differences in precipitation and large fluctuations from one year to the next. Drought is a regular occurrence, which is predicted to worsen with the regional projections on climate change.

Maladaptive Mono-crop, inappropriate irrigation and unsustainable land use practices: major justification for the proposed project in Omusati region of the small scale irrigation farmers include:

- Induced risks for small-scale irrigation crop farmers: as a result of heat waves crops are desiccating, leading to lowered yield and eventually to economic losses, and food insecurity (for Summer crops);
- Frequent frosts, resulting in decreasing yields; economic losses and food insecurity (for Winter crops);
- The use of flood irrigation is associated with high evaporation, reducing crop water use efficiency;

Whereas the induced risks and vulnerability for the livestock farmers in (Omaheke region) livestock farmers are:

- High bush encroachment and this is causing a decline in pasture production. Thus lowered carrying capacity for cattle production, consequently leading to income losses and food insecurity.
- Frequent droughts reduce soil cover by grasses and herbs which otherwise protect the soil from erosion. This increases vulnerability of ecosystem services (e.g. nutrient recycling, etc. and cause a decline in perennial component of pasture.

Bush encroachment and inappropriate animal husbandry: bush encroachment impacted about 26 million ha of woodland savannas in Namibia (Ministry of Environment and Tourism, 2014)). That is on average capacity declined from 1 LSU per 10 ha to 1 LSU per 20 or 30 ha, for example. The concomitant economic loss of more than N$700 million per annum has had a direct impact on the livelihoods of 65,000 households in rural subsistence farming families and 6,283 commercial farmers and their employees. On communal areas, climate induced bush encroachment interacting with other human

stressors exacerbate prevailing natural problems like variable dry environment, limited arable land, and increasing heats and temperatures. These further affects food security and nutrition, limit efforts to maintain living standards and improve livelihoods, despite efforts by government to improve them. Losses related to increased drought events caused by newer climate risks, if included in the loss figure calculated above could be much bigger than the current projection, and will have a drastic negative impact on the entire country economy. These aspects and dynamics will be exacerbated by the projected adverse effects of climate change (Desert Research Foundation of Namibia, 2015). In addition to this, limited and lack of alternative sustainable land use practices that are climate smarter and knowledge in rangeland management and animal production are also hampering livestock farmers' capacities to cope with the impacts. Although communal farmers had long-term knowledge that allowed them to adapt to living and farming in arid lands of Namibia, the new stressors from climatic risks are stressing their adaptive capacities, such as they are unable to cope given the frequencies and scope of the risks. They are now faced with lack of appropriate alternative knowledge to enable them to adapt to these risks while still making a living out of livestock and sustain the range land conditions without causing additional human damages to the lands. Consequently there is a higher and slow onset of land degradation, which if not address now is likely to negatively impact future generations to make a living out of this land

A number of potential risks have been considered and partially analysed in the concept formulation period.

Table 2: Background information, impact and mitigation measures

Region	Background information	Active sectors	Impact & projections	Mitigation measures
Omaheke	– The region known as cattle area – Hunting & gathering for natural resources for daily survival by San people – 72% population lives in rural areas – Poorly distributed & unreliable – Small irrigated gardens	– Livestock farming – Tourism – Wildlife conservation	– Shift in vegetation zones & distribution of plants – Less water availability – Increase in temperature – Prolonged droughts & persistent dry spells – Increase in seasonal rainfall – Invasive species spotted	– Apply selective debushing – Quantify pasture : composition before and after debushing and for rested and non-rested grazing areas; – Apply methods for rangeland resting; and – Estimate carrying capacity for livestock production;
Omusati	– Extreme salinity of the soil – Hand-dug wells &	– Small scale crop & livestock farming – Wildlife	– Increase in temperature – High evaporation – Floods – Projected long	– Earth dams to capture rain water for micro irrigation activities

	boreholes – Providing drinking water for people & livestock – Frequent flooding of the "lishana" systems Angola – Water resources heavily dependent on climatic conditions in southern Angola	– Fishers	periods of droughts – Pests invasion	– Tree planting to serve as windbreaks – Pest control mechanisms – Access and better use of manure / soil fertilisers to reduce salinity – Micro finance to initiate self-help projects that will strengthen livelihood options – Training the farmers on smart agriculture

1.5 Proposed Solutions to the Barriers

The desired state at the end of the project is to have increased the resilience of the natural and human agricultural systems particularly with improved livelihood options and better adapted ecosystems to climate variability and change. Through strengthened the resilience and adaptive capacities of vulnerable farming communities to climate variability and climate change. Specific problem to be addressed, to Small scale Irrigation farmers:

- High temperatures and heat waves in summer
- Frequent exposure of crops to frost in winter
- Inefficient irrigation systems used
- Post-harvest losses

Specific problem to be addressed, to livestock farmers:

- Bush encroachment
- Loss of soil cover and nutrients

However, the following section presents key barriers to achieving all of the above:

a) Insufficient diffusion of climate-resilient irrigation and water conservation and management measures and practices

At present, farmers have limited access to physical water infrastructure that is required to maintain resilient rural livelihoods in a changing climate. Increasing the water storage capacity of soils, improving the management of irrigation system, and introducing more efficient/alternative irrigation techniques and conservation practices are highlighted as key

measures to increase the adaptive capacity and resilience of rural farming systems in Namibia.

In some of the small scale pilot initiatives undertaken under the local community based on the ground adaptation, it was noted that thorough site assessment should be done as part of the project implementation to enable farmers to quickly adopt and apply while practicing the adaptation actions as opposed to training prior the implementation. This include for instance adopting the adaptation option for micro- drip practices, which is known for being the most water efficient method under irrigation. Water drops right near the root zone of a plant in a dripping motion.

A combination of climate smart and efficient technologies including installing the systems properly can steadily reduce the loss of water through evaporation and runoff. Therefore this project will support all major aspects of irrigation such as irrigation system design, system maintenance, erosion control, and irrigation scheduling training for farmers.
For the bush thinning mechanism; the de-bushing mechanical applications will be applied based on the cost effectiveness. Similarly, the project considers feasible charcoal production mechanisms will be adopted as a means to improve sustainable harvesting of wood production using unproductive thicketed bushes. The environmental, social impacts and risks of these will be further detailed during the PFG.

b) Insufficient knowledge and access to climate-resilient crop and livestock farming practices

Farmers have inadequate information, knowledge and full awareness on alternative and diversification of crops, which combined with traditional knowledge, can provide a number of adaptation benefits, including an economic buffer in case of crop failures, and recognized benefits for soil fertility and nitrogen fixing. With improved farmer's information on sustainable practices, such as soil management in combination with inter/multi-cropping, resilience can be enhanced to enable adaptation activities across the entire spectrum of the project sites. Firstly, at present, there are incomplete efforts on the ground, on a limited scale to promote the full comprehensive diffusion and wide scale uptake of these practices on a critical scale. In addition there are still inadequate uptakes of few drought-tolerant species, which taking into account the climate risks projected will be appropriate in the foreseeable future. Lack of, and inadequate knowledge by farmers to apply water efficient irrigation practices and management is also ideal as an adaptation activity.

Secondly, despite various past initiatives, awareness about and technical capacity to implement adaptation measures such as early maturing crops and drought resistant crop varieties, resilient cropping and livestock rearing systems, intercropping (the practice of growing two or more crops simultaneously in the same field), adaptive management of shifting growing seasons, soil fertility management and animal husbandry is still limited. Whereas farmers used to apply traditional knowledge to adapt to natural aridity the intensity, scope and extent of the changing weather conditions are such that they are unable to catch-up speedily enough. In addition, human management impacts the ecological restoration in the particular project sites and landscapes.

c) Access to relevant climate information that enables farmers to timely prepare for climate change and reap benefits from adaptation measures

Due to inherent natural variability and vulnerability factors, a number of development initiatives have operated in Namibia. However most of those focussed on small scale pilots without much replication or upscaling to address regional scopes. Further, while some of the development assistance such as improved and diversified livelihood options and access to water resources has contributed to reducing the underlying vulnerability of poor farmers, the degree of their exposure to climate risks were not properly addressed, due to partial and incomplete climate risks information. With the recent completion of the V&A under the third national communication, adaptation options and actions have been better assessed giving better perspectives for adaptation intervention at specific sites. Hence this project will use the results of the Vulnerability assessment and adjust it with in-depth localised and site-specific information to improve relevant and timely access to information for proactive decision making that will benefit farmers. Uncertainty surrounding future climate change impacts and future socio-economic development constrained by specific identified optimal adaptation options. However, it is anticipated that uncertainties will decline over time as more climatic and socio-economic data becomes available.

Adaptation measures currently outlined in Namibia's policy documents are designed in a flexible adaptive management manner so that suitable adaptation options that could be adjusted or reversed to micro-level actions as new information becomes available. This is particularly important for adaptation options that have long-term implications, or measures that need to be taken over longer life span, such as infrastructure and soil management practices that could easily alter the soil characteristics towards declining fertility. Another aspect that will be considered in this project relates to suitable management and interpretation (including use of) of regional-national-local and micro data and assessments.

Largely this project will benefit regional social and environmental dimensions of climate impacts, however during the PFG there will be detailed assessments on the full scope of environmental and social (including gender) risks and impacts in line with the AF policy to be conducted.

d) **Social and environmental inequities including aggregate barriers due to poverty and gender inequalities**

Whereas these types of barriers are mostly of anthropogenic nature, they are exacerbated by climate induced factors, such as limited rainfall that is inadequate to productively cultivate, lack of alternative arable land and narrow widow to plant timely in response to variable rainfall. As pointed out in the IPCC AR4, climate change impacts disproportionately affect vulnerable populations, many of whom are poor. In the specific project site, the majority of the poor are women thus their vulnerabilities are de facto doubled if not tripled. Therefore this project will consider the factors that underlie the distribution of the costs and benefits of adaptation options. The distributional aspect of net

benefits will be best addressed when the particular vulnerable groups such as women are targeted on the ground. Giving weights to different adaptation costs and benefits according to who receives the benefits and who bears the cost, for example is likely to enhance the resilience in the long-term, doubling the adaptation benefits for poor people.

1.6 Project location

The project will be implemented in two regions; out of the 14 regions of Namibia (that is Omusati and Omaheke). As shown below Table 3 Omusati region is the second highest densely populated (next to the Khomas region where the capital city is located). The region is characterized by subsistence farming practices and communal land tenure system. The oshana system, which is a broad, shallow but vegetated ephemeral river system, dominates the environment. The high percentage of sand particles (above 60%) determines the texture and accounts for the low water retaining capacity. Organic matter in the topsoil is low (1 to 5%), the nitrogen content is too low for horticulture, while the pH is neutral (FSNAP, n.d). Due to high evaporation in the oshana system, the soils are saline. Sodium and gypsum is commonly found in the soils. Whereas; Omaheke among the least populated region, but it is highly bus in terms of density in the country; and known with livestock farming.

Table 3: Household population information at Project Sites

Region	Total Household pop	Population percentage	Average household size	Percentage of Female unemployment	Female percentage of population
Omusati	46 919	10	4.8	47.1	51
Omaheke	17 613	4	3.8	39.1	48

The two regions were carefully selected following a number of elaborate participatory processes that commenced with the national development-led process resulting into the Policy on Climate Change in 2011; the Strategy and Action Plan in 2014 as well as the V&A assessments finalised in 2015. The locations and sites were selected on the basis of observed temperature extremes, frequency of drought episodes, and the impacts of climatic parameters on food and livelihood security. An additional criterion for selection was the potential to access ground and surface water resources – vital prerequisites for small irrigation (thus Etunda and Epalela in Omusati). The direct beneficiaries of the project are subsistence farmers in rain-fed areas and vulnerable group whose access to arable land is severely threatened by soil erosion and land degradation. Special emphasis is placed on women and female-headed households within this vulnerable group.

Figure 3: Map of Namibia depicting the project proposed sites.

To address the adverse effects of climate change in Namibia requires that site specific and the primary beneficiaries. Hence, the on-going practices which are currently impacted by the effects will be supported with the implementation of adaptation options and activities that responds to the vulnerabilities and effects within the particular to the sites.

Regional scope - Omusati region, site specific location - Etunda Irrigation Scheme and Epalela Community Initiated Irrigated Crops

- The beneficiaries of small-scale irrigation project components will be the two communities of Etunda (beneficiaries from the government funded irrigation scheme) and Epalela (households who have initiated irrigated crop production).In total 67 small-scale irrigation farmers will benefit from the project outputs.
- The Epalela community-initiated irrigated crop production started their irrigation activities in the 1990 using the water from Olushandja / Etaka earth dam and the Calueque – Oshakati Water Canal. There are 65 small-scale irrigation farmers at Epalela, farming under the umbrella name Olushandja Horticulture Project Producers Association (OHPA). These small scale farmers are responsible for their individual plots' irrigation development and its management.

Regional scope - Omaheke region, site specific location Otjinene and Epukiro constituencies

In Omaheke region the main agricultural production is livestock (63%), followed by crop production (18%) and poultry (16%). Hence this project will focus on livestock production because it is the main driver of the people's welfare and food security. 42% of the population in Otjinene and Epukiro constituencies are female headed and are most vulnerable to changes in livestock production brought by climate change and variability.

Table 4: Omaheke region agricultural activity and total population

Agricultural activity	Households	Household (in %)	Human Population	Population in agriculture (%)
Total	6 834	100%	34 854	100%
Livestock	**4 292**	**63%**	**21 300**	**61%**
Crop	1 204	18%	6 628	19%
Poultry	1 063	16%	5 476	16%
Other agric activities	275	4%	1 450	4%

The project site is the Epukiro and Otjinene constituencies which are selected because of the high bush encroachment occurrence. Bush encroachment is facilitated by increasing atmospheric carbon dioxide and continuous overgrazing of grasses by livestock which puts woody plants at a competitive advantage. These two constituencies have the highest bush densities among the eastern communal areas of Namibia in the Omaheke region (see Table 5) and thus will be the focus areas for this project.

Table 5: Bush densities in the constituencies of Omaheke Region

Constituency	Number of bushes per hectare	Household size
Aminius	2,750	2 700
Epukiro	**8,117**	**1 231**
Otjinene	**7,735**	**1 588**
Otjombinde	2,883	1 500

Table 6 lists the possible institutional project direct or indirect beneficiaries and actors on the project. This assist the consideration of the project to the cost effectiveness of the proposed project is closely linked to the approach of increasing local resilience through the empowerment of local and community-based institutions.

Table 6: Institutional project beneficiaries and actors

Irrigation	De-bushing and re-seeding
Ministry of Agriculture, Water and Forestry	Ministry of Agriculture, Water and Forestry
NamWater Corporation	Regional Councils
Agro-Marketing and Trade Agency (AMTA)	Farmers association (unions)
Namibia Agronomic Board (NAB)	Higher education institutions
Regional Councils	Farmers
Farmers association (unions)	Ministry of Regional and local government
Higher education institutions	Water Point Committees at the project site
Farmers	Farmers cooperatives
Ministry of Regional and local government	
Water Point Committees at the project site	
Farmers cooperatives	

2. PROJECT / PROGRAMME OBJECTIVES

The overall project objective is ***to implement priority adaptation actions and practices to strengthen the adaptive capacities and enhance resilience of vulnerable farming systems and communities to climate variability and climate change***. Specifically the project will support:

1. Enhancement of crop and livestock small scale farmers' adaptive capacity to cope with higher temperature, heats and decreasing rainfall, and associated variability while securing their food and livelihoods;
2. Introduction of water efficient irrigation technologies for small scale farmers to increase their production activities;
3. Reduction of bush encroachment and enhance the productivity of grazing areas, prone to climate risks and carry out pasture re-seeding with climate smarter annual and perennial grass species; and
4. Strengthening knowledge and skills for adaptive crop, livestock and rangeland ecosystem management.

The project objective is aligned with the Objective presented by the Adaptation Fund to ***"Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels".***

The project is also fully aligned to the overall policy directives and principles, such that there will be activities on site that are specifically funded by the AF resources complementing ongoing implementations which are directed to overall adaptation approaches in the country. For instance the National Policy on Climate Change (2011) recognises that the national developmental planning process should be participatory and inclusive of all key stakeholders (national, regional and local) as well as public, private and civic; thus it promotes integration and coordination of programmes of various sectors to better provide critical foundations that can further enhance systemic adaptive capacity whilst pursuing sustainable development. The policy against which the specific support and objective of this project is drawn encompasses five objectives:

- Objective 1: develop and implement appropriate adaptation strategies and actions that will lower the vulnerability of Namibians and various sectors to the impact of climate change
- Objective 2: develop action and strategies for climate change mitigation
- Objective 3: integrate climate change effectively into policies, institutional and development frameworks in recognition of the cross-cutting nature of climate change.
- Objective 4: enhance capacities and synergies at local, regional and national levels and at individual, institutional and systemic levels to ensure successful implementation of climate change response activities.

- Objective 5: provide adequate funding resources for effective adaptation and mitigation investments on climate change and associated activities (e.g. capacity building, awareness and dissemination of information)

3. PROJECT / PROGRAMME COMPONENTS AND FINANCING:

The project will be divided into the following four components; as presented below table.

Table 7: summary of project components, expected concrete outputs and outcomes

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
Component 1: Enhancement of crop farmers' adaptive capacity to temperature variability	1.1 600 hectares will be covered with shade nets	Average profitability increased by more than 60%	62 558.00
	1.2 132 small scale farmers will be trained and other actors on post-harvest; furthermore will able access to packing, storage and ICT system		62 557.40
Subtotal for component 1			**125 115.40**
Component 2: technical good crop production management systems and introduction of efficient irrigation technology systems	2.1 Strengthening better crop management and irrigation for small scale irrigation farmers	Production Management effectiveness of 132 farmers' capacities for crop and irrigation strengthened; 600 hectares efficiently irrigated with water consumption reduced by 30-40%	15 500.00
	2.2. Water saving efficient drip irrigation introduced to 132 small scale farmers; that covers 600ha		234 730.80
Subtotal for component 2			**250 230.80**
Component 3: Sustainable Bush thinning and re-seeding of degraded grazing areas	3.1 Selective bush thinning to allow grass growth and species diversity	200 000 hectares sustainably de-bushed and re-seeded with grass cover ; about	75 069.24

	3.2 Re-seeding of grazing areas to cover soil with high root biomass and good root biomass with higher species diversity	50% of the population targeted constituencies livelihoods enhanced through sustainable diversification (that is about 1500 households)	75 069.24
	3.3 production of sustainable production of charcoal as source of additional income		37 534.62
Subtotal for component 3			**187 673.10**
Component 4: Knowledge and skills management	4.1 Community mobilisation climate risk management and preparedness planning	Timeliness and quality of climate risk information disseminated to farmers enhanced (through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-term climate scenario planning); Knowledge, understanding and adaptive capacities of farmers and extension officers improved	10 852.5
	4.2. Dissemination and strengthened disaster risk management for climate induced risk		20 852.5
	4.3 building to farmers and students related to risk management for climate induced risks		30 852.7
Subtotal for component 4			62 557.70
1. Total Project/Programme Cost			625 577.00
2. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			58 806.91
3. Amount of Financing Requested			750 000.00

3.1 Projected Calendar:

Table 8: Project Calendar

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

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

4. PROJECT PROGRAMME COMPONENTS

4.1 Component 1: Enhancement of crop farmers' adaptive capacity to temperature variability

The main Outcome of Component 1 is targeting to benefit about 132 in total of small scale farmers in Omusati region; known as Etunda Irrigation Scheme which is supported by the government and community based irrigation. Those fully supported by government are about 67 farmers. Whereas, community project is located at Epalela that is solely Community Initiated Irrigated Crops about 65 farmers; both farming community using Kunene River flowing from Angola.
The physical and ecosystem-based fresh water management measures, this project proposing to be verified with a view to 1) enhance the strategic use of existing physical and natural assets such as irrigation management; and 2) ensure ownership by community and sustainability of the adaptive investments. This contextualized approach not only ensure that AF investments but are tailoring to the local context, that able to provide platforms for community dialogue, consensus building and capacity development on climate-induced water scarcity issues. Compliance with environmental and social safeguards are not required as the project strengthening community resilience to climate change induced risks of the existing enterprise.

Component 1 is comprised following Outputs:

Output 1.1: 600 hectares will be covered with shade nets
Seasonal shifts in rainfall, temperature and humidity (heat wave and frost) give rise to production and quality problems, including pressure from pests, diseases and weeds. These cannot currently be predicted with much certainty. Temperature extremes (heat waves) will have negative impacts.

The most common used in many place and has been proven effective reducing greenhouse temperatures in summer and in nurseries producing shade loving ornamentals. Very little work has been done with shade cloth for field production of vegetables in Namibia.

This proposed shade cloth may have to fit for a number of crops. Certainly, leafy green production could benefit, potentially extending the production of lettuces through the summer. Research has shown that the potential for shade cloth can improve quality in peppers and tomatoes, allow for the summer crops such as lettuce produce more, and improve the production of repeat blooming in summer months. In Namibia there are few

growers that have incorporated shade cloth into their production systems, which shows good sign of adaptation mechanism.

There are a number of different types of shade cloth available. The most common colours are black and green. However, white or aluminized shade cloth may offer additional cooling. Other colours such as red may benefit specific crops by filtering different wavelengths of light. However, to cut down light can impact significantly to photosynthesis. Normally vegetable crops require shade between 20 % and 40% with ~30% being the most common recommended practise; along shade net (i) conservation tillage to conserve soil moisture; and (ii) implement good crop rotations, maximise the benefits of nitrogen-fixing species (legumes; for example preceding a wheat crop). These two mentioned systems will be integrated to shading system.

Activities under Output 1.1 include:

Activity 1.1.1: Design and co-finance shade net of which technically and environmentally appropriate

Activity 1.1.2: In consultation irrigation role players or actors, revise/develop good irrigation management system (including a conflict resolution).

Activity 1.1.3: Organize sessions and trainings targeting on relevant know-how and technological means to manage the system.

Activity 1.1.4: Organize awareness raising events and community members on climate risks, resilient water use, and participatory management of the water systems and irrigation management.

Activity 1.1.5: Production of a technical report on the effectiveness, success and challenges in enhancing sustainable small scale irrigation system. And also a robust M&E framework established at the inception phase of the project will capture the use, effectiveness in terms of enhancing water access, and irrigation management.

Output 1.2: Develop packing and storage system to reduce post-harvest loss

As indicate in the report International Journal for Rural Development Rural 21 (2013), climate change will continue to exert its influence not only on crop production, but also on increasingly valuable harvest, the influence shown in the table below:

Table 9: **Impact on post-harvest activities as a result of climate change**

Harvesting and drying • Increased rate of crop drying, in field and at homestead • Increased fire risk of the mature crop
Pest & disease management • Faster reproduction of insect pests & diseases (shorter lifecycles due to higher temperatures) leading to more rapid • build-up of insects and fungi in stored produce • contamination of stored products • Pest and disease territories expand e.g. to higher altitudes or previously cooler areas • Efficacy of some grain protectant active

• ingredients decrease and others increase
Storing • Higher pest incidence and carry-over • during 'cold season' increases the need • for thorough storage structure hygiene & management of residual infestation • prior to storing new crop Increased pest reproduction and mobility leading to need to re-winnow, sort and re-treat grain midway through storage period • Increased moisture migration and condensation resulting in rotting zones in grain bulks with excess free moisture • Increased risk of reduced seed viability especially for some legumes, e.g groundnuts

To handle the above mentioned problems; and also to achieve the output of 1.2, thefollowing activities will be performed:

Activity 1.2.1: Organize sessions and trainings targeting small-scale irrigation farmers focusing on appropriate technologies forto managing post-harvest losses

Activity 1.2.2 Select and store crops and varieties which are less susceptible to post-harvest pest attack

Activity 1.2.3: Design ITC enabler to support small-scale production and marketing system, to improve market access and timely delivery of produce to consumers

- ICT enabled agricultural extension worker and information to farmers to improve handling post-harvest loss
  - Market price for commodities and link among different constituencies (districts)
  - Farming best practices
  - Supplier directory
- **Mobile survey-based collection of farm data**
  - Raw data
  - Analyses
  - GIS data

4.2 Component 2: technical good crop production management systems and introduction of efficient irrigation technology systems

The main Outcome of Component 2 is to increase to diversification and resilience of the most vulnerable small scale irrigation farmers in Namibia, thus includes improvement of technical crop production management systems and introduction of efficient irrigation technology. Namibia small scale farmers faced multitude challenges that incudes high investment costs, poor planning and lack of maintenance for their implements, inefficient and inappropriate irrigation systems (most important the irrigation development never consider the impact of climate change induced risks), particularly extension services are

not trained specifically on the irrigation technologies and climate related risks. In summary (i) Poor initial planning led to poor operations; (ii) Farmers did not see the benefits of investing in better irrigation systems due to lack of awareness and resources, and (iii) infrastructure was not maintained.

Therefore, component 2 comprises the following Outputs, that includes promotes climate-resilient agricultural methods that will have two outputs technical crop production management systems and introduction of efficient irrigation technology.

Output 2.1: Strengthening better crop management and irrigation for small scale irrigation farmers

In the first fold of the methods under this component will include improvement of plant density by optimizing plant population and row spacing; drought-tolerant crop varieties (such as groundnut, sorghum and pearl millet); and also better weed; surface mulching to reduce water evaporation, improvement of soil quality by means of maintaining the soil cover to protect the soil physically from sun, rain and wind, and to feed soil microorganisms; and integrated nutrient management for improving the physical, chemical and biological characteristics of the soil. Soil conditions in Namibia is already in deteriorated state in general from recurring drought- and flood-induced erosions and are likely to be exacerbated under intensifying impacts of climate change unless these resilient agricultural methods are implemented effectively. Investments on enhancing water efficient irrigation will improve the situation.

Activities under Output 2.1 include:

Activity 2.1.1: Organize training events on a range of climate-resilient farming methods targeting group and extension workers including drought-resilient crop varieties, optimization of plant population, weed control and crop and surface mulching;

Activity 2.1.2: Establish a participatory, demonstration plots in both small scale irrigation farmers site and undertake field trials of drought resistant crops and drip irrigation techniques to enable local dissemination and transfer of adaptation know-how

Activity 2.1.3: Organize exchange visits and farmers' field school involving project and non-project community members, students, government institutions, agricultural extension officers and NGOs will benefit

Activity 2.1.4 Produce at least one technical report capturing lessons learnt on the effectiveness of drought-resilient farming methods

Output 2.2: Water saving efficient drip irrigation introduction to 132 small scale farmers; that covers around 600ha

The aim of this output to improve inefficient irrigation projects encountered, that can help to inform strategies for sustainable future management and water use in Namibia agricultural sector by: (i) Identifying cost effective, sustainable irrigation and profitable, (ii) exploring the role of farmers in design, management and maintenance, and (iii) to ensure

that irrigation contributes its maximum potential to a vibrant agricultural sector. It is important to take note this output aligning with the Comprehensive Africa Agriculture Development Programme (CAADP) of the New Partnership for Africa's Development (NEPAD) which has identified land and water management as a priority, and intends to extend the area under sustainable land management and reliable water control systems.

Activities under Output 2.2 include:

Activity 2.2.1: Water saving drip irrigation will be included with solar pumping system;

Activity 2.2.2: Production systems improvement will be introduced: that includes sustainable production systems are put in place. Presently, there is a lack of consistent use of improved seeds, fertilizers (generally low fertilizer use – both organic and inorganic), etc. Crop protection is not well developed and integrating pest management practise;

Activity 2.2.3: Farmers will be trained with properly instructed in irrigation technology and encouraged to regularly contribute money to facilitate ownership

Activity 2.2.4 Produce at least one technical report capturing lessons learnt on the effectiveness of drought-resilient farming methods

4.3 Component 3: Sustainable Bush thinning and re-seeding of degraded grazing areas

The main Outcome of this component is to benefit 1500 household of Otjinene and Epukiro. This represents about 50% of 1400 and 1600 households' populations for Otjinene and Epukiro respectively. It is important to take note that the sample represents about 10% of the total Omaheke region total population.

The primary rationale for selecting these two constituencies was due to climate variability and change factors, however the other secondary reasons considered were: intensity or highly bush encroached area (drastically reduced land and soil productivity), which accounted about **8119 and 7,735** bushes per ha for Epukiro and Otjinene respectively.

Learning from the community-based adaptation strategy documented by the Namibia Small grant, which is supported by the GEF, it is largely recommended to undertake extra local stakeholder level participation prior to any concrete investment activities under ***Component 3*** is implemented. Thus just before the commencement of Component 3 there will be participatory community-based assessments, which are essential for community-based organizations and village stakeholders to verify and confirm the specific locations and site-specific design elements of livestock adaptation measures in the community context. These assessment activities will not only verify to ensure the AF outcome alignments are adhered to, but that the project investment activities will be carried out in compliance with national standards particularly to comply with the Environmental Management Act no 7 of 2007 and associated regulations. As the proposed activities will not alter any existing land use, there would be no land clearing for virgin lands as production systems will be integrated in the existing land scape of the project sites. However where de-bushing and re-seeding is to be undertaken full scope of

precautionary principles as well as national botanical guidelines will be adhered to including the principle that only indigenous species will be used.

Output 3.1: Selective bush thinning on 200 000 hectares de-bushed area to allow grass growth and species diversity (estimated about 50% of the population targeted constituencies will benefit; that is about 1500 households)

Climate-related shocks and economic stresses in rural households have been identified as the most important cause for a decrease in the numbers of livestock. The major factors determining the functioning and dynamics of savannas are the following:

- **Primary determinants**, such as **rainfall, soils and nutrients**, are functions of a specific geographical region and are to a certain extent beyond the farmer's control. Rainfall, together with soil moisture balance, has an overwhelming effect on vegetation structure, composition and productivity. Rather than a gradual annual increase in bush numbers, the general view is that woody plants establish in large numbers during certain years, and at varying intervals. Prolonged denudation of soils caused by droughts and grazing, followed by above-average rainfall years with frequent rainfall events, favour mass tree recruitment.

- **Secondary determinants**: these act within the constraints imposed by primary determinants. They can often be directly modified by management. The exclusion of occasional hot veld fires, the replacement of most of the indigenous browsers and grazers by livestock, injudicious stocking rates, poor rangeland management practices, and artificial water points are regarded as the major causes of bush encroachment. In the past, **high-intensity** fires played a major role in maintaining open savannas. However, with the introduction of cattle farming, veld fires were suppressed – and this is regarded as a major factor contributing to bush encroachment. Although fires kill tree seedlings and saplings, mature woody plants are seldom kills species but assist to regenerate and grow actively. High-intensity fires are regarded as a prerequisite for effective burning. These fires depend largely on the amount and structure of the fuel, its moisture content, the prevailing atmospheric humidity, and wind speed. Thus, fire is not effective where high bush densities occur, but it can serve as an effective management tool for modifying the structure of the woody layer and as an aftercare treatment. Together with an increase in domestic livestock (grazers) and a **decrease in game numbers (browsers)**, the pressure on the grass layer has increased, the competitive advantage of a vigorous perennial cover has declined, and a more favourable environment for the woody component has been created. Although some research findings indicate that the seeds of Acacia mellifera, for example, are not transferable from one season to another. Because of factors like seasonal dormancy, hard-seededness and the presence of allelochemicals, the seed content in the soils has gradually built up, resulting in several hundred seeds per square

metre. Furthermore, the absence of ungulates in tandem with the suppression of fire creates favourable conditions for bush encroachment.

This procedure assists you to assess the current pasture base, which outlines what improvements can be made and when to consider introducing new species.

Activity 3.1.1 Assess the existing pastures across all significant pasture zones identified on the farm. Collect additional information on new and alternative pasture species, including their seasonal growth patterns,

Activity 3.1.2 Cutting (bush thinning) to increase plant tillering, using high density, short-term grazing or cutting to prevent undesirable annual grasses from reseeding and maintaining perennial grass and clover cover to limit germination of annuals in autumn (follow the grazing management tactics to increase, maintain or decrease individual species)

Activity 3.1.3 addressing soil health and soil fertiliser content for the most responsive and desirable species

Activity 3.1.4 use tactical herbicides to control weeds (e.g. low chemical rates in a spray-graze, allowing desirable pasture species to recruit through setting and dropping seed before grazing or cutting).

Output 3.2: 200 000 hectares will re-seeded with grass cover; estimated about 50% of the population targeted constituencies will benefit (that is about 1500 households)

Changes in rainfall, runoff, infiltration, temperature and evapotranspiration will bring concomitant changes in structure and function. Midgley *et al.* (2005) expect grassy savanna to lose its spatial dominance to desert and arid shrubland vegetation types. They predict that arid vegetation types will increase their cover by up to 20 % by 2050, and up to 43 % by 2080, in the absence of a CO2 fertilization effect. There will be changes in species suitability for specific areas and particularly shifts in the ranges of C3 and C4 species. C4 species will probably retreat in a north easterly direction with C3 species (including bush) filling this gap. If the fertilization effect of higher CO2 in the atmosphere is taken into account, the predicted C3/C4 shift is even more dramatic, as C3 species are generally advantaged by CO2 stimulation; bush encroachment will likely increase towards the north east of Namibia (where the study area).

Activity 3.2.1 Reseeding and maintaining perennial grass and clover cover to limit germination (following the grazing management tactics to increase, maintain or decrease individual species)

Activity 3.2.2 Manipulate the species mix to achieve the right pasture composition.

Activity 3.2.3 Introduce high root biomass of some grasses and the overall greater average root biomass of diverse plots that promote the retention of N by preventing leaching

Activity 3.2.4 (1) test for a "fertility effect"—the positive effect of plant diversity on soil fertility (Zak et al. 2003)—using additional measures of fertility; and (2) determine whether the additive of species traits ("additive fertility effects"), the interaction of species traits ("interactive fertility effects"), or both. Because plant growth is an integrated measure of soil nutrient availability, that use seedling bioassay to assess how plant diversity influences the fertility of soil beneath species-poor and species rich plant communities.

Output 3.3: Production of sustainable production of charcoal as source of additional income

Encroacher bush is currently seen as a huge problem, but it is possible to change this into an opportunity. Firstly, there is the option (already applied to some extent) of using bush for fire-wood and charcoal. Secondly, technology has advanced to such an extent, and is becoming more affordable, to convert bush into electricity and/or bio-oil and/or biochar, by the process of pyrolysis. Thirdly, there may be future opportunities under the UNFCCC Clean Development Mechanism (CDM). It is quite likely that the CDM Executive Board will in future allow the use of biochar (which is a way of extracting carbon dioxide from the atmosphere and burying carbon in the form of very stable soil organic matter for hundreds to thousands of years, while at the same time improving soil quality) as a methodology under the CDM. Implementation of energy efficient technologies and measures, and use of renewable energy in farming operations could be financially supported by using either the compulsory (i.e. CDM) or voluntary carbon mechanisms.

Activity 3.3.1: Production of charcoal or wood that benefit farmers as additional

4.4 Component 4: Knowledge/skills development and Research

The outcome of Component 4 is to avail appropriate climate related information; to enhance farmers' planning and decision-making. This component will be achieved through the following Outputs:

Output 4.1 Capacity development on Early Warning System (EWS)

This Output will ensure increasing capacity of farmers to acquire and use climate-related risk data, vulnerability and hazard information from local organizations and EWS online resources. The aim is to enable informed planning and investment decisions about appropriate risk reduction measures, and communicate actions that can be taken in advance of impending climate hazards to reduce human, material and livestock losses from slow and sudden onset of extreme events.

This output will achieve two things (i) producing a resource manual to train on tailor-made EWS modules for small-scale irrigation farmers; and (ii) to livestock farmers to implement climate change adaptation strategies.

Activity 4.1.1: Synthesize available early warning data applicable to small irrigation farmers and livestock farmers

Activity 4.1.2: Produce manual specific to small scale irrigation and livestock farmers designed to introduce aspects of early warning and disaster management

Activity 4.1.3: Organize a training workshops, on EWS suitable to small scale irrigation farmers and livestock farmers

Activity 4.1.4: Develop ITC platform to access timely early warning data suitable to small scale irrigation farmers and livestock farmers

The four thematic that ITC will support

Figure 4: Thematic area where ITC is able to support

Output 4.2. Research component

This output will encompass research on integrated climate change assessment and benefits of adaptation strategies; e.g. testing different combinations of adaptation packages, suitable to small irrigation farmers and livestock farmers.
Under this output; the following activities will be carried out:

Activity 4.2.1: Model and evaluate the economic impacts of climate change and benefits of adaptation strategies using integrate climate, crop and economic variables of different adaptation

packages (e.g. testing different crop varieties, fertilizers, watering regime…etc).

Activity 4.2.2: Model and evaluate crop/vegetation and livestock climate integration; and benefits of adaptation strategies.

Output 4.3: Capacity building to farmers and students related to risk management for climate induced risk

Students will be attached for six months to the project as interns as part of the work integrated learning curriculum of the Namibia University of Science and Technology (NUST). The benefit of the internship with community for six months would be:

i. work experience and transferable skills: skills that fit within Namibian socio-economic situation and cultural setup to assist for climate change adaptive capacity; specifically students who will attached with community should be candidate that understand the culture, and custom of society so that good trust and relationship to be created,
ii. Student will earn course credit: earning credit through practical teaching experience student become more competitive and capable to solve climate related problem
iii. Gain practical experience, by applying methods and theories learned in classes: Many people learn best by being hands on. But everyone can benefit from practical exposure of what they have been learning in class, put to action; whether it's in agricultural research lab and marketing development meeting, specifically related to climate change.

Additional advantage of this type of linkage will: (1) (professional ideological education) it makes clear the specialty orientation; (2) (specialty understanding and practice) it strengthens and stabilize students' thoughts about their specialty; (3) (curriculum experiment) it helps students master the methods and means of doing basic experiments and trains their action ability and basic skills; (4) (course practice), through combination of theory and practice it consolidates students' mastery of theories; (5) (curriculum design) it promotes the cultivation and training of the ability to solve social practical problems with the application of specialized theories; and (6) (training at practice base) it helps students participate in special training platform which combines real agricultural production, study and research, further trains students' comprehensive ability to analyse and solve problem and cultivates their ability to be a team player.

Activity 4.3.1: Develop module that target to farmers and students, related to climate change, irrigation management and post-harvest handling.

Activity 4.3.2: registered students' identification and attached to the project. In this component two levels of student researchers will involve that is undergraduate as part of the internship for shorter period type research (six month) the second group will involve postgraduate

students, which they involve minimum two year and maximum three years project involvement.

B. Describe how the project/programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

5. ECONOMIC, SOCIAL AND ENVIRONMENTAL BENEFIT

The primary beneficiaries which are targeted are about 132 small scale irrigation farmers and about half of the 3000 households at the targeted project sites (that is 50% of the **Otjinene and Epukiro constituencies** households population).
Omusati region beneficiaries will be about 132 small scale irrigation farmers (SSIF), who are currently applying conventional farming at Etunda Irrigation Scheme. This will complement the farmers supported by Government, who are about 67 farmers. The selections of farmers will be largely due climate related impacts and other factors such as vulnerable resettled farmers who are about 90 but the project will only target 67.

At Epalela, that is Community Initiated Irrigated Crops about 65 subsistence farmers will be primary beneficiaries. Both farming communities are mainly using water from the Kunene River outlets that flows from Angola or rain fed from flood plains within the Cuvelai system. The on-going farming activities of the small scale irrigation farmers are affected by (i) high temperatures and heat waves in summer, (ii) frequent exposure of crops to frost in winter, (iii) limited rainfall and (iv) post-harvest losses due to increased heats and drought.
Small scale farmers will benefit from the project through additional investments in natural and productive capital (that includes improved water saving irrigation system, post-harvest management, crop and irrigation management and also from better understanding of climate change that is early warning systems).

Omaheke region: which is predominately livestock farmers', with specific problem related to (i) bush encroachment and (ii) loss of soil cover and nutrients; this project main target will be Epukiro and Otjinene constituencies. This constituencies were selected due to presentence of heavy and highest bush densities among the eastern communal areas of Namibia in the Omaheke region; which is accounted for 8119 and 7,735 bushes per ha respectively. This project will benefit about half of 3000 household of both constituencies. That is estimated the household population is about 1400 and 1600 for Epukiro and Otjinene constituencies respectively; ***which represent about 10% of Omaheke region total population.***

Economic benefits of the project can be broadly categorized into two types: reductions in potential losses of agricultural produces or assets (e.g. livestock or built structure) imposed by additional climate risks; and enhanced/diversified income opportunities especially for the marginalised group that includes women and youth farmers.
Within the context of the proposed AF project, farmers in Namibia have historically faced economic losses primarily in the form of crop losses due to climate anomaly during the cultivation or due to post-harvest losses, livestock losses (or its productivity) due to higher

bush encroachment and fodder, and losses of crop, livestock and infrastructure. Presently, losses from these shocks are unexpected and extremely difficult to buffer for most vulnerable farmers due to multiple factors as described in the Underlying Causes section. A suit of interventions proposed in the project will equip them with a range of options that increase their resilience to and reduce potential losses from such shocks.

Expected social benefits from the project are multiple and interrelated with economic and environmental benefits that will be brought about by the project. Most importantly, a dedicated Component focusing on increasing resilience to climate change through better irrigation farming system that include introduction of technology and for the second site better range land management on the existing source of livelihood. It is important to note that Namibian farmers are already highly vulnerable to the current climate variability, let alone the future climate variability which are predicted to be larger.

It is also important to take note that natural disasters not only destroy economic assets but also impact social cohesions as the lack of economic viability accelerates outgoing migration trends in search for income earning opportunities. Climate risk information dissemination network as well as heightened awareness that will be strengthened with the AF resources, will also increase the preparedness of vulnerable communities.

Table 10: Benefits, baseline and project impact

Type of Benefits	Baseline	After the project
Social Benefits	Existing water resource management practices do not consider equality issues and buffer capacities for times of drought or flood	Better social cohesion and community cooperation through climate-sensitive water resource management
	Prevalence of diseases in times of drought or flood, due to pollution of limited water resources	Health benefits through improved access to safe water sources and reduction of water-borne diseases
	Due to climate change (evaporation, heat wove & forest) for crop farmers; whereas due to high bush encroachment for livestock stock high economic loss and food security compromised.	Improved social wellbeing, through improved income that contributes to poverty reduction and food security
	Limited awareness of climate change-related impacts, emerging risk patterns and appropriate no-regrets adaptation options	Better enhancement of community networking and information sharing on climate change adaptation capacity for disseminating

Type of Benefits	Baseline	After the project
	Reactive nature to hydro-meteorological hazards which increases the potential need for costly humanitarian relief and subsequent high social inequality	and interpreting early warning information to mitigate the risks of such hazards Abated economic and human losses from increasing and intensifying incidents of climate-induced disasters
Economic Benefits	Induced risks for small-scale irrigation crop farmers: as a result of heat waves crops are desiccating, leading to lowered yield and eventually to economic losses, and food insecurity(for Summer crops) Winter crops: experiencing frequent frosts, also leading to lowered yields and economic losses and food insecurity. The use of flood irrigation is associated with high evaporation, reducing crop water use efficiency Experiencing high bush encroachment and this is causing a decline in pasture production. Thus lowered carrying capacity for cattle production, consequently leading to income losses and food insecurity. Frequent droughts reduce soil cover by grasses and herbs which otherwise protect the soil from erosion. This increases vulnerability of ecosystem services (e.g. nutrient recycling, etc. and cause a decline in perennial component of pasture	Crop farmers will increase their income from better adaptation to climate change; thus will improve standard of life rural community and will have better food security. Livestock farmers will increase their income from improved rangeland carrying capacity; thus will improve standard of life rural community and will have better food security Value addition of from debushing will provide additional income that contribute to the better standard of life
Environmental benefits	Land and soil degradation due to reduced plant cover (and soil organic matter) - Low plant cover due	Better irrigation management will conserve water and reforestation will improve soil fertility, retain moisture, and

Type of Benefits	Baseline	After the project
	to insufficient growth - Reduced carrying capacity for livestock production - Increased erosion - Dune activation - Lowered crop and pasture production All these will result in a general condition of desertification and increased vulnerability	restore ecosystem resilience and protective ecosystem services - Improved runoff management and infiltration of both rangelands and arable areas will reduce soil erosion and land degradation - Carbon sequestration will be increased through reforestation, watershed area conservation, and the establishment of agroforestry systems -Dependency of communities and livestock on fragile and remnant natural resources for fuel wood, construction and fodder will be reduced through

Based on the Environmental and Social Policy of the Adaptation Fund, this project is classified under category C, i.e. the implementation of the project adaptation activities will not be causing any environmental and social harm. Furthermore, the project sites have been selected on existing land use practices which are to be improved with adaptation measures and options, thus no land use change is likely to occur due to the project activities.

5.1 Benefit to women and vulnerable communities

- Historically rural women are constrained by unequal access to productive resources and services and inadequate or inaccessible infrastructure. The limitations rural women face in turn impose huge social, economic, and environmental costs on society as a whole and rural development in particular in Namibia, as a result agricultural productivity lags behind. Thus from this project women and vulnerable communities will benefit from higher access and participation; as the main target of this project will be to women and vulnerable communities.
- Economic empowerment is important as a means of guaranteeing families' secure livelihoods and overall well-being. Women and vulnerable communities' economic empowerment can have a positive impact and interconnected with, their social and political empowerment, through their increased respect, status, and self-confidence and increased decision-making power in households, communities, and institutions. While there is a strong "business case" for addressing women and vulnerable communities' economic empowerment

- This project will enable women and vulnerable communities' greater access to productive resources, and enable greater integration.
- Women are crucial in translating agricultural production into food and nutrition security, and the well-being of, their families, their communities which improve capabilities of the society

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

6. ANALYSIS OF THE COST-EFFECTIVENESS OF THE PROPOSED PROJECT

6.1 Cost effectiveness of decentralized, community-driven resilience vs. top-down relief planning

'Bottom-up' community resilience, as opposed to top-down government planning, is a framework for understanding and managing complex socio-ecological systems such as the ones represented by the proposed target areas. The local resilience approach emphasizes principles of flexibility rather than stability and is based on the premise that resilient local systems are adaptable, flexible, and prepared for change and uncertainty. In contrast, non-resilient systems are prone to irreversible or catastrophic losses, and irreparable economic damage, as presented in Table 6 the possible beneficiaries and actors in the project.
Managing for resilience at the local level realizes the practical opportunities provided by effectively managed ecosystems in supporting the environment and dependent human communities to absorb climatic and economic shocks, regenerate and reorganize so as to maintain key functions, economic prosperity, social well-being and political/social stability: By implementing this project in a community-driven and participatory manner, the impact of the project will contribute to greater abilities of local communities to 'bounce back' from climatic extremes. This, in turn, will reduce dependence on state interventions and humanitarian relief by the central government. Greater community resilience will contribute to greater equality between regions and thereby reduce potential for political/social conflict. In the immediate term, the resilience approach proposed by this project is supporting physiological acclimation by vulnerable ecosystems to climate change, while reducing the magnitude of humanitarian costs associated with rapid ecosystem degradation or collapse. In addition, it facilitates the necessary diversification of dependent communities to alternative food, livestock and income sources. Along these lines, the proposed resilience approach is providing much greater long-term economic benefits than emergency response, disaster relief or retrofitting of critical infrastructure.

The proposed action in this project will be linked to various focal areas. Such as, regional rural development agenda that consider climate long term resieleince of farmers interlinked to the dimension of development, such as social services versus increasing productivity, or subsistence production versus market-oriented production. Rather, it should follow a people-centered and livelihood-oriented approach, based on the specific regional circumstances and needs (see also fig 6).

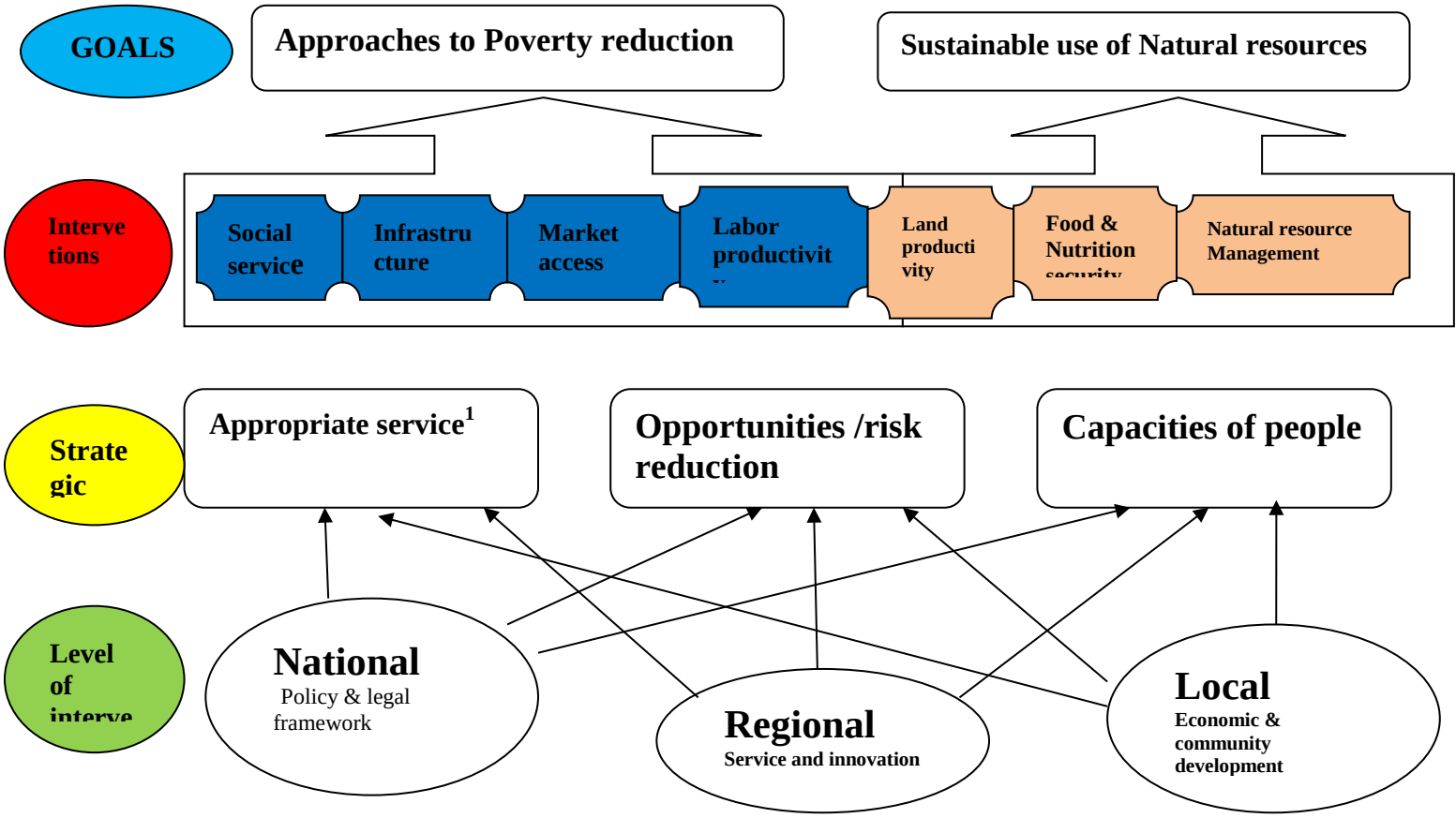

Figure 5: Regional Rural development (RRD) Concept context of climate change relience
Source: Rauch T, Bartels M, Engel A (2001).

Its focus should be on the *region* as the **level of intervention**, but also to get involved in designing *local* level interventions (such as farming systems development and community-level organisational development), with proper *national* level interventions (e.g. decentralisation policy or land legislation) (see also fig 6).

Why Regional?

- to ensure solutions with regard to the natural and the socio-cultural and environmental conflict;
- to establish target group specific accessible support and service systems with successful coping strategies to adopt risk;
- to link national (sector) programmes with local needs;

- to provide sufficient flexibility that can ensure effective participation of communities in the design and implementation of regional programmes;
- to provide a forum where regional or local communities can interrelate with government;
- to ensure that programmes are designed with due consideration of the wider spatial context of market systems, service systems and ecological systems and take account of comparative local advantages, economies of scale, replicability, and synergy effects, and are not simply an addition to local action plans.

An alternative to this community resilience & empowerment approach is a sectorally-driven, top-down approach where adaptation resources are allocated to line ministries and departments and a cookie-cutter adaptation planning is made at the central level. This approach is thought to be less desirable for two reasons from the stand point of cost-effectiveness. Firstly is the significantly limited outreach of line departments in Namibia. Secondly, a centrally (or sectorally) driven model is likely to have lower return on investments in the medium- to long-term as the design, locations, and local management structure almost always fail to reflect the needs of local community. The mismatch between the needs and government provision leads to loss of interests among community, lack of ownership, and eventual abandonment of the investments. Although this approach would still contribute to building technical capacity of department staff for, for example, climate resilient water infrastructure design, but due to their limited outreach (compared with NGOs and CBOs), the application and replication potential beyond the project target sites is likely to be significantly limited.

6.2 Cost-effectiveness of different technical options

During preparation of this proposal, a number of alternative options to achieve the same intended Outcome were assessed in terms of, not only costs, but also effectiveness and feasibility. Table blew presents the comparison of proposed interventions against alternatives that can be considered.

Table 11: summary of comparison for cost effectiveness

Adaptation Objective	Proposed Measures	Comparison with Alternative(s)
Enhancement of crop farmers' adaptive capacity to temperature variability	Introduction of shade net	Continuously irrigate to protect heat wave, which is already water consuming strategy For frost using smoke or fire around the field, which cause fire accident and contributing to burring wood that create pressure on the resources
Introduction of technical	Improvement crop	*Terraced Irrigation:* this is a

good crop production management systems and introduction of efficient irrigation technology systems	management (that include plant density by optimizing plant population and row spacing); and introduce drought-tolerant crop varieties. And also introduction water saving drip irrigation with solar pumping system	very labor- intensive method of irrigation where the land is cut into steps and supported by retaining walls. The flat areas are used for planting and the idea is that the water flows down each step, while watering each plot. This allows steep land to be used for planting crops *Sprinkler System*: this is an irrigation system based on overhead sprinklers, sprays or guns, installed on permanent risers. The system buried underground and the sprinklers rise up when water pressure rises *Rotary Systems*: this method of irrigation is best suited for larger areas, for the sprinklers can reach distances of up to 100 feet. *Center Pivot Irrigation*: this is a form of overhead irrigation. Steel or aluminium pipes are joined together, supported by trusses, mounted on wheeled towers. The sprinklers are situated on the length of the tower and they move in a circular motion The above theoretically impossible. 1) prohibitive cost (multiple amount of the proposed AF project budget); 2) technology which is difficult to operate and maintain by local communities; and 3) high operational costs to run the diesel pumping station; and 4) all of the above alternative not save water and energy at all
Improving carrying capacity for open rangeland livestock farming, by reducing bush encroachment on grazing	Bush thinning and re-seeding of grazing areas 1.1 Apply selective de-bushing	1.4 Feedlot operation is not possible with the Namibia stressed with water and feed

areas, and carry out pasture re-seeding with both annual and perennial grass species	1.2 Apply methods for rangeland resting 1.3 Sustainable Production of charcoal as source of additional income	requirement, which required to be purchased as imported commodities to Namibia farmers. The initial investment cost and operational cost also very high

6.3 Increasing cost effectiveness through community contributions:

Cost-effectiveness of the proposed adaptive investments can also be considered to enhancement of community adaptation, through community contributions (which also have a positive side effect of stronger ownership and sustainability). That could be communities contribute in terms of voluntary labor and in kind contributions in site selection, planting and patching, mulching, irrigation construction, boundary demarcation and weeding.

6.4 Cost-effectiveness in day-to-day project operations:

Operational cost effectiveness of the proposed AF project is further enhancement through the following characteristics:

1) Throughout the project, AF resources will be aligned with the financing and delivery of project Outputs that have competitive procurement components to ensure cost effectiveness;

2) During the project preparation phase, the project will make an active effort to mobilize co-financing from different sources, which is expected to diversify financial risks and increase financial flexibility.

3) A number of project activities will involve local communities and connect directly to local opportunities for the purchase of goods and services.

D. Describe how the project / programme 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 programmes of action, or other relevant instruments, where they exist.

7. CONSISTENCY WITH SUSTAINABLE DEVELOPMENT OBJECTIVES OF NAMIBIA

The fourth National Development Plan indicated the overall objective is high economic growth, employment creation and increased income equality. As a result agriculture, tourism, manufacturing and logistic identified as priority area. Therefore, this project aligns with the national plans and priorities very well.

The climate change vulnerability assessment and adaptation assessment report by MET has prioritised four key sectors that are important and highly vulnerable to Namibia's economy and development sectors, these include: agriculture, tourism, health and water (VA report). The project addresses agriculture as a vulnerable sector to climate change and variability. Both livestock and crop production systems are very vulnerable and support about 70% of Namibia's population MET, 2011).

The proposed project is fully aligned with the implementation of national policies and programmes that will assist Namibia to meet its obligations under the UNFCCC. Along these lines, it is based on findings from **1st, 2nd and 3rd National Communication to the UNFCCC**, which recommends adaptation measures for the agriculture sector including the use of high-quality, heat stress-tolerant plant varieties suited to local climatic conditions; adjustment of agricultural cropping systems to achieve greater diversification, multiple cropping, inter-cropping and mixed-cropping patterns; improved water management measures, such as water-saving, optimized fertilization, deep fertilization, flood prevention and control of soil erosion; and improvement of genetic strains of crops to adapt to climate change.

As indicate on the Ministry of Environment and Tourism (2013-2020) "Climate Change Strategy and Action Plan" Indicated that Namibia climate change strategy is divided into three aspects namely ***Adaptation, Mitigation and Cross-cutting issues for adaptation and mitigation***. Adaptation is to address through three thematic areas: (i) food security and sustainable resource base, (ii) sustainable water resources, human health and (iii) well-being and infrastructure, while sustainable energy and low-carbon development and transport will address the aspect of mitigation. Cross-cutting issues will be addressed by the following themes: capacity building, training and institutional strengthening, research and information needs, public awareness, participation and access to information, disaster reduction and risk management, financial, resource mobilisation and management, international cooperation, networking and technology development; and transfer and legislative development.

Adaptation

i. Food security and sustainable resource base

In particular, the poor and vulnerable, especially women and children will be severely affected. Therefore, under the theme of food security and sustainable resource base, the following strategic aims shall be undertaken:-

Agriculture

- Development of climate resilient cropping/ agriculture / production systems
- Development of climate resilient crop varieties / cultivars
- Diversification of agriculture and livelihoods
- Development of climate resilient livestock breeds
- Adaptation against drought

Forestry

- Conservation, utilisation and sustainable development of forest resources

Fisheries and aquaculture

- Conservation, utilisation and sustainable development of fisheries and aquaculture (incl. marine and freshwater aquaculture)

Coastal zone

- Conservation, utilisation and sustainable development of the coastal zone and its resources

Biodiversity and ecosystems

- Conservation, utilisation and development of biological resources and maintenance of ecosystems to ensure environmental sustainability

ii. Sustainable water resources

The Climate change strategy will therefore undertake the following with regards to water resources:-

- Conserve and manage watershed / catchment areas
- Promote integrated development and management of water resources
- Promote conservation and sustainable utilisation of water resources
- Improve trans-boundary cooperation regarding water resources
- Support institutional and human capacity building in water resources management and use

iii. Human health and wellbeing

Poor sanitary conditions due to predicted floods in some areas as well as malnutrition due to reduced crop yields and reduced livestock productivity will increase child mortality. Therefore, the strategy will therefore address the following:-

- Adaptation to climate change related health risks
- Assessment of impacts of climate change on human health and well being
- Expansion of health facilities and network to remote areas
- Improve capture, management, storage and dissemination of health information
- Improve access to sanitation and water
- Increase human resources capacity and improve efficiency
- Support action plans against HIV/AIDS

Cross cutting issue for adaptation and mitigation

i. Strengthening institutional capacity

Building human and institutional capacity to address climate change must be a fundamental component of the Namibia climate change strategy; state that lack of competent technical experts poses a serious capacity bottleneck in specialized fields and climate change is such one field. Hence the strategy will:-

- Strengthen human resource capacity building for climate change
- Main-stream climate change in national, local and sector policies, development plans & program
- Strengthen institutional capacity for climate change management

- Mainstream climate change in the media
- Develop and implement educational program on climate change and its impacts
- Promote and facilitate development of educational materials on climate change
- Facilitate and support training of scientific, technical and managerial personnel in climate change
- Develop disaster risk reduction capacity building plans and programmes for climate change.
- Establish Climate Change Resource Centre and Climate Change database

ii. Research and information needs

There is need to undertake research especially in order to quantify the likely impacts and development of practical solutions for adaptation and mitigation.

- Collect data and model climate change an national, regional & local levels
- Monitor ecosystem and biodiversity changes and their impacts
- Conduct climate-proof research
- Undertake research on sea level rise
- Establish a centre for research and training on climate change
- Conduct inventories on traditional / indigenous knowledge and coping practices
- Undertake studies on the cost of adaptation and mitigation
- Study macroeconomic and sectoral impacts of climate change

iii. Public awareness, participation and access to information

knowledge-based economy and technology driven nation' was included in NDP4. In order to effectively address adaptation and mitigation, the public needs to be aware and have access to accurate, up-to-date information in order for them to effectively participate in climate change issues. The strategy therefore will undertake the following:-

- Awareness raising and public education on climate change
- Promote and facilitate development of public awareness materials on climate change
- Facilitate access of climate change information to the public
- Promote public participation in addressing climate change and development of adequate responses

The Government acknowledge that there is a need through the project, to break down existing barriers to adaptation, including: 1) lack of information at all levels, awareness, required skill and its management of climate risks, 2) weakness at local and national capacities to develop climate change strategies and adaptation measures and its dissemination and replication mechanisms, 3) poverty and the lack of resources to invest in soil and water preserving assets at the community and household levels that can improve livelihood of the community, 4) lack of alternatives to short-term and sustainable coping strategies, and, 5) institutional fragmentation which resulted to poor coherent strategy and projects that are complementary

As a result the "***Namibian Climate Change Strategy and Action Plan"*** developed as a tool to guide to tackle to the above mentioned challenges. Thus this project shows clearly that the proposed project components and activities are consistent with the government national and sectoral strategies related to climate change for ***Adaptation, Mitigation and Cross-cutting issues for adaptation and mitigation***. That includes component 1 (enhancement of crop farmers' adaptive capacity to temperature variability), component 2 (technical good crop production management systems and introduction of efficient irrigation technology systems), component 3 (bush thinning and re-seeding of grazing areas) and component 4 (knowledge and skills management) contribute directly to the "***Namibian Climate Change Strategy and Action Plan;*** as presents below self-explanatory graphic demonstration (Figure 7).

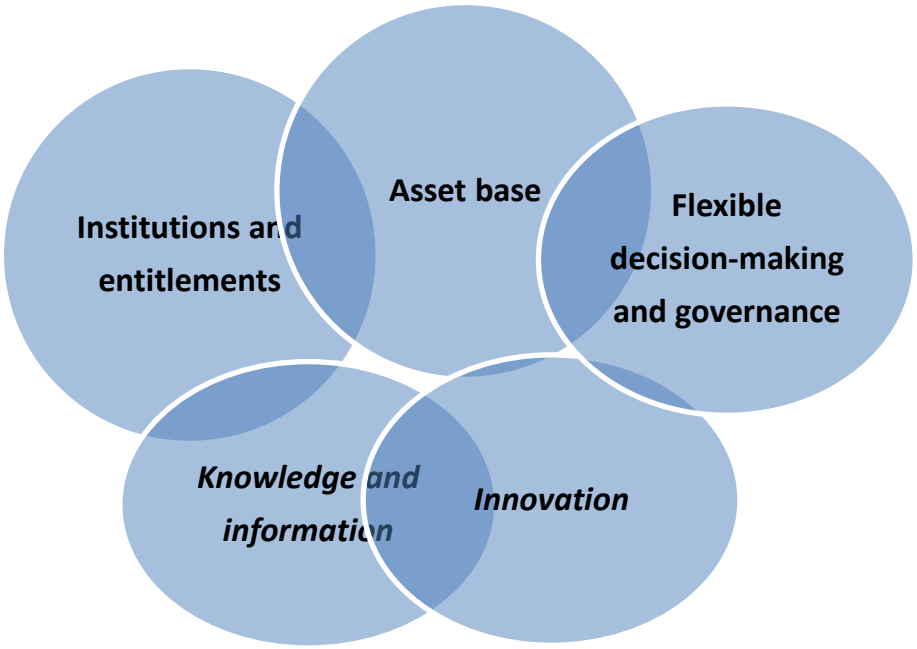

Figure 6: Graphical demonstration adaptation reasoning

E. Describe how the project / programme meet relevant national technical standards, where applicable.

8. NATIONAL TECHNICAL STANDARDS

The Project activities will be carried out in compliance with national standards. The proposed interventions will adhere to national technical standards that are in force, particularly related to the operation and value addition. Through its training activities aimed at technical services the project will promote the knowledge and understanding of such standards. The following legal and policy framework will be complied with:

- ***Environmental Management Act no 7 of 2007:*** the scale of the project and associated impacts are small scale in nature would not have significant impacts on people and the environment. There would no land clearing as production systems

will be integrated in the existing landscape of the project sites. Debushing activities will follow acceptable standards in line with the Forest and Fire Management Policy of the Directorate of Forestry (MAWF)

- ***Water Resource Management Act no 2004:*** The project would not require the drilling new boreholes for the abstraction of ground water. Existing high yield boreholes will be utilised. The volumes of water to be used will be minimal as efficient water use technology will be employed. Therefore, environmental impact will not be required.

- ***Soil Conservation Act 76 of 1969:*** Soil pollution will be minimised as organic fertilisers (chicken manure) will be applied. The layout of the production system create the conducive micro climate for crop growth through the use of natural and fruit trees as wind breaks and thereby prevent wind erosion. This is aligned with the requirement of the Act.

- ***Agricultural Pesticide Act 3 of 1973:*** Approved pesticide will be used in line with the requirement of the Namibian Agronomic Board.

- ***Forest Act 12 of 2001:*** The project will not cut down tree and will indeed conserve protected tree such as *Acacia erioloba* and *Bosciaalbitrunca* that occur in the project area.

- ***Communal Land Reform Act 2002:*** the selection of project sites where done in consultation with local communities and traditional authorities. The latter are the custodians of the communal land and have jurisdiction over the use and allocation of land.

- ***The Health Act, 1977 (Act 63 of 1977):*** regulations promulgated under the Act govern, among others, the hygiene aspects of food premises and the transport of produce. Training and skills development intervention will ensure occupational health and safety standards of the workplace (project site).

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

9. SYNERGIES AND COMPLEMENTARITIES AMONGST VARIOUS INITIATIVES

At present, there is no other project which focuses on adaptation actions to projected risks and impacts as a result of climate change in the selected communities. Further there is no single initiative that is focusing on an integrated farming, ecosystems-based approach to reduce the vulnerability of local farmers. Thus while this project will benefit from a number of synergies and complementary actions, it is the only one in the proposed sites that will implement a range of adaptation actions that directly responds to the recent V&A assessments and deals with the selected options.

The Ministry of Agriculture, Water and Forestry, Directorate of Extension and Engineering Services launched a project entitled “Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development” in Namibia Funded by the Ministry of Agriculture Water & Forestry, the project **technical specifications includes:**

1. Integrated production and protection management techniques
2. Micro-garden system
3. Micro-irrigation techniques
4. Cultivation of improved and adapted varieties

With ultimate goal of the project contribution to food security by improving access to high quality fresh horticulture produce at household level all year round; and also promote employment and income for the less endowed population in the Urban and Peri-Urban environment. In addition to this project is aiming at:

1. Efficient water usage less insects and disease
2. Require little physical effort, weak/old and young can do it
3. Require limited space

This project complement very well with this proposed project in that technologies and practices can be shared. The Urban and Peri-Urban agriculture project looks mainly at water-saving technologies but has little focus on climate change, rainfall variability and increased temperatures. The proposed project will complement this aspect in future upscaling of lessons learned and further implementation.

Another initiative of government under the MAWF is encouraging the development of irrigation based agronomic production in Namibia (known as Green Scheme) with the aim of increasing the contribution of agriculture to the country's Gross Domestic Product and to simultaneously achieve the social development and upliftment of communities located within suitable irrigation areas, and to also promote the human resources and skills development within the irrigation sub-sector to possibly enhance cross-border investment and facilitate the exchange of relevant and limited resources with neighbouring countries. That is, to create a commercially viable environment through effective public-private partnership, stimulate private investment in the irrigation sub-sector and settle small-scale commercial irrigation farmers who would then gain valuable practical training on irrigation and start own small-scale irrigation projects in the vicinity of the large-scale Green Schemes. The proposed project will extend lessons learned to this already established small-scale irrigation farmers to improve production and climate adaptability.

Another bigger and multi-sectorial five year project (2008-2012) initiative known as Country Pilot Partnership for Integrated Sustainable Land Management (CPP-ISLM) is worked towards combating land degradation by using integrated cross-sectoral approaches, which would enable Namibia to ensure environmental sustainability as well as the protection of dry land ecosystems and their functions.

The CPP-ISLM is a partnership programme between eight Ministries, namely the Ministry of Environment and Tourism; Ministry of Agriculture, Water and Forestry; Ministry of Lands

and Resettlement; Ministry of Regional And Local Government And Housing and Rural Development; Ministry of Mines and Energy; Ministry of Finance, Ministry of Fisheries and Marine Resources; and the National Planning Commission. The implementing partners include, the Global Environment Facility (GEF), United Nations Development Programme, the European Union (EU), German Technical Cooperation (GIZ), Non- Governmental Organisation communities such as the Namibia Nature Foundation (NNF), are all aimed at overcoming barriers to combating Land degradation and its effects. These programmes incorporate projects on community-based rangeland management which introduce rotational grazing and pasture management – of which these are being implemented in Kunene region (Otjitjekua), Omusati and Ohangwena regions. Several debushing and charcoal production activities are being undertaken by the freehold farmers adjacent to the Otjinene and Epukiro constituencies in Omaheke region. However, no debushing activities have taken place in the Otjinene and Epukiro constituencies – despite the massive bush encroachment that has reduced rangeland productivity.

The Innovative Grants Mechanism (IGM) component was a small-scale pilot investment that financed tangible produce and practical results from the use of natural resources and its products. However, while it included those that contribute to improved land management it did not specifically target nor implemented concrete adaptation measures as proposed in this project. The grant facility supported pilot community-based projects which broadly addressed the following:

- Income generating activities linked to sustainable land management that improves livelihoods through job creation.
- Food security and capacity building in ISLM.
- Activities that promote public-private partnerships in ISLM for sustainable livelihoods and activities that preserve and restore biodiversity in areas under greatest land-use pressure
- Actions improving market access and performance of natural resources and products from improved land management
- Activities that mainstream biodiversity priorities into land use planning and policy-making.

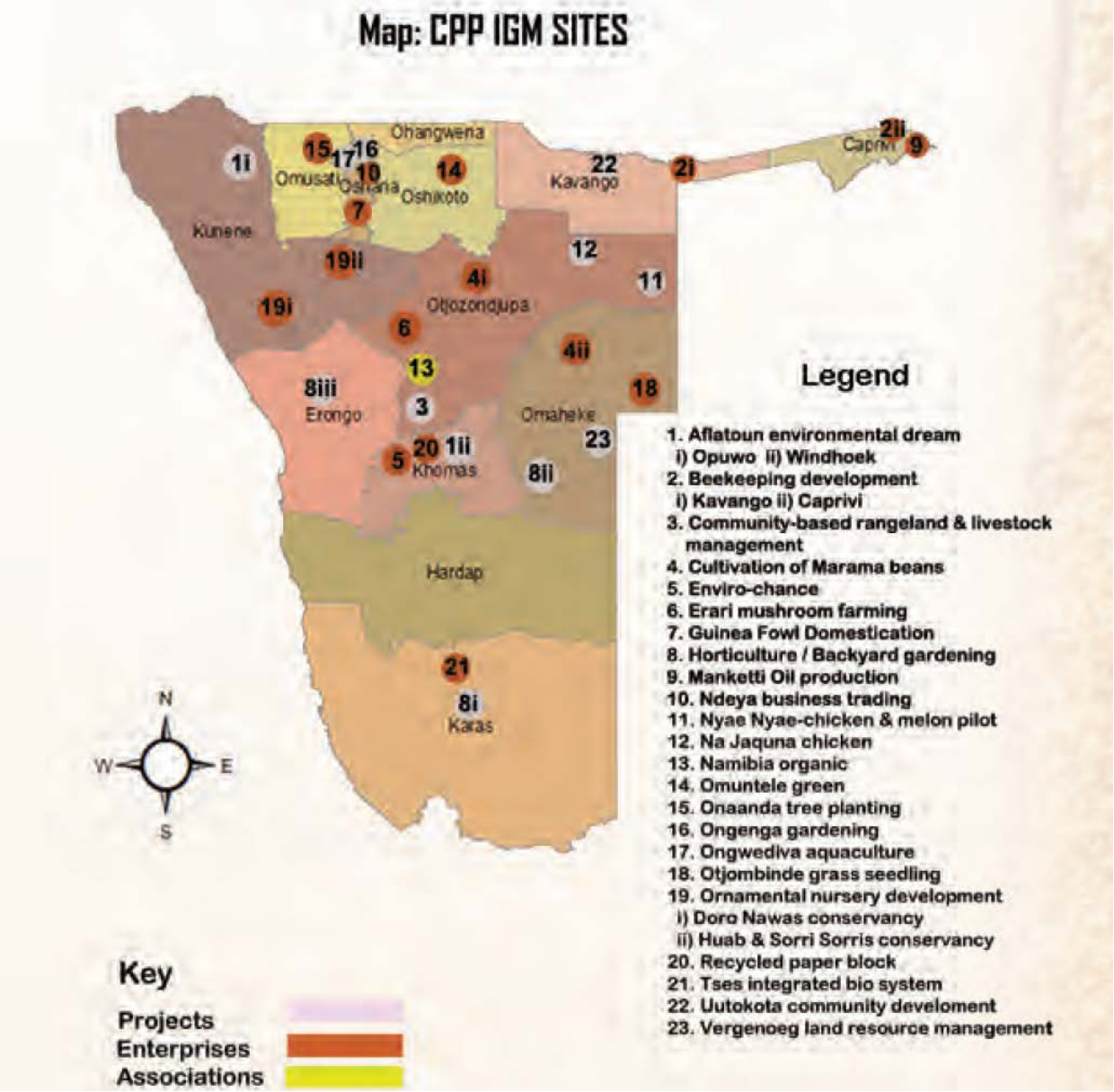

Figure 7 Similar Country Pilot Partnership for Integrated Sustainable Land Management (CPP-ISLM) project in Namibia

The area of overlap with “Urban and Peri-Urban Horticulture Development” of MAWF will be very similar; however, this project is focusing on rural community to enhance climate resilience, which will make the two complementary in nature. In these two regions there is no such project initiative’s at all so far. The CPP-ISLM project will be used as best model for project design for lessen to be learned from the reports of CPP-ISLM and also visiting the existing projects that will enable this project to coordinate the implementation of this project with the above existing, for example during training the use the successful farmers to demonstrate their experience and also with regards to project management.

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

10. ADAPTIVE LEARNING, LESSON APPLICATION AND CUMULATIVE LEARNING

- **Technical Reports:** The report will include the economic, social and environmental benefit of the project. The process followed to implement the project that may include planning, organizing, coordination of the project and controlling process followed. All best practices having significant impact on Technical report, summarising all the technical processes followed in implementation of the activity, its cost economics and impact on the communities.
- **Pamphlet:** Pamphlet is also among the dissemination strategies for the lessons learned on this project
- **Regional workshops:** there are number of annual regional workshops in Namibia, that includes farmers day, Ongwediva trade fair and Windhoek Trade fair will be among the platform to disseminate lessons learned
- **Publications:** the following different publication strategies would also use to disseminate information
    - Magazine and Newsletters
    - Scientific publications
    - Conference proceedings
- **Mass media (radio services) :** one of effective information dissemination strategies will be radio as it is used widely in Namibia
- **Facebook, WhatsApp and twitter:** for wider dissemination strategies also social medias will be also applied. These are useful towards the youth generation who directly liaise with the older generation in provision of updated information.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation

11. STAKEHOLDERS ENGAGEMENT AND INVOLVEMENT

The project interventions and sites were selected based on a number of innovative elements of Namibia's participatory planning processes. That commenced with the elaboration and formulation of the policy on climate change adopted in 2011, followed with in-depth stakeholder engagements and involvement in the development of the national climate change strategy and action plan adopted in 2014; which were then followed by detailed V&A assessments in preparation for Namibia's third national communication. The NCC Strategy and Action Plan offer a comprehensive national framework for Namibia to climate proof different economic sectors and the livelihoods of all individuals. The development of the National Climate Change Strategy and Action Plan is therefore a result of a multi-pronged consultative and interactive process involving national, regional and local stakeholders. The Ministry of Environment and Tourism (MET) led the first two phases: namely the consultative meeting involving stakeholders at national, regional, and

local levels, and the final validation meetings which were clustered in specific geographical regions. To ensure sustainability of the information, strategies and processes followed, due diligence was ensured by the members of the Namibian National Climate Change Committee (NCCC), a multisectoral platform that includes private, public and civic organisations. They ultimately ensured that the policy, strategy and V&A assessments were aligned to the major national development processes. The NCCC also ensured that the global and regional climate change impacts were considered within the nationally-led processes.

Following on such elaborate processes, the sector (agriculture) which is the focus of the interventions was carefully selected from the direct inputs of the Omaheke and Omusati regional and local stakeholders as contributions to the policy and strategy development process. To ensure that there is direct buy-in and current socio economic local data, a refinement process is proposed to help with the selection of beneficiary on the ground. This is more to ensure that the proposed beneficiaries are ground truthed and that the stakeholders have another opportunity to refine the project interventions. This will be finalised during the PFG implementation.

The Desert Research Foundation of Namibia (DRFN) which is accredited as the National Implementing Entity (NIE) for Namibia by the Adaptation Fund; has been a critical facilitator in this process functioning in close partnership with the Ministry of Environment and Tourism, which is the Designated Authority of the AF. A number of participatory meetings which were aimed at developing and refining the concept took place.

In summary, the development of this project started in 2011 (climate change policy) and intensive interactive consultations took place over a period of five years, the latter include the specific elaboration of this project, and consisted a great variety, diverse and multiple numbers of stakeholders in the country. These included government ministries, agencies, Members of Parliament, Non-Governmental Organisations (NGOs), IGOs, private sector representatives, regional councils, local authorities; Community based Organisations (CBOs) and other civil/civic society organisations. The inputs gathered during those consultations form the basis of the project. A final round of consultations is foreseen during the PFG (in 2016) phase which is not only necessary but also very ideal so as to avoid an extended time lag between the on-site stakeholders and beneficiaries and project implementation. This round will also include a very important project element to verify and validate the social and environmental risks and impacts in accordance with the eight performance standards of international funding institutions.

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

12. ADAPTATION FUNDING JUSTIFICATION

12.1 Component 1: Enhancement of crop farmers' adaptive capacity to temperature variability

Baseline situation:

The proposed project (Component: Small-scale Irrigation farmers) builds on the capacity provided by the Green Scheme to small-scale farmers. The Green Scheme Policy of 2008 makes provision for inclusion of "small-scale farmers (SSFs) on irrigation land developed by the State". The Green Schemes are contracted to private entities (service providers) that are contractually obliged to provide capacity to the small-scale irrigation farmers. The Green Scheme Policy makes the following pronouncements:

Service provision to the small-scale farmers

According to the Green Scheme Policy of 2008, "under this arrangement, the service provider is obliged to provide services to the small-scale farmers." According to Article 5 of the contract agreement between the Ministry and the service providers, "the services provided in terms of irrigation water and mechanisation services shall be charged at a cost only tariff as agreed upon between the service provider and the Project Steering Committee. Charges on input materials, including but not limited to seed, fertilizers and pesticides, shall be at a cost price plus a 5% handling fee (cost price to include transportation costs to the project). The service provider shall purchase on behalf of the project agricultural produce from the S/MSFs at the market price prevailing at farm gate, as announced by the Agronomic Board of Namibia, less 5%".

Government assistance to small-scale farmers

According to the Green Scheme Policy of 2008, "the small-scale farmers who excelled in Farming in the State agro projects at the expiry of their contracts will be assisted and supported to acquire their own land for farming. Such farmers who qualify will be assisted in accessing finance for agricultural inputs, marketing, plant, and machinery."

The Small-scale farmers should migrate elsewhere once their capacity is built. However, the government has this far not provided land to SSFs who are performing well.

SSFs are experiencing none climate induced challenges listed below:

Sharing of farm implements, machinery and equipment between the commercial and the SSFs components as well as with the other projects in the surrounding areas;

- Old implements and equipment;
- Lack of spare parts for the implements in the local market;

- Distance to the market;
- Delay of input materials by the suppliers;
- Lack of cold and packing/ storage facilities at the projects and
- Unfavourable environmental and climate conditions.

The climate induced risks that includes, unfavourable environmental and climate conditions are manifested by high temperatures, heat waves, increased rainfall variability, flash floods and crop pests – all which makes crop production highly vulnerable and thus threatening livelihoods.

Adaptation alternative:

Introduction of use of shade-cloth has been for reducing greenhouse temperatures in the summer and in nurseries producing shade loving ornamentals. Very little work has been done with shade-cloth for field production of vegetables in Namibia.

12.2 Component 2: technical good crop production management systems and introduction of efficient irrigation technology systems

Baseline situation:

Ministry of Environment and Tourism (2014) chapter for Namibia's 3rd UNFCCC report has highlighted the key risk factors for the 2014 growing season as follows:
(1) Potential dry spells can affect agricultural production;
(2) Increasing food prices can put pressure on vulnerable groups relying heavily on food markets; and
(3) Seasonal water scarcity during the dry season can pose a serious health risk.
The baseline situation in Namibia is characterized by a climate-induced pressure on natural resources, which in turn leads to unsustainable agricultural practices and environmental degradation. The effects of dry spells, drought and erosion push many poor farmers into ecologically sensitive areas, where they apply unsustainable agricultural practices to survive and make at least short-term economic gains.

Adaptation alternative:
After the project, the most vulnerable farmers will have access to additional adaptation options which will diversify their livelihood assets and increase long-term resilience from climate-induced shocks and stresses. Farmers will have access to the tools and know-how for conservation agriculture, efficient post-harvest processing and storage techniques to ensure safe handling and storage of agricultural produce during extreme climate events (droughts, floods, rains), and diversification of livestock production to buffer the effects of flooding and drought. These measures will be implemented on the basis of participatory assessments and community-based experimentation, ensuring that they correspond with communal priorities and capacities. The impact of the improved access to drought-resilient seed varieties through establishment of community-based seed banks and demonstration plots is likely to be reinforced with available climate risk information that is promotion.

12.3 Component 3: Bush thinning and re-seeding of grazing areas

Baseline situation:

This component will focus on **Otjinene and Epukiro constituencies, Omaheke region,** that to deal with Rangeland Management and Bush Encroachment Forum promotes de-bushing and the re-establishment of a Savanna ecosystem (landscape). Several commercial farmers on Namibia's freehold lands have started with selective de-bushing which has led to increased grass production, higher species diversity and abundant soil surface cover. For better management of pasture regrowth, rotational grazing plays an important part. There is however, no such project implemented in communal areas of Namibia, where the land use is shared by multiple households in villages.

In the Omaheke region, particularly the Otjinene and Epukiro constituencies, the majority of farmers have fenced off parcels of land and graze inside and outside these parcels but with no particular attention to managing the soil cover and productivity, and grazing species diversity.

Adaptation alternative:

The **De-bushing and soil cover management component**, will de-bush selectively, enhance soil cover and pasture species diversity, thus re-establishing a Savanna ecosystem that is productive to livestock farmers, furthermore, value addition from wood and charcoal production.

12.4 Component 4: Knowledge and skills management

Baseline situation:

Irrigation, crop and rangeland management among the farmers that integrate climate change issue is not well established in Namibia, which require a lot of work to be done around capacity building with reliable information data collection, analysis and interpret further is the lacking component in Namibia farming community or role players which require strengthening.

Early Warning system is envisaged by the government to alert the population under threat of an imminent disaster in not yet sufficient lead time to undertake protective actions. Furthermore, the system requires the following components to work together: (1) Hazard monitoring and detection; (2) Issuance of warning signals; (3) Multi-level dissemination of risk and warning signals; and (4) Preparedness at the local level to interpret warning signals and take timely and appropriate actions. In this chain, the effective and efficient dissemination of hazard information of the local level is especially critical, and a common weakness in many early warning systems. If this part fails, innumerable human and material losses can follow.

Adaptation alternative

This component proposing to enhance the timeliness climate risk information through establishing and strengthening organizational framework. Farming community and role player members will be trained to receive and interpret information.
The second measure to enhance the effective dissemination and use of climate risk information, a Climate Risk Information (CRI) at the project local community will be established. The CRI sub-committee will act as a platform on which government agencies and CBOs/NGOs can efficiently and effectively share climate risk information that are seasonal in nature while they work with their village counterparts of farmer's groups.
These activities will be supplemented by a series of awareness raising and training events targeting farmers themselves so that they are better able to interpret emerging climate risk information whether. The participatory establishment and analysis of climate risk and hazard maps, and the process of updating them along with the project progress, will not only enable to undertake decentralized preparedness and risk mitigation planning.

Additionally, this component facilitates student involvement to conduct research on production management, irrigation management and rangeland management linked to climate change.

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

13. SUSTAINABILITY OF THE PROJECT RESULTS BEYOND PROJECT LIFECYCLE

The project is deemed sustainable in all aspects namely:

- **Financial sustainability**: the project as part of its design includes the development of an exit and sustainability strategy which will build its reputation through evidence of success and as such will attract funding from development partners and especially the government of Namibia. There are also strong income generation and entrepreneurial aspects which will make projects outcomes financially sustainable.
- **Policy level sustainability:** there is an increasing realization that climate and land use change challenges requires a range of local and regional strategies and technological interventions. The proposed project will provide an opportunity to kick-start such an approach, which moves beyond academia (science-based) into a more implementation-based policy-informing process, aimed at the ultimate improvement of livelihood opportunities.
- **Environmental sustainability:** the project looks at water use efficiency and rangeland species diversity. Operations will be sensitive to environmental sustainability. Amongst others the following will be incorporated; Water-use efficiency: low water usage in irrigation system; organic or low pesticide application, the project will make use of solar energy for water pumping; soil fertility management: soil nutrients will be managed to suit crop requirements and analysis of soil chemical and physical properties with a strong focus on the

use of organic matters. The programme also aims at selective debushing will retain indigenous protected trees species; improve soil cover and rangeland and pasture species diversity.

- **Technical sustainability:** Various inputs that are locally available will be sources for most of the projects, which guarantees right quality and quantity outputs, especially focusing on avoiding delays of project implementation and maintenance of systems put in place. There is a high degree of technical soundness of all the projects and as such high production levels are expected, and will not lead to conflicts to local social systems or technology in place. The programme seeks to build on local knowledge.

Institutional sustainability

Financial support

- The existing arrangement to access the finance Agri Bank since January 2007 provide voucher system with a loan, each get about $ 2 000 to $ 10 000 depending on the programme. This loan is from MAWF and given to Agri Bank to manage it; this support expected to continue.
- Agribank continued also to support livestock with regards to stocking and de-stocking of their heard and also to control bush

Support of Government

- The government is assisting with the provision of infrastructures. The center pivots, tractors, trucks and cars are all from the government, via Ministry Agriculture, Water and Forestry (MAWF); in addition to this service provide support small scale farmers with marketing.
- MAWF supporting farmers with extension services and training, this expected to continue;
- With regards to livestock farmers MWAF in collaboration with Ministry of Environment (MET) is already supporting farmers in terms of (i) Resource conserving technologies and management practices for controlling bush sustainably, (ii) supporting community institutions and organisations such WPC; and (iii) enabling external environment, including farmer support services
- MET is supporting farmers' adaptive capacity to climate change by promoting water saving technologies (well rehabilitation and water use efficiency) through the Scaling-up Community Resilience to climate change programme (SCORE),
- MAWF's livestock revolving scheme is focusing on poverty reduction through the implementation and support of livestock schemes that are adaptive to climate change through the Directorate of Agricultural Production, Extension and Engineering Services (DAPEES).

The programme will be geared towards establishing a strong partnership between private, academic and research institutions. The involvement of the final beneficiaries and business communities in the initial stages of the research will be a roadmap towards technology transfer among the sectors. A research agenda which planned on the three pillars: (1) final beneficiaries (technology users); Researchers (technology developers); and (3) policy makers. The involvement of all stakeholders at all levels of the program will ensure gender balance with highest priority given to young women.

PART III: IMPLEMENTATION ARRANGEMENTS

14. ARRANGEMENTS FOR PROJECT/PROGRAMME IMPLEMENTATION

The methodological approach that will be used for the implementation of the proposed action is very critical for the successful implementation of the project. The agreed approach will be discussed with a variety of stakeholders:

The project will work closely in collaboration with institutions involved in crop farming initiatives in the country so as to avoid duplications. Such examples include working with:

- Ministry of Agriculture, Water and Forestry, Directorate of Agricultural Production, Extension and Engineering Services provides services to farmers in the form of advisory and training services; Provision of seeds and implements to small-scale farmers; Contributes to the implementation of effective drought preparedness planning and responsive drought management system; The Directorate also regulates and manages irrigation of crops in the country. In addition, the Directorate of Water Resource Management – deals with environmentally sustainable water use and management for the current and future generations.

- NamWater Corporation which the bulk water supplier of the country and thus will be consulted on irrigation water provision.

- Agro-Marketing and Trade Agency (AMTA) is a specialised Agency of the Ministry of Agriculture, Water and Forestry (MAWF) with a mandate to coordinate and manage the marketing and trading of Agricultural Produce in Namibia. AMTA manages the Fresh Produce Business Hubs (FPBHs) and National Strategic Food Reserve (NSFR) infrastructure, and uses this infrastructure for food storage to ensure food safety and security in Namibia. Thus AMTA encourages surplus crop production.

- Namibia Agronomic Board (NAB) promotes the agronomic industry and facilitates the production, marketing and processing of controlled products in Namibia. The Board also sources funding to enhance small-scale agronomic production and marketing.

- Both the Omusati and Omaheke Regional Councils have an interest in the climate change activities linked to developmental activities taking place in the region.

The project will work closely in collaboration with institutions involved in livestock production and rangeland use farming initiatives in the country so as to avoid duplications. Such examples include working with:

- Ministry of Agriculture, Water and Forestry (MAWF)

- The MAWF established the Namibia Rangeland and Bush Encroachment Forum in 2013 to promote sustainable rangeland management. The Forum is tasked to implement the National Rangeland Policy and Strategy through awareness campaigns and public private partnerships. The National Rangeland Policy and Strategy was approved by the Namibian cabinet in 2012,

- The Directorate of Forestry (DoF) in the MAWF is mandated to promote sustainable use of Namibia's forest resources, and implements this through a number of projects: forest and veld management, community forestry, nurseries and distribution of seedlings. Thus DoF will be a key partner overseeing the debushing process,

- The Directorate of Agricultural Production, Extension and Engineering Services (DAPEES) provides training and extension services to livestock farmers; DAPEES will provide training on rangeland management as part of the extension services delivery,

- The Omaheke Regional Council has an interest in the climate change activities taking place in the region, and collaborates with the Regional Drought Emergency Management Unit under the Omaheke Regional Governor's Office.

In this project proposal will have meticulously considered a number of implementation scenarios, consciously knowing that community projects continue to fail because of challenges associated with the 'prisoner's dilemma' and 'free-rider problems'. Hence it is difficult to sustain newly created organisational set ups with new rules and procedures, to ensure the long-term existence and economic viability of such entities. Our discussions with targeted communities, academics and players in the NGO sector should need to create a "producer cooperative" approach is the most appropriate. In the absence of defined and functional village-based producer cooperatives, the existing active community based committees are the most functional organisations that create rules of governance and manage water infrastructure and finances at the village level.

How the Proposed Action will build on Existing National Programmes

Since 1995 the Government of the Republic of Namibia has embark on community-based programmes to empower rural communities, these are conservancies (focusing on wildlife), community forestry and village water point committees. This proposed action will specifically build on the existing village committees.

Organisational Framework for the Implementation of the Proposed Action

The National Implementing Entity (NIE) is contracted by the Adaptation Fund (AF) to execute the oversight role for projects/programmes funded through the AF. In this role, the NIE plays several roles which include overall project monitoring and evaluation as well as administration of the funds received through the AF. Furthermore the NIE played a critical

role during the development of the proposal through guidance and advice as well as quality assurance of the conceptual and project design. Thoroughly discussions and consultations will be carrying on the previous discussions. .

In the context of lessons learnt from already completed projects by NUST and other partners, as listed below has demonstrated technical, managerial and administrative capacity to complete small and big project.

1. Preventative rangeland management (workpackage of BIOTA): the aim of this project to undertake research and publicise results on strategic trampling, patch burning and eco-friendly parasite control, all applied by farmers; supponsered by BMBF Promotion no.: 01 LC 0624A2 with the projct value of EUR 99608, and its project life 01/01/2007 to 30/04/2010
2. Participatory action research between agriculture students of the NUST and the resettled community at Vasdraai
   The aim of this project was to undertake facilitate small-scale eco-friendly trials by resettled farmers and share the results. Farmers became more aware of the environmental consequences of their actions and learnt alternative approaches, while students and extension workers learnt how to improve their interactions with farmers; know as Country Pilot Partnership Programme (CPPP)-UNDP; project value Euro 12370, and its project life was 20/05/2010 to 23/12/2010
3. Contribute towards improving the livelihood for Emerging Commercail Farmers (ECFs): Eu- Under Namibian Farmers Support Programme; under agribank Namibia on the behalf of Farmer Support programme (GIZ). Aiming at too contribute towards improving the livelihoods for emerging commercial farmers; with project value Euro48 000; and its project life with two phases first phase 01/03/2009 to 31/6/200; and second phase 30/3/2011 to 30/08/2011;
4. Agronomic benchmarks and Timber provision of woodlands (workpackages of The Future Okavango). The aim of this project was to undertake research and publicise results on agronomic benchmarks and timber provision of woodlands; sponsored by BMBF Commission no.: 01 LL 0912 A; with project value Euro200 000; and its project life was 01/09/2010 to 31/08/2015.
5. Southern Africa Agricultural Model Intercomparison and Improvement Project (SAAMIIP): aming at developing the compatible integrated regional assessment of climate change and its impacts, the study area is sub divided into respective regions in the continent so that proper African regional situation strategy of adaptation mechanisms can be adopted; this project involved more than ten research institution in Southern Africa; with project value of $400 000 and its project life cycle was from April 2012 to March 2014; and it was sponsored by US-AID and UK-AID

The **Project Team (PT)** will have the following core staff:

- National Project Manager
- Monitoring and Evaluation Officer (responsible for tracking of results indicators)
- Financial and Administrative Assistant;

- Data Assistant;
- Sector Specialists (agriculture, water engineer, livestock, forestry and soil conservation).

National Project Manager, M&E officer, finance and data assistance will be stationed at project site. Five sector specialists will be stationed in township-based project offices to facilitate smooth local implementation and backstopping of the project.

To assist the PT on technical questions, a **Technical Advisory Group (TAG)** will be formed to provide guidance and advice on technical questions related to water management, soil management, range land management and crop management. Furthermore, will include general agriculture, forestry, food security and risk information/communication. The main objective of the TAG is to identify technical strengths and weaknesses of the project, take stock of available and required technical know-how under different project Components, and provide technical backstopping and quality control throughout the project period. The TAG will include representatives from local farmer organizations and NGOs, technical staff from Government Departments (such as the Department of Meteorology and Hydrology, the Ministry of Agriculture, Water and Forestry), the Livestock Breeding and Veterinary Department), and other UN agencies such as FAO. FAO's involvement in this TAG is especially important.

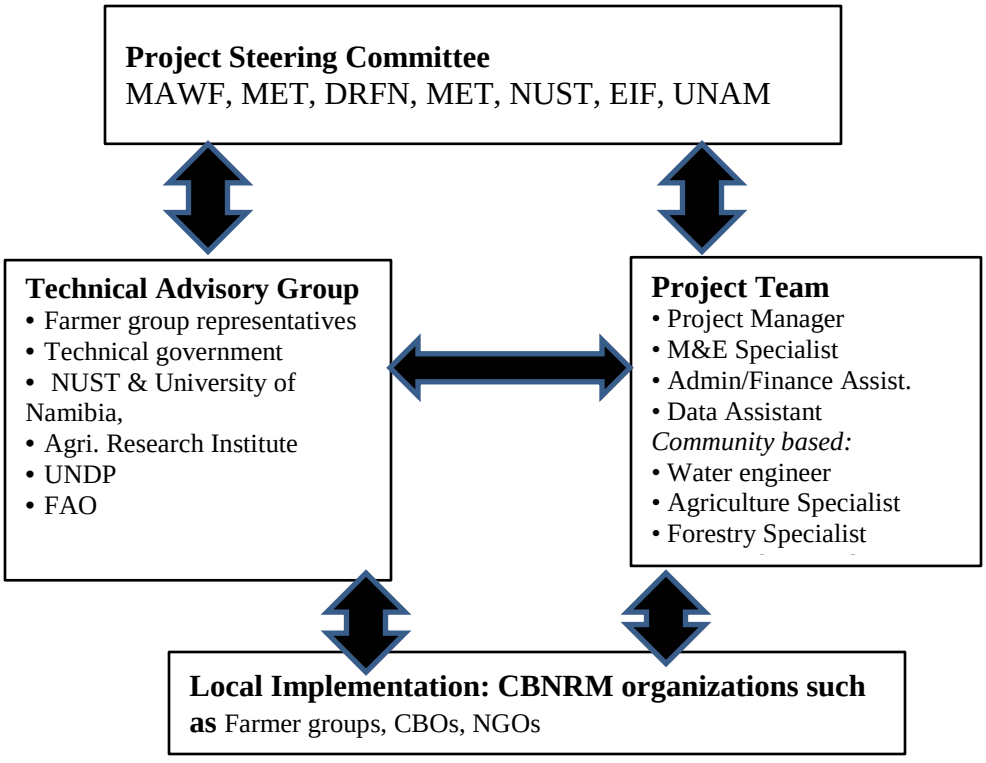

Figure 8: Organogram of the proposed project organization

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

15. DESCRIPTION OF RISK MANAGEMENT

The following risks as well as associated risk management strategy of this AF project that have been prepared; below table present risk analysis and mitigation measures

Table 9: Risk Analysis and proposed Mitigation measures

Risk types	Main risk factors	Mitigation measures
Political	Political interference	The action will be implemented within national goals and priorities thus adhering to national and regional legislative frameworks. Political buy-in would be solicited through component 1 (community mobilisation), in addition to this through the exposure trips and policy briefs.
Delay in project implement ation	External factors may delay project implementation	The project is a high priority of the Government, and will receive support where difficulties are encountered
Socio-economic	Lack of partner buy-in (no commitment / interest from partners beyond the initial phase)	This will be dealt with from the on-set of the initiative through forming strategic partnerships with clear incentives from all involved stakeholders. Cooperation principles will be identified through with institutional procedures and capacity development for the components. The participating parties operate within a signed MoU and hence have already agreed on common vision and collaboration.
	Impractical technology options	Technology is demand based and identified by the users, hence fostering ownership over process. This will be addressed through Component 2.
Physical	Geographical barriers to share S&T data	The establishment of the proposed technology model will be adapted and will from the on-set identify common unifying approaches, while recognising physical (Geographical) elements.
Financial	Failure to achieve financial sustainability by the end of the project. Failure to attract third party funding beyond initial phase	During expansion will address this risk through developing an exit strategy from the beginning of the action. The community water point committees would also add to sustainability of the action.

Human capacity	Lack of proper/ strategic leadership in management team	The Coordinator of the action has vast experiences in dealing with similar actions and as such has appropriate skills at project design, management and implementation levels. Appropriate templates and reporting structures and procedures will be put in place to ensure smooth project management in accordance to project objectives and goals.
	Poor experienced/ qualified staff recruited for the project in later years	It is envisaged that the Initiative participants will also benefit from the comprehensive capacity development programme planned through this initiative hence addressing the staff quality risk, while operating on results based principles would boost the reputation.
	Inadequate trainers	International and local industry experts will be used as resource persons while building capacity in local trainers. The capacity development will appropriate address this risk.
Quality	Compatibility of technology and quality results	Address quality control and assurance issues through ensuring that relevant national stakeholders are involved in the process from the beginning of the programme to facilitate the technology identification and transfer process.

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

16. monitoring and evaluation arrangements

That includes the following different combinations of M&E documents will be used

- **Quarterly report:** Quarterly monitoring reports will be prepared
- **Annual Report:** Annual Report is an extensive key report which is prepared to monitor progress made since project start and in particular for the previous reporting period. This will be assessed by Project Director and would be submitted to project managing board.
- **Periodic field Survey report:** all field survey, visit and demonstrations and any experimental testing will be documented and monitored
- **Mid-term Assessment Report:** The project will conduct mid-term review
- **Terminal Evaluation Report:** Three months prior to completion of the project, an independent

17. Budget for M & E

To enable a rigorous financial and resource planning framework which fully meets the AF standards, the NUST proponents require PFG funds to complete this task, hence the budget for M & E is one of the activities to be done with the PFG.

- **D. Include a results framework for the project proposal, including milestones, targets and indicators**

18. results framework for the project proposal

Project results framework

Table 13: Summary of results framework

Project strategy	Indicator	Baseline	Target	Source of verification	Risk & assumption
The overall project objective is ***to implement priority adaptation actions and practices to strengthen the adaptive capacities and enhance resilience of vulnerable farming systems and communities to climate variability and climate change***	% of households in target site implementing climate change adaptation livelihood measures introduced by the project (crop and livestock farmers' able to increase adaptive capacity to cope with temperature variability)	Current agricultural practices among subsistence farmers are based on historical climatic conditions and trends and are unsuited to increased drought conditions that are becoming increasingly frequent prone to temperature variability	by the end of the project cycle; about 132 small scale irrigation farmers; and 3000 households will benefit from and implement climate-resilient agriculture or livestock practice	Project evaluation and technical reports Field surveys	Climate-resilient farming practices introduced by the project demonstrate large enough difference compared to non-climate-resilient practices
	% of farmers using climate risk information to adjust their livelihood behavior	Currently climate risk information on sudden onset of disasters is delivered only by TV/radio and yet the level of interpretation and response is low. The outreach and understanding of information on slow onset of disasters are even lower.	All households in target, report that they have changed their livelihood behaviour based on climate risk information produced by the project	Periodic field surveys Quarterly and annual project reports	Seasonal climate risk information such as bulletins is produced and disseminated in a timely manner for farmers to adjust their behaviour

	% farmers & students capacities increased to farm manage system will be increased	Currently capacity of farmers to farm management with climate risk the level of interpretation and response is low	All households in target location, report that they have capacitated to interpret climate risk information produced by the project	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening
OUTCOME 1: On average profitability will increase by more than 60% **Core AF's outcome indicators** **Outcome 4:** Increased adaptive capacity within relevant development and natural resource sectors	Number of small scale irrigation farmers reporting increased their profitability	Project targeted site of small scale irrigation farmers profit is very low	Project targeted site of small scale irrigation farmers will increase their profitability by at least 60%	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening
Output 1.1: 600 hectares will be covered with shade nets	Shade net for 600ha infrastructure put in place	There is no shade net among the project site small scale irrigation farmers	600 hectares will be covered with shade nets; that equivalent to 132 farmers beneficiaries	Project evaluation and technical reports Field surveys Project evaluation	Beneficiaries interested to take up the technology and continue to maintain; and also good cooperation among stakeholders

Output 1.2: 132 small scale farmers will be trained on post-harvest ; furthermore will able access to packing, storage and ICT system	Number training facilitated & people attended	There is no training on existing farming system, packing, and storage and ICT systems.	132 small scale and other actors project beneficiaries will be trained	Register record and level of satisfaction feedback report	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening
OUTCOME 2 Increase 132 farmers capacities on crop and irrigation management; furthermore 600 hectares irrigated using efficient irrigation systems; as a result water consumption reduced by 30-40% **Core AF's outcome indicators** **Outcome 4:** Increased adaptive capacity within relevant development and natural resource sectors	Number of small scale irrigation farmers reporting increased their management capacity and also water saved by upto 30-40% from efficient irrigation systems	Project targeted site of small scale irrigation farmers management capacity is very low High water consumption from inappropriate inefficient irrigation systems	Project targeted site of small scale irrigation farmers of 132 management capacity will be increased Water will save by at least 30-40% from efficient irrigation systems	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested in training and willing and capable to absorb and apply training capacity strengthening Beneficiaries interested to take up and maintain efficient irrigation systems
Output 2.1 Strengthening better crop management and irrigation for small scale irrigation farmers	Number of small scale irrigation farmers reporting increased their management capacity	Project targeted site of small scale irrigation farmers management capacity is very low	Project targeted site of small scale irrigation farmers of 132 management capacity will be increased	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested in training and willing and capable to absorb and apply training capacity strengthening

Output 2.2 Water saving efficient drip irrigation introduced to 132 small scale farmers; that covers 600ha	Water saving by about at least 30-40% from efficient irrigation systems	High water consumption from inappropriate inefficient irrigation systems	Water will save by at least 30-40% from efficient irrigation systems	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested to take up and maintain efficient irrigation systems
OUTCOME 3 200 000 hectare de-bushed and re-seeded with grass cover ; estimated about 50% of the population targeted constituencies will benefit (that is about 1500 households) ***Core AF's outcome indicators*** ***Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors***	Size of hectare de-bushed and re-seeding	High density of bush encroached area and low grass growth and species diversity	200 000 hectare land size; that is equivalent to 1500 household beneficiaries	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested to take up bush thinning and maintain grass growth and species diversity
OUTPUT 3.1 Selective bush thinning to allow grass growth and species diversity	Size of hectare de-bushed	High density of bush encroached area	200 000 hectare land size de-bushed; that is equivalent to 1500 household beneficiaries	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested to take up bush thinning and maintain grass growth and species diversity
OUTPUT 3.2 Re-seeding of grazing areas to cover soil with high root biomass and good root biomass with higher species diversity	Size of hectare re-seeding	Low grass growth and species diversity	200 000 hectare land size; that is equivalent to 1500 household beneficiaries	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested to take up re-seeding and maintain grass growth and species diversity

OUTPUT 3.3: production of sustainable production of charcoal as source of additional income	Volume of charcoal/wood produced	There is no/low income from charcoal/wood production	1500 household beneficiaries	Periodic field surveys Quarterly and annual project reports	Beneficiaries interested to take up charcoal/wood production
OUTCOME 4: Timeliness and quality of climate risk information disseminated to farmers enhanced through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-term climate scenario planning; furthermore capacity of farmers and extension officers increased ***Core AF's outcome indicators*** ***Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level***	% of farmers using climate risk information to adjust their livelihood behavior	Currently climate risk information on sudden onset of disasters is delivered only by TV/radio and yet the level of interpretation and response is low. The outreach and understanding of information on slow onset of disasters are even lower.	All households in target, report that they have changed their livelihood behaviour based on climate risk information produced by the project	Periodic field surveys Quarterly and annual project reports	Seasonal climate risk information such as bulletins is produced and disseminated in a timely manner for farmers to adjust their behaviour
OUTPUT 4.1 Community mobilisation climate risk management and preparedness planning	Number of community climate risk communication products in active use by mobilized (farmers and actors, such as authorities, NGOs and CBOs) to improve planning decisions and prioritize investment	No active climate risk mobilization initiative by farmers, authorities, NGOs and CBOs to improve planning decisions and prioritize investment actions			Beneficiaries interested in mobilisation and willing and capable to absorb and apply training capacity strengthening

	actions				
OUTPUT 4.2. Dissemination and strengthened disaster risk management for climate induced risk	Number of climate risk communication products in active use by farmers and actors (authorities, NGOs and CBOs) to improve planning decisions and prioritize investment actions	No active climate risk communication products in active use by farmers and actors (authorities, NGOs and CBOs) to improve planning decisions and prioritize investment actions	Climate hazard maps and risk scenarios are available in each project site Climate hazard maps updated at least twice during the project lifecycle	Field survey in availability and application of hazard maps, use of instruments Local communities report on disaster risk preparedness plan Quarterly and Annual Evaluation Report, project evaluation and technical report	Beneficiaries interested in mobilisation and willing and capable to absorb and apply training capacity strengthening
OUTPUT 4.3 Capacity building to farmers and students related to risk management for climate induced risks	Number of farmers and actors trained related to climate risk management	No training on climate risk hazard related	Regular contact and trustful relationship with communities & stakeholder & Revised guidelines of operational management	Copies of training agenda/manual and copies of publications	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening

19. MILESTONE TIME FRAMEWORK

Table 10: Milestone time framework for the project implementation

		YEAR 1				YEAR 2				YEAR 3			
Component 1	**Enhancement of crop farmers' adaptive capacity to temperature variability**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Inception workshop												
Output 1.1:	**600 hectares will be covered with shade nets**												
Activity 1.1.1	Design and co-finance a simple network of technically and environmentally appropriate and shade net.												
Activity 1.1.2	In consultation irrigation role players or actors, revise/develop good irrigation management system (including a conflict resolution).												
Activity 1.1.3	Organize sessions and trainings targeting on relevant know-how and technological means to manage the system												
Activity 1.1.4	Organize awareness raising events and community members on climate risks, resilient water use, and participatory management of the water systems and irrigation management												
Activity 1.1.5	Production of a technical report on the effectiveness, success and challenges in enhancing sustainability												
Output 1.2:	**training on post-harvest; packing, storage and ICT system**												
Activity 1.2.1	Organize sessions and trainings targeting small scale irrigation on technology and post-harvest handing management												
Activity 1.2.2	Design local made packing and storage facilities												
Activity 1.2.3	Design ITC enabler to support small scale production and marketing												
Component 2:	**technical good crop production management systems and introduction of efficient irrigation technology systems**												
Output 2.1:	**Strengthening better crop management and irrigation management for small scale irrigation farmers**												
Activity 2.1.1	Organize training events on a range of climate-resilient farming methods												
Activity 2.1.2	Establish a participatory, demonstration plots in both project farmers site												
Activity 2.1.3	Organize exchange visits and farmers' field school												
Activity 2.1.4	Produce at least one technical report capturing lessons learnt												
Output 2.2:	**Water saving efficient drip irrigation introduction**												

Activity 2.2.1	Introduction of water saving drip irrigation with solar pumping system													
Activity 2.2.2	Introduction of production systems improvement													
Activity 2.2.3	Training on irrigation technology													
Activity 2.2.4	Production of technical report													
Component 3	**Bush thinning and re-seeding of grazing areas**													
Output 3.1:	**Selective bush thinning to allow grass growth and species diversity**													
Activity 3.1.1	Manipulation using fertiliser application, grazing management and strategic herbicide application													
Activity 3.1.2	Cutting (bush thinning) to increase plant tillering													
Activity 3.1.3	addressing soil health and soil fertiliser content													
Activity 3.1.4	use tactical herbicides to control weeds													
Output 3.2	**Re-seeding of grazing areas to cover soil with high root biomass and good root biomass with higher species diversity**													
Activity 3.2.1	Reseeding and maintaining perennial grass and soil cover													
Activity 3.2.2	Manipulate the species mix to achieve the right pasture composition.													
Activity 3.2.3	introduce high root biomass of some grasses and the overall greater average root biomass													
Activity 3.2.4	test for a “fertility effect "													
Output 3.3	**Production of sustainable production of charcoal or wood**													
Activity 3.3.1	Production of charcoal or wood that benefit farmers as additional													
Component 4	Knowledge and skills management													
Output 4.1	Community mobilisation climate risk management and preparedness planning													
Activity 4.1.1	Synthesize available information													
Activity 4.1.2	Organize a training													
Output 4.2	Dissemination and strengthened disaster risk management for climate induced risk													
Activity 4.2.1	Finalize operational procedures for the Climate Risk Information in coordination with the MET & MWAF													
Activity 4.2.2	Organize a national level workshop on communication strategies													
Activity 4.2.3	Organize community level trainings on interpreting publicly available weather forecasts broadcasted													
Output 4.3.	**Capacity building to farmers and students related to risk management for climate induced risk**													

Activity 4.3.1	Develop module that target to farmers and students												
Activity 4.3.2	registered students' identification and attached to the project												

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

A. Record of endorsement on behalf of the government[1] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

(Enter Name, Position, Ministry)	Date*: (Month, day, year)*

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

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 (……list here…..) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme 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.	
Name & Signature Implementing Entity Coordinator	
Date: *(Month, Day, Year)*	Tel. and email:
Project Contact Person:	
Tel. And Email:	

[6] Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

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