



ADAPTATION FUND

PROJECT PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT INFORMATION

Project Category:	Regular
Country:	Namibia
Title of Project:	Namibia Conservation Agriculture Project 2 (NCAP 2) – Building Adaptive Capacities and Climate Change Resilience for Improved Food Security for Smallholder Farmers in Northern Namibia
Type of Implementing Entity:	National
Implementing Entity:	Desert Research Foundation of Namibia (DRFN)
Executing Entities:	Kongalend Financial Services (Pty) Ltd
Amount of Financing Requested:	USD 1,500,000

Short Summary

The Namibia Conservation Agriculture Project (NCAP) 2 – Building Adaptive Capacities and Climate Change Resilience for Improved Food Security for Smallholder Farmers in Northern Namibia will build on productive interventions undertaken in the communal land areas of Namibia's seven northern crop-growing regions to work with small-scale and subsistence farmers (mostly women) who depend entirely upon the climate for rain-fed agricultural production of staple grains for income and household food security. Farmers in these areas typically utilise mal-adaptive farming practices ill-suited to climate change adaptation, which results in low yields, hunger, poverty and increasing vulnerability to climate change impacts, such as the alternating threats of droughts and floods.

The project will be implemented by a consortium of three Namibian institutions headed by an executing entity, Kongalend Financial Services, an established development microfinance institution providing access to productive credit, including agri-business loans to smallholder farmers. To this effect, Kongalend will work with three executing partners: the Namibian National Farmers Union (NNFU), NCBA CLUSA Namibia and Creative Entrepreneurs Solutions, consolidating our work together on climate change-related practical interventions in northern Namibia, where the majority of the population are based and depend on the land for their livelihoods.

NCAP 2 will have three main components: firstly, further extension of training on conservation agriculture (CA) methods including the establishment of demonstration plots to serve as tangible local examples of climate change adaptation success and as training grounds for practical skills transfer with project support. More than 65,000 members of farming households will directly benefit from this proposed intervention. NCAP 2 partners' prior work in the target area has demonstrated the success of this approach.

The second component is designed to capacitate local entrepreneurs to provide the CA inputs and services that farmers increasingly demand. This will be achieved through, among others, technical support, business training and affordable loan products tailor-made to meet this need.

The third component will be to promote climate change adaptation awareness, knowledge and learning through the strategic collection, management and dissemination of project research, data and ground-up lessons learnt on best practices, with the ultimate goal of broad CA adoption and long-term sustainability.

Project financing is based on 50% AF funding and 50% co-funding. All costs (project activities cost, project execution cost and project management fee) for implementing the project will be equally shared between AF funding and co-funding.

The proposed project's design is firmly rooted in NCAP 2 partners' prior work over the last 10 years in the target areas through NCAP intervention, incorporates lessons learnt and responds to demand for progression and upscaling from small farmers.

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List of abbreviations and acronyms

ACAF	Aspiring Conservation Agriculture Farmer
AF	Adaptation Fund
ARV	Antiretroviral
CDAPP	Community Draught Animal Power Promoter
CES	Creative Entrepreneurs Solutions
CLUSA	Co-operative League of the United States of America
CA	Conservation Agriculture
CBA	Community-Based Adaptation
CBA CPS	Community-Based Adaptation Country Programme Strategy
CBO	Community-Based Organisation
CONTILL	Conservation Tillage Namibia Project
CPPISLM	Country Pilot Partnership for Integrated Sustainable Land Development
DA	Designated Authority
DRFN	Desert Research Foundation of Namibia
EU	European Union
FAO	Food and Agriculture Organisation (of the United Nations)
FAOWFP	Food and Agriculture Organisation / World Food Programme
FFS	Farmer Field School
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF-SGP	Global Environment Facility – Small Grants Programme
GPS	Global Positioning System
GRN	Government of the Republic of Namibia
HDI	Human Development Index
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
IPCC AR	Intergovernmental Panel on Climate Change Assessment Report
IPCCWG	Intergovernmental Panel on Climate Change Working Group
KM	Knowledge Management
LF	Lead Farmer
M&E	Monitoring and Evaluation

MAWF	Ministry of Agriculture, Water and Forestry
MDG	Millennium Development Goal
MET	Ministry of Environment and Tourism
MGECW	Ministry of Gender Equality and Child Welfare
MPESW	Ministry of Poverty Eradication and Social Welfare
NAB	Namibia Agronomic Board
NBC	Namibian Broadcasting Company
NCAP	Namibia Conservation Agriculture Project
NCBACLUSA	National Co-operative Business Association – Co-operative League of the United States of America
NDP	National Development Plan
NDP4	The Fourth National Development Plan
NEEEF	New Equitable Economic Empowerment Framework
NGO	Non-Governmental Organisation
NHIES	National Household Income and Expenditure Survey
NIE	National Implementing Entity
NNFU	Namibian National Farmers Union
NNFUCAC	Namibian National Farmers Union Conservation Agriculture Committee
NSA	Namibia Statistics Agency
NSCT	Namibia-Specific Conservation Tillage
PC	Project Coordinator
PGRFA	Plant Genetic Resources for Food and Agriculture
PSC	Project Steering Committee
RMDSP	Rangeland and Marketing Development Support Project
SADC	Southern African Development Community
SCCF	Special Climate Change Fund
SHG	Self-Help Group
SNC	Second National Communication
SOM	Soil Organic Matter
SPA/CPP	Strategic Priority on Adaptation / Country Pilot Partnership
USAID	United States Agency for International Development
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNDP	United Nations Development Programme

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNWTO	United Nations World Tourism Organisation
WFP	World Food Programme
WHO	World Health Organisation

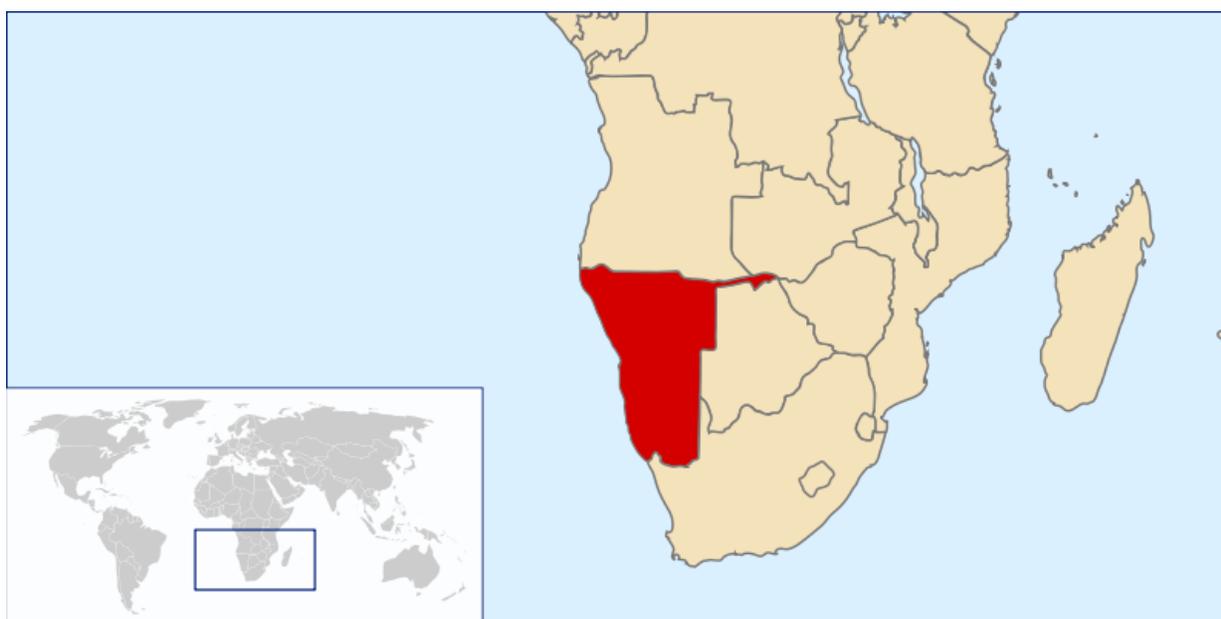
Project background and context

Geographic context

Namibia is located in southern Africa, and is bordered by the Atlantic Ocean in the west, Angola to the North, Botswana to the east and South Africa to the south, as shown in Figure 1 below.

The country gained independence from South Africa in 1990. The country is a stable parliamentary democracy classified by the World Bank as an upper-middle income country. Yet, Namibia faces certain unique challenges due, among other things, to its increasingly harsh climate, recent apartheid history and severe equality gap.

Figure 1: Namibia within Southern Africa



Situated between the Kalahari and Namib Deserts, Namibia is the most arid country in sub-Saharan Africa.¹ The western half of the country is home to the Namib Desert, which stretches the entire length of Namibia's Atlantic 1570 km-long coastline and ranges in width between 100 and many hundred kilometres. The Kalahari Desert, which Namibia shares with South Africa and Botswana, encompasses the eastern third of the country.

Due in large part to its aridity and difficult climate conditions, Namibia's population density is extremely low. The total population equals approximately 2.1 million people,² who occupy a total area of 824,269 km². As a result, Namibia ranks 236 out of 241 countries in population density, with an average of 2.6 persons per square km².

¹ Sweet J & Burke A, *Country Pasture / Forage Resource Profiles for Namibia*, (2006) United Nations Food and Agriculture Organisation (FAO)

²Namibia 2011 Population and Housing Census, Namibia Statistics Agency

Project Areas and Target Groups: Namibia's seven northern regions – where the proposed project will take place – are home to the majority of rurally-based Namibians who practice rain-fed subsistence agriculture on communal land for the purposes of household food security and small income generation.

As shown in Figure 2 below, the north-central and north-eastern regions where the proposed project will take place include: Omusati, Oshana, Ohangwena, Oshikoto, Kavango West and Kavango East (formerly Kavango), and Zambezi (formerly Caprivi) regions.

Figure 2: Project regions



Population number per region as per the 2011 Housing and Population Census

While each of the geographic areas where the proposed project will take place has much in common in terms of economic development and climate change threats and challenges, the demographic characteristics of each region are distinct. Table 1 below highlights some of these key differences.

Table 1: Demographic characteristics of proposed project target regions

	Kavango East & Kavango West	Ohangwena	Omusati	Oshana	Oshikoto	Zambezi	Total
Population	223,352	245,446	243,166	176,674	181,973	90,596	1,161,207
Households	36,741	43,723	46,698	37,284	37,400	21,283	223,129
Female headed	43%	57%	55%	54%	49%	44%	50.30%
Average household size	6	5.6	5.2	4.5	4.8	4.2	5.05
No. of smallholder farmers*	11,076	27,216	27,035	16,598	17,758	12,556	112,239
No. of hectares under conventional cultivation*	17,257	62,271	73,657	43,797	58,223	22,606	277,811

** Data derived from the Annual Agricultural Surveys, 1996-2003, undertaken by the Central Bureau of Statistics (the predecessor agency to the Namibia Statistics Agency). The NSA conducted an Agricultural Census in 2014 whose results will only be published later this year.*

Environmental context

Namibia is the most arid country in sub-Saharan Africa, with the lowest mean annual rainfall (270mm) in sub-Saharan Africa.³ However, it is the absence of moisture in the atmosphere – rather than the absence of rain – which gives Namibia its truly dry weather conditions, and which leads to the classification of Namibia as arid.

Specifically, the country is located between two climatic systems: the inter-tropical convergence zone, which feeds in moisture from the north, and the subtropical high pressure zone, which pushes moist air back with dry air. The result is both low rainfall and low atmospheric moisture.

Current Climatic Conditions: Namibia is classified as a water- scarce country, with water considered to be the factor most limiting development. Mean annual rainfall in Namibia ranges from approximately 700 mm in the northeast to less than 25 mm in the west and southwest of the country. Most rain falls in the summer months (from November to February) in the form of intermittent thunderstorms and showers. Overall, about 22% of the country is classified as desert, 70% as arid to semi- arid and about 8% as dry sub- humid.⁴

Table 2: Annual rainfall distribution and climatic classification in Namibia⁵

Rainfall (mm)	Classification	Percent of land
< 100 mm	Desert	22%
101 – 300 mm	Arid	33%
301 – 500 mm	Semi-arid	37%
501 – 700 mm	Sub-humid	8%

Most surface water is held in ephemeral and perennial border rivers, small channels, salt pans (the Etosha pan being the largest) and lakes. The country's main rivers are the Kunene, Kavango and Zambezi which form its northern border and the Orange River which forms its southern border. A significant amount of water is obtained from these rivers. However, high solar radiation, low humidity and high temperatures lead to very high evaporation and evapotranspiration rates. Average maximum temperatures vary between 30°C and 40°C, while minimum temperatures vary between 20°C and below 10°C.

Namibia also uses underground water resources, with active and fossil aquifers being exploited.⁶ Only about 1% of rainfall replenishes the groundwater aquifers that many Namibians depend on, and 2% runs off into surface water resources, which have extremely high rates of evaporation.⁷ Water is mostly extracted through boreholes, and in communal areas, through hand-dug wells.

³Sweet & Burke, *Country Pasture/Forage Resource Profiles for Namibia* (2006), FAO

⁴Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. *Atlas of Namibia: A portrait of the land and its people* (2002)

⁵Sweet & Burke, *Country Pasture/Forage Resource Profiles for Namibia* (2006), FAO

⁶ Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. *Atlas of Namibia: A portrait of the land and its people* (2002)

⁷Dirkx, E., Hage, C., Tadross, M., Bethune, S. and Curtis, B., *Climate change vulnerability and adaptation assessment* (2008)

About 70% of Namibia's vegetation is classified as savannah and the country is endowed with unique biodiversity. Abundant state and private conservation areas enable wildlife to prosper, with 13.8% of Namibia's land area under conservation status.⁸ Non-timber forest products and other so-called "veld" products are widely used to supplement diets and livelihoods. Community-based conservation is a key management strategy, and 26 conservancies and 10 community-forests are situated in the regions that this project targets.

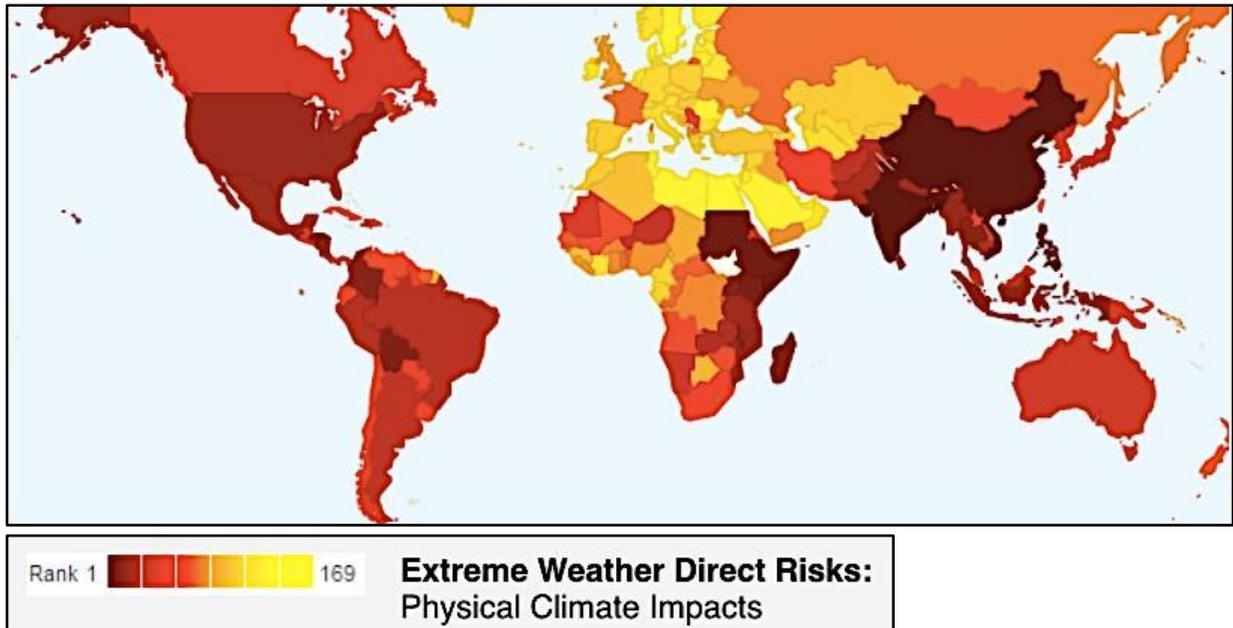
Changing Climatic Conditions: As sub-Saharan Africa's driest country, Namibia is already subject to persistently high temperatures, droughts and erratic rains interspersed with floods. Climate change impacts are exacerbating these already difficult conditions by increasing aridity and climate variability. While the entire African continent is expected to warm during this century, southern Africa in general (and Namibia in particular) is expected to warm faster than the global average.⁹ At the same time, rainfall in Namibia (and southern Africa) is projected to decrease overall.¹⁰ As shown in Figure 3 below, Namibia is the most at-risk country in southern Africa for physical climate change impacts and risks from increasingly extreme weather.

⁸ National Climate Change Policy of Namibia (2010)

⁹ Inter-Governmental Panel on Climate Change Working Group II Assessment Report 5 (UNEP, WMO)

¹⁰ Inter-Governmental Panel on Climate Change Working Group II Assessment Report 5 (UNEP, WMO)

Figure 3: Centre for Global Development - Climate Change Map



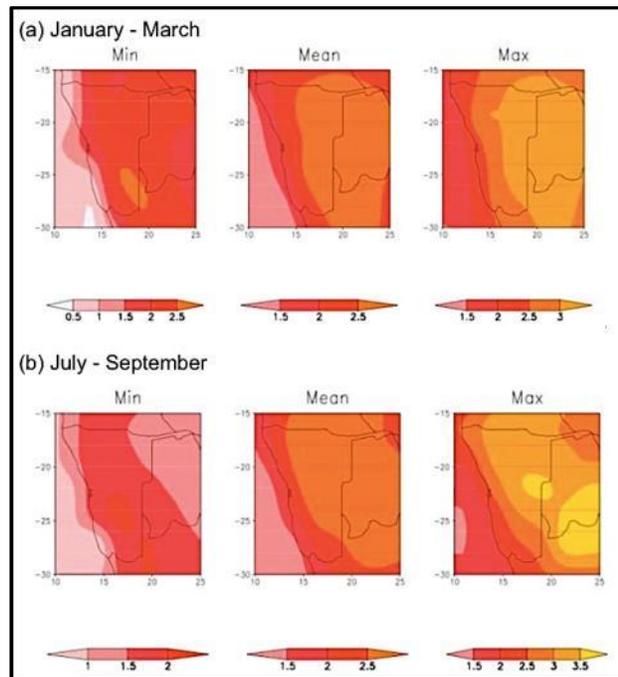
National Climate Change Projections: The Second National Communication to the UNFCCC (SNC, 2011) and the Climate Change Vulnerability and Adaptation Assessment Report (2008), provide the first detailed description of the observed climate trends and climate change projections for Namibia. Another vital study in this area was an assessment commissioned by UNDP and carried out by the Tyndall Centre.¹¹ The Namibian Ministry of Environment and Tourism (MET) has also studied and reported widely on observed climate trends and projected climate changes for Namibia. All reports indicate that stronger climate variability is likely. The findings of these studies are explored in greater detail in Box 1 below.

¹¹ University of Oxford School of Geography and the Environment

Box 1: Projected Climate Change in Namibia

Temperature change: Maximum temperatures have been increasing over the past 40 years, as observed in the increasing frequency of days exceeding 35°C and decreasing frequencies of days with temperatures below 5°C. This suggests an overall warming. Expected impacts – with a high degree of certainty – are for Namibia to become hotter throughout the year with a predicted increase in temperatures of between 1°C and 3.5°C in summer and 1°C to 4°C in winter in the 2046 – 2065 period. By mid-century, the number of days exceeding 34°C is predicted to increase from 67 to 118, and average maximum temperatures will likely increase from 33°C to 34.4°C.

Figure 4 below indicates the minimum (left), mean (middle) and maximum (right) projected change in the mean surface air temperature (°C) from 13 GCMs in the periods from January-March and July-September.¹²



Precipitation change: The northern and central regions of Namibia are now experiencing a later onset and earlier cessation of rains, resulting in a shorter farming season. There has been a statistically significant decrease in the number of consecutive wet days in various locations, as well as an increase in measures of rainfall intensity. Overall, the amount of rainfall is decreasing. Both developments negatively impact rural smallholder farmers who practice rain-fed subsistence agriculture. It is also bad news for Namibia's groundwater reserves. A reduction of between 10 and 20% in rainfall by the period 2045–2065 over the Angolan catchments of the Zambezi, Kavango, Cuvelai and Kunene rivers is expected to lead to a significant reduction in runoff and drainage in these river systems.

Evaporation and Evapotranspiration: It is predicted that, even without the additional stresses of climate change on the water resources, demand will have surpassed the installed abstraction capacity by the end of this year (2015). The projected temperature increases will result in evaporation and

evapotranspiration increases in the range of 5 to 15%, further reducing water resource availability and dam yields. Floodplains in the Zambezi (Caprivi) region and oshanas (ephemeral rivers and pans formed in the shallow depressions of the Cuvelai system in the north) remain particularly vulnerable, as smaller areas will be inundated, and because they may dry out more rapidly due to increased evaporation.

Winds: The minimum, mean and maximum expected changes in surface wind for the 2046–2065 period are as follows: During summer, minimum changes converge around zero whilst maximum changes (approximately 0.8 ms⁻¹) are predicted for onshore flow from the southwest. The mean changes are of a similar pattern (though lower in magnitude) to the maximum changes and are consistent with increased convective activity and an associated low-pressure trough over the continent during summer.

Both mean and maximum wind changes during winter months indicate a similar (though stronger – approximately 1 ms⁻¹) pattern of change compared with summer months. However, both the maximum and mean projected changes indicate increases in the southerly component of wind over the ocean. These projected changes are consistent with a retreat of mid-latitude storms (which normally bring north-westerly winds) towards the south and an increase in the south Atlantic high-pressure system which drives winds from the south.

¹²Dirkx et al. (2008)

Climate Change Impacts on Namibian Society and Economy: Namibians, as well as sectors of the Namibian economy, will be negatively affected by climate change. Overall, the frequency and intensity of extreme events (e.g. drought and floods) are expected to increase. Negative impacts will include reduced water availability, vegetation and land degradation, and ecosystem and biodiversity destruction, as well as negative impacts on poverty eradication, economic development, food production and health.¹³

The country's rural poor, particularly pastoralists and dry-land subsistence farmers, will be affected the most.¹⁴ Indeed, Namibia is considered the 7th most at risk nation in the world in terms of agricultural productivity loss due to climate change impacts.¹⁵ Table 3 below, which is organised by region, identifies some of the expected climate change impacts directly relevant to the project zones and indicates how climate change may negatively affect the people of those regions.

Table 3: Climate change projections for key sectors in the project regions¹⁶

Region	Background Information	Active Sectors	Impacts & Projections
Kavango East & Kavango West	Frequent flooding Forests & national parks Slash and burn practices Home to 11% of Namibia's population	Small-scale crop & livestock farming Tourism Forestry Fisheries Housing and infrastructure	Same impacts as listed above, with severe flooding, increases in summer rainfall and significant mosquito and water-borne disease impacts
Ohangwena	Flat / plain landscape No permanent rivers 99% of population in rural areas Highest population density in Namibia at 21.3 people per km ²	Small-scale crop & livestock farming Seasonal fresh water fishing Forestry Housing and Infrastructure	Temperature increases Floods (2006-2009) Water-borne diseases Droughts (2013-2015) Decreasing rainfall intensity Longer dry season and shorter growing season Mosquito, tsetse fly and other pest infestations Deforestation
Omusati	Extreme soil salinity Hand-dug wells and boreholes provide water Frequent flooding of the "lishana" system Water resources heavily dependent on climatic conditions in Angola	Small-scale crop & livestock farming Wildlife Fisheries	Same impacts as listed above, with exacerbated flooding impacts

¹³ *Namibia Environmental and Climate Change Policy Brief* (2008), University of Gothenburg

¹⁴ Reid, H., Sahlen, L., Stage, J. & MacGregor, J. The economic impact of climate change in Namibia: How climate change will affect the contribution of Namibia's natural resources to its economy (2007), Environmental Economics Programme Discussion Paper 07-02

¹⁵ Wheeler, D., (2011), Centre for Global Development

¹⁶ National Climate Change Strategy & Action Plan 2013 – 2020 (2012), MET

Oshana	Water dependent upon groundwater drainage from southern Angola High salinity of soil and underground water Low soil fertility Smallest region Population density of 18.7 people per km ²	Small-scale crop & livestock farming Seasonal fresh water fishing Housing and Infrastructure	Same impacts as listed above, with extreme deforestation already present
Oshikoto	Extensive woodland areas High salinity of soil and underground water 70% of land area has less than 1 person per km ²	Both small-scale & large-scale crop & livestock farming Wildlife Forestry	Same impacts as listed above
Zambezi	Frequent flooding Highest rainfall in Namibia (600mm – 700mm) Largest number of perennial rivers Rich vegetation and best arable land in Namibia Highest malaria rate	Small-scale crop farming Tourism Forestry Fisheries Housing and infrastructure	Same impacts as listed above, with severe flooding, increases in summer rainfall and significant mosquito and water-borne disease impacts

Climate Change Impacts on Agriculture: Climate change will affect agricultural yields directly through changes in temperature and precipitation, and indirectly through changes in soil quality and the introduction of pests and diseases. Critically, a reduction of crop yields is expected, resulting in temporary or even longer-term food shortages, malnutrition and dependency. Seasonal shifts in the rainy season are expected to lead to a shortening of the growing season, especially reducing the time for crops to ripen. This may have a significant impact on grain production, and may require an adjustment of currently prevailing agricultural calendars and practice. Increased aridity is also expected to lead to increased grazing stress and deteriorating vegetation and animal health. Overall, a loss of dry-land crops and of rangeland capacity is predicted.

Climate Change Impacts on Food Security: In rural Namibia, household food security is derived from two sources: household food production from agriculture and food purchases funded by cash income, government feeding programmes or bartering. Hence, the loss of a season's harvest can have devastating impacts on those already living precariously.

In 2009 and 2011, the northern Namibian regions were declared *flood emergency areas*. Only two years later, in May 2013, the entire country was declared a national *drought disaster area*, with surveys identifying 330,925 people as "food-insecure" whilst another 447,577 classified as "moderately food-insecure" due to drought. An estimated 109,000 children under the age of five living in rural households were classified as severely or moderately food insecure and at risk of malnutrition. More recently, in April 2015, the Government of Namibia announced that 417,944 people were in immediate need of drought relief.¹⁷ The resulting hunger situation threatens to worsen in the coming years, unless widespread climate change adaptation efforts are undertaken.

¹⁷ Drought Press Release (24 April 2015), Republic of Namibia

Both drought and floods are ever-present threats for communal farmers' food security. Their harvests, historically, depend directly on predictable and sufficient rainfall. Until recently, wild fruits and vegetables, riverine fish and small animals were available during times of relatively good rainfall and provided an important buffer for poor households during times of food shortage. However, increasing deforestation, erosion along rivers, and unsustainable harvesting among an increasing population are, together, shrinking the availability of these back-up food supplies and increasing the relative dependence on staple crops for household and national food security.

In this perfect storm, it is no surprise that Namibia is one of a handful of countries with “no progress/ deterioration” when it comes to success in reaching the Millennium Development Goal hunger target, which measures the progress made by countries towards halving the percentage of people suffering from undernourishment, to bring the figure below 5 percent. The FAO estimates that 1 million of Namibia's 2.1 million people are “undernourished persons,” giving Namibia one of the highest rates of undernourishment in the world at 42.3%.¹⁸ Given worsening climatic conditions and the persistence of destructive agricultural practices, it is unimaginable that the situation will improve without intervention.

CES and NNFU carried out a household food self-sufficiency baseline for the 2013/2014 crop season, which measured the number of months of food self-sufficiency for approximately 500 subsistence farmers applying *conventional farming methods* (i.e. disc harrowing or mouldboard ploughing). The results of the study are presented in Table 4 below.

Table 4: Food Self-Sufficiency per Household per Region per year (2013/2014 Crop Year) applying conventional farming methods, measured in number of months of food-self sufficiency

Region	Average (months)	Median (months)
Kavango East	5	5
Kavango West	4.9	4.5
Omusati	4.5	4
Oshana	6.9	6
Oshikoto	8.3	8
Zambezi	6.6	6
Average:	6.6	Median 5.6 months

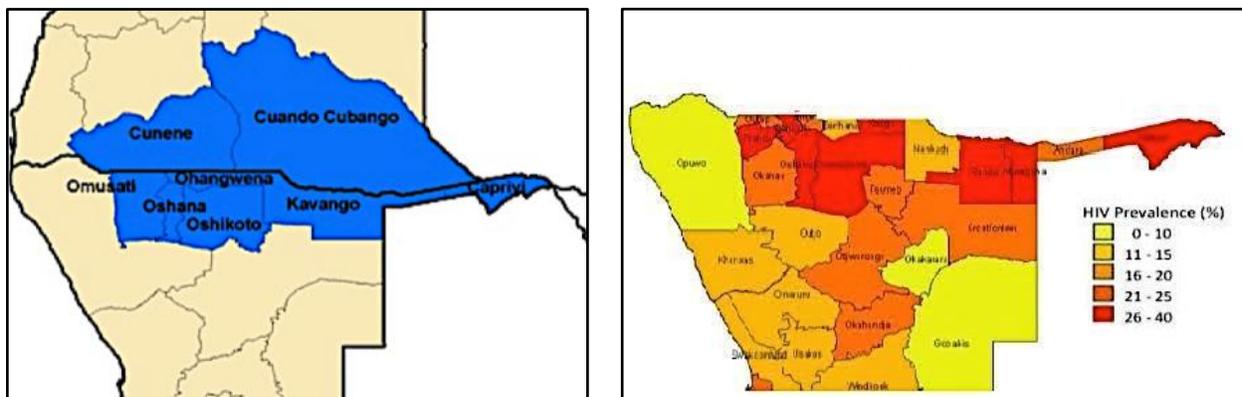
As the data shows, subsistence farmers practicing conventional methods in the most productive regions averaged only 8.3 months of food self-sufficiency, whilst other regions averaged only 4.5 months of food. A follow-up survey is planned for July 2015, which will measure food self-sufficiency with the same farmers after they had switched to CA methods in the 2014/2015 crop season, which will serve to quantify the increase in household food-self-sufficiency when farmers switch to CA methods.

¹⁸ *Interactive Hunger Map* (2015), FAO; www.fao.org/hunger/en/

Climate Change Impacts on Human Health: Climate change affects human health through negatively impacted agricultural production, which forms the basis of food security and incomes for most Namibian households in the project area. Changes in rainfall also directly affect human health through the presence (and absence) of vector- and water- borne pathogens. It can be expected that small changes in temperature and precipitation will boost the population of disease- carrying mosquitoes and result in increased malaria epidemics in the malaria-prone areas of northern Namibia. Floods in northern Namibia also exacerbate outbreaks of cholera and bilharzia. Vector reproduction rates, parasite development cycles and bite frequencies typically increase with rising surface air and water temperatures (see Figure 7 below for regions most at risk).

Women, orphans, vulnerable children, the chronically ill, and those infected with HIV/AIDS are most vulnerable to the impacts of climate change. For example, factors threatening vulnerable groups under normal conditions – poverty, malnutrition, unsafe water, sanitation and hygiene, limited access to health facilities, a weak health status and stigma – are intensified during floods due to infrastructure breakdown, crop failure and water-borne diseases, such as cholera.²² The HIV/AIDS pandemic, in combination with poverty and the reduced capacity of institutions to respond during times of flood, has already reduced the resilience of rural households.²³ A visual comparison of Figures 6 and 7 below demonstrates that flood-prone regions overlap with regions having the highest HIV/AIDS rates in the country.

Figures 6 and 7: Provinces and regions in Angola and Namibia vulnerable to flooding²⁴ & HIV prevalence by district in central and northern Namibia²⁵



²² Anthonj, C., Nko *The impact of flooding on people living with HIV: a case study from the Ohangwena Region, Namibia* (Vol 8, 2015) Global Health Action

²³ Dirkx et al. (2008)

²⁴ *Food, Agriculture & Natural Resources* (2009), Southern African Development Community (SADC)

²⁵ *Progress Report for Namibia* (2014) UNAIDS

In the case of the 2009 floods, a lack of basic infrastructure left many in northern Namibia unable to access anti-retroviral drugs for months in addition to the decimation of crops by floodwater, causing widespread famine and under-nutrition. While the increased incidence of flooding is directly related to climate change, soil-degrading agricultural practices exacerbate the problem by decreasing the ability of the soil to hold water. Introduction and sustained access to climate-smart methods that improve soil health will improve water infiltration of the soils and decrease the severity of flooding when it does occur.

Climate Change Impacts on Energy and Infrastructure: Climate change greatly impacts the energy sources and infrastructure used by smallholder farmers and vulnerable groups. Floods and storms often disrupt electricity supply and lightning strikes during storms cause failure of small transformers and destruction of wooden poles. Most households use wood for cooking and heating water or make limited use of alternative sources, such as gas or paraffin. Electrification of the rural areas is an ongoing challenge for government. Climate change will affect the distribution and availability of wood resources, thus leading to a scarcity of biomass energy for many households.

During the severe floods of 2008 and 2009, settlements situated close to the *oshanas* (ephemeral lakes) in the north central regions were severely inundated, and many people experienced damage or loss of their homes, belongings and goods. Public services (e.g. schools) were interrupted for prolonged periods of time, and roads and storage facilities were damaged. In rural settlements, floods resulted in sewage systems being washed away, while pump stations in urban areas were inundated, causing floodwater to mix with sewage, thus posing a serious risk to human health.

Social context

Namibia's low population density is characteristic of arid ecosystems. Seventy-three percent (73%) of Namibians live in rural areas and approximately two-thirds of those live in the north-central regions where the proposed project will take place. Although Namibia is classified as an upper-middle income country, about 20% of the population is classified as poor and about 9.6% as severely poor.²⁶

The regions with the highest incidence of poverty are within the proposed project's target area, namely Kavango (57%), Ohangwena (45%) and Oshikoto (41%).²⁷ The gender make-up of the population is 51.64% female and 48.36% male. Twenty-three percent of the total population are under the age of 15.²⁸ Overall life expectancy is 66 years for females, and 63 years for males.²⁹

²⁶ Namibia Household Income and Expenditure Survey (NHIES) (2009/10), Namibia Statistics Agency (NSA)

²⁷ Poverty Report (2010), NSA

²⁸ Population and Housing Census Indicators (2011), NSA

²⁹ NHIES (2009/10), NSA

The prevalence of stunted children – a significant health and development indicator – is 29%, though the percentage of stunted children is far higher in many regions of the proposed project's target area, including Kavango (40%), Ohangwena (34%) and Oshikoto (32%).³⁰ It is anticipated that these already high rates will increase due to climate change impacts. Namibia also records one of the highest levels (18.8%)³¹ of HIV/AIDS prevalence in the world, especially in the northern regions, which adds to local vulnerabilities, especially at the family and household levels.

Smallholder Subsistence Farmers: The majority of smallholder farmers practice agriculture at a subsistence level and have no other income sources. Most employ conventional farming methods (such as disc harrowing), with limited (or no) crop rotation. These maladaptive practices degrade the soil, increase wind and water erosion and lead to consistently low yields.

These farmers lack access to training on adaptive practices, as well as quality agricultural inputs and support services. In general, their levels of formal education are very low, and they have an extremely limited ability to make profitable agricultural investments – all too often lacking the knowledge and inputs necessary to diversify agricultural production and improve soil quality for sustainable, higher yields. Desperately needed in these areas is training on adaptive practices, such as CA, as well as improved access to seed and other farming inputs and services.

³⁰ According to a landscape analysis on maternal and child nutrition in Namibia conducted by the World Health Organisation and the Namibia Alliance for Improved Nutrition (2012)

³¹ African Health Observatory, WHO, HIV/AIDS Analytical summary (2009)

Women and Vulnerable Groups: Households headed by women constitute a significant portion of the food insecure population. Although comprehensive data is limited, regional figures and the national census suggest that as many as 62% of households are effectively female-headed. Women are thus obliged to engage in traditionally-malework in the field, including intensive tasks such as tilling and clearing. With the increase of climate variability, another challenge facing women is the quality of land, which is deteriorating coupled with lack of access



CA farmers in Kavango West participating in an NCAP training session on field planning.

to fertiliser, implements and the technical know-how to boost the productive potential of their fields. Given these vulnerabilities and impacts, a typology of the most affected groups is presented below – which gives an indication for the type of target in the project zones. This data is derived from the IPCC WGIIAR5 Africa report on cross cutting approach for equity and social justice in adaptation and FAO country study on women agriculture and rural development.³²

Female-Headed Households: Traditionally, men are the head of the household, whilst women and girls are responsible for all aspects of household management, including fetching water and collecting firewood.³³ However, women-headed households (who are often the sole carers for HIV-AIDS orphans) are becoming more common, often as a result of adult men migrating to urban areas in search of jobs. Women heading rural households or employed on farms thus form one of the most vulnerable groups in Namibia.

Over 36,000 farm workers support an estimated 230,000 dependents on wages ranging between N\$80- 380 per month, an equivalent of approximately USD 8–38 per month. They also have extremely limited (or no) access to farming tools, new technology, markets, banking or credit. The lack of access to productive inputs, combined with an absence of male labour, places enormous burdens on the time and health of women and children.³⁴ Women-headed households possess smaller land holdings on average than male-headed households, thus limiting their production capabilities and further reducing food security. It is vital to household food security and family health that women-headed households receive training on adaptive farming techniques, as well as improved access to agricultural inputs and services.

³² National sectoral report for Namibia – women, agriculture and rural development, FAO

³³ LeBeau D, et al. Gender Disaggregated Work in Rural Northern Namibia

³⁴ Namibia: Poverty Alleviation with Sustainable Growth (2011), World Bank

The health and well-being of the majority of children in Namibia is integrally tied to women's roles as farmers and food producers. Subsistence farming is the most common primary source of income for female-headed households, especially in the rural areas.³⁵ However, the decline in crop production and food availability, together with a reduction in cash income, are further entrenching many households in poverty. As a result of these conditions, few households, whether male or female-headed, produce enough food to be self-sufficient.



Farmers in Oshana region attending a CONTILL project after-harvest evaluation workshop.

Orphans and Vulnerable Children: 18.3% of Namibian children live in severe poverty, and 10.5% of all Namibian children depend on child maintenance and foster care grants from government to supplement their families' subsistence farming activities.³⁶ At the same time, 13.8% of Namibian children are orphans, with 34% of them falling below the lower poverty line in households where one or both parents have died.³⁷

Many orphan children live with elderly relatives, who are physically unable to help with farm labour. The responsibility for agricultural production and household food security therefore falls upon orphan children and reduces their ability to pursue education in order to meet more immediate short-term needs.³⁸ There is a critical need to increase the income of households with orphans through improved agricultural practices that enable production above subsistence levels. Introduction of less labour-intensive agriculture frees (especially) female children to attend school and pursue education as a means to long-term elevation from poverty.

³⁵ *NHIES*, pg. 56 (2009/2010), NSA

³⁶ *Child Poverty in Namibia Report* (2011), NSA

³⁷ *Orphans and Vulnerable Children Report* (2003), UNESCO

³⁸ *Child Poverty in Namibia Report* (2011), NSA

Economic context

Namibia's most important economic sectors are agriculture, fisheries, mining and tourism. The country's economy is therefore highly dependent upon natural resources. The economy is currently diversifying into natural resource processing, and the tourism sector is growing as well, although tourism in Namibia is also closely linked to natural resources.³⁹

About 630,094 Namibians make up the labour force,⁴⁰ with 27.4% employed in the agriculture sector where more women are subsistence farmers than men.⁴¹ For many households, improving agriculture is secondary in importance to gaining wage-earning jobs. Given degrading soil health and increasing populations, agricultural productivity using conventional methods is no longer sufficient to ensure household food security, let alone to generate cash income. Instead, households increasingly rely on cash income from non- agricultural sources to supplement food production. Thus, off- farm employment and income generation are central components of agricultural and rural development in Namibia. The official unemployment rate⁴² in Namibia was 27.4% in 2012.⁴³ However, non-governmental sources peg the figures as high as 50%.⁴⁴ Unemployment amongst the youth is particularly high at 42.8%. Almost two- thirds of these are young females.

Structural Income Inequality: Namibia has among the highest income disparity in Africa, with a Gini coefficient of 0.6 and a ranking of 128 in the global ranking of 187 countries for which the Human Development Index (HDI) is calculated.⁴⁵ GDP growth was approximately 5.3% in 2014, though these gains came primarily in the secondary and tertiary industries, such as manufacturing and tourism, which recorded growth rates of 10.6% and 6% respectively. The primary industries recorded a near zero growth. This is mainly a result of a decline in the agriculture sector and in the price of uranium.⁴⁶ GDP growth has been highly unequal in social and geographic terms. Other relevant socio- economic key indicators are depicted in Table 5 below.

Table 5: Key socio-economic indicators based on the National Accounts, Labour Force and Census reports⁴⁷

Key Indicators	
Income per capita	USD14,559
Inflation rate	6.5%
Illiteracy rate	13%
Life expectancy (male / female)	63 / 66
Access to healthcare	80%
% of population below poverty line	29%

³⁹ *Tourism Satellite Account: 4th edition* (2013) United Nations World Tourism Organisation (UNWTO)

⁴⁰ *Namibia Labour Force Survey* (2012), NSA

⁴¹ According to the *Namibian Labour Force Survey* (2012), in addition to women making up a larger portion of the subsistence farming sector they also make up a larger percentage of unpaid family labourers (7.3%) compared to males (4.9%), NSA

⁴² "Unemployed" defined in the broad sense; all persons within the working age group available for work but without work

⁴³ *Namibia Labour Force Survey* (2012), NSA

⁴⁴ Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. *Atlas of Namibia: A portrait of the land and its people* (2002)

⁴⁵ *Human Development Report* (2013), UNDP

⁴⁶ *African Economic Outlook – Namibia* (2015) Economic Advisor, UNDP

⁴⁷ *National Accounts Report* (2014), NSA

The informal sector is a major component of economic activity in Namibia. The primary source of income for more than 40% of households is subsistence agriculture, a social grant or other income source outside of the formal employment sector. Own account workers and contributing workers are highest in the Omusati region with over 30%, with Oshana, Ohangwena, Kavango, Otjozondjupa and Oshikoto showing percentages of approximately 29%, 27%, 14%, 10% and 7%, respectively.⁴⁸

The Agricultural Sector: About seventy-three percent (73%) of Namibians are rural, resource-poor subsistence farmers, who rely on rain-fed agriculture either directly or indirectly for economic support.⁴⁹ The majority of these farmers live in the northern regions of the country where the proposed project will take place. Farmers in these areas are highly vulnerable to climate variability and climate change impacts due to high population numbers and low annual rainfall. Northern subsistence farmers are dependent upon this insufficient (and increasingly variable) rainfall for food security. At the same time, the sandy and nutrient-poor soil in these regions is unable to hold ground water due to soil degradation. Quality seed for main staple crops, such as pearl millet, is also in short supply.

In terms of production systems, Namibian farmers engage in five major agricultural systems: (i) small-scale cereal, (ii) livestock, (iii) mixed cattle ranching, (iv) intensive agriculture; and (v) natural resource production.⁵⁰ The farming sector is divided into small-scale (i.e. smallholder or communal farmers) and large-scale commercial producers. In the northern communal land areas, approximately 50% of farmers are classified as smallholder farmers.⁵¹

Farmers in the northern regions where the proposed project will be undertaken produce cereal crops, such as pearl millet, sorghum and maize, as well as legumes, such as cowpeas. All are grown under rain-fed conditions. Many also farm with cattle and smaller livestock, such as goats, donkeys, pigs and chickens.⁵² Some level of irrigation farming exists. However, limited water resources render large-scale irrigation unsustainable.⁵³



⁴⁸ NHIES (2009/2010), NSA

⁴⁹ Sweet & Burke, *Country Pasture/Forage Resource Profiles for Namibia* (2006), FAO

⁵⁰ Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. (2002). *Atlas of Namibia: A portrait of the land and its people*

⁵¹ Rural Poverty Portal – Namibia, International Fund for Agricultural Development

⁵² Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. (2002) *Atlas of Namibia: A portrait of the land and its people*

⁵³ Heyns P (2005) Water institutional reforms in Namibia

Smallholder farming plots under conventional, low-yielding methods, in the northern regions of Namibia.

Despite growing populations, the percentage of land dedicated to agriculture has remained stable over the past decade at around 47%. In the northern regions, the yields of staple crops, such as pearl millet, sorghum and maize, are projected to decrease by 5.7%, 7.3% and 15.3% respectively over coming years due to climate change.⁵⁴ The recently released IPCC WGIIAR5 report emphasises that semi-arid and arid areas will be under particular threat. Namibia's agricultural sector is considered to be extremely vulnerable to climate change. Specifically, Namibia is considered the seventh most at risk nation in the world in terms of agricultural productivity loss due to climate change impacts.⁵⁵

Namibia is already a naturally water-scarce country, and the impacts of climate variability and climate change are (and will be increasingly) severely felt because vulnerable livelihoods and production systems are tightly linked to rain-fed subsistence agriculture. Other sources of livelihood are not developed enough to provide viable alternatives. Frequently occurring extreme climate events, such as flooding in the Cuvelai drainage system and severe droughts throughout the regions, damage agricultural production, creating food shortages, disease and other detrimental health effects.

The agriculture sector is a priority sector under Namibia's Fourth National Development Plan (NDP4, 2012/13 to 2016/2017).⁵⁶ The sector has recorded slowed growth of 5.3% in real value added for 2012 compared with growth of 10.6% registered in 2011. The deceleration in the growth rate of agricultural output was reflected in both the livestock and crop production sectors, which *contracted* by 3.6% and 6.5%, respectively. These sectors are highly dependent on the amount of rainfall received for productivity.

Development context

While Namibia is classified as an upper-middle income country, it faces serious development challenges, including increasingly harsh climatic conditions, extreme and variable weather, water scarcity, widespread poverty, food insecurity and a lack of rural resources and opportunities. These challenges are reflected in Namibia's core development indicators, as well as the picture of development in the agricultural sector, each of which is discussed separately below.

⁵⁴ World Bank Climate Change Knowledge Portal – Namibian Agriculture

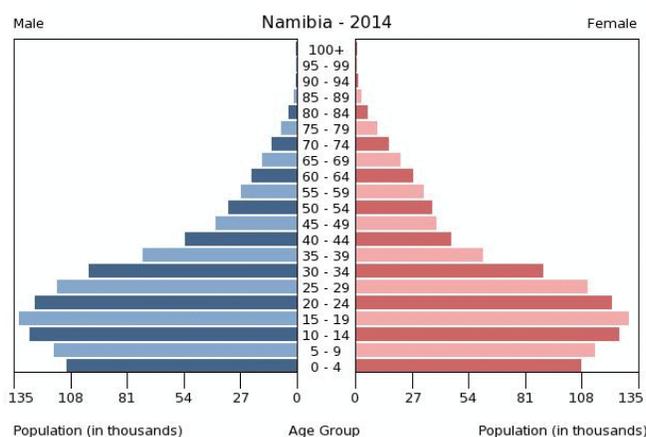
⁵⁵ Wheeler, D., 2011; www.cgdev.org

⁵⁶ National Development Plan 4. Available at : http://www.npc.gov.na/?wpfb_dl=37

Core Development Indicators: The overall development situation in Namibia is characterized by extreme inequality, with a Gini coefficient of 0.6, and a ranking of 128 out of 187 countries.⁵⁷ According to the UNDP, income inequality remains a serious challenge in Namibia with high poverty levels in rural areas, especially among female-headed households, pensioners and subsistence farmers.⁵⁸ While most estimates place the percentage of the population below the poverty line at only 28.7%, it should also be noted that the UNDP's 2005 Human Development Report found that as many as 34.9% of the population live on \$1 per day and up to 55.8% live on \$2 per day.⁵⁹

Population pyramids can also provide a useful visual in terms of describing the make-up of a population and its stage of development. As seen in Figure 8 below, Namibia is in stage 1: “expanding.”

Figure 8: Namibia’s population pyramid⁶⁰



Population pyramids shaped like Namibia’s – with a wide base and a narrow top – indicate a high birth rate (typical of agriculture-based societies as well as societies with low gender equality); with a rapid fall in each upward age group due to high death rates and a short life expectancy – most likely due to extremely high rates of HIV and limited access to healthcare.

Additionally, statistics and figures that describe Namibia as a whole, while dismal, skew the reality that access to healthcare, education and wage employment is far less available on average in the rural target regions than in the country as a whole. See Table 6 below.

Table 6: Key development indicators for Namibia and project regions⁶¹

Key Development Indicators by Region	Namibia	Zambezi	Kavango East	Kavango West	Ohangwena	Omusati	Oshana	Oshikoto
Rural area (%)	57%	69%	71%	71%	94%	54%	87%	
Literacy rate 15+ years (%)	89%	84%	79%	86%	88%	96%	88%	
Unemployment (%)	37%	38%	54%	43%	42%	37%	40%	

⁵⁷ UNDP Human Development Report (2013)

⁵⁸ UNDP in Namibia – Progress towards MDG 1: Eradicate Extreme Hunger and Poverty

⁵⁹ *Namibia Economy Profile*(2014), Index Mundi

⁶⁰ *People and Society: Age Structure* (2014), CIA World Factbook – Namibia

⁶¹ Population and Housing Census (2001 – 2011), NSA

Life expectancy at birth, Male	63	41	42	43	46	46	50
Life expectancy at birth, Female	66	43	42	45	50	48	50
Gender Data							
Average number of children per woman	3.6	4.1	4.5	4.6	3.8	3	4.1
Girls 6-15 attending school (%)	-	81%	78%	53%	91%	52%	87%
Infant mortality per 1000 live births	-	119	142	112	78	87	119
Household Data							
Average household size	4.4	4.2	6	5.6	5.2	4.5	5.8
Household main income: farming (%)	16%	24.3%	45.7%	48.6%	59.6%	23.5%	41.33%
Household main income: pensions and cash remittance (%)	21%	21%	18%	35%	36%	24%	24%
Households with safe water	80%	73%	66%	56%	52%	84%	70%
Households with electricity	42%	32%	24%	11%	9%	31%	20%

As evidenced in the above table, regions vary greatly in terms of key development indicators, often with great departures from the national averages. For example, only 53% of girls aged 6-15 in Ohangwena region attend school, illuminating the severity of food insecurity in that region given that girls are often obliged to stay at home to help their mothers. Life expectancy at birth is also a figure worth noting, as the national average (63 for females and 66 for males) is 20 years greater than those of Zambezi, Kavango East, Kavango West and Ohangwena – due in large part to the HIV epidemic, which disproportionately affects the northern and northeast regions.

Development in the Agricultural Sector: For the estimated 73% of Namibia's population that live in rural areas, the vast majority relies on subsistence agriculture as either a primary (or supplementary) source of food security and income. However, significant impediments to agricultural development include extreme weather (alternating droughts and floods), eroded and nutrient-poor soils, water scarcity, deforestation, insufficient access to quality farming inputs (e.g. seed and tractors) and a widespread lack of knowledge and information about adaptive farming practices.

Exacerbating the already difficult development scenario in the agricultural sector is the fact that most smallholder farmers in rural northern Namibia continue to utilise destructive farming methods, such as mono-cropping, inappropriate tillage practices (e.g., disc harrowing and mould-boardploughing), inadequate soil cover and the removal of crop residue on eroded soils. These practices fail to efficiently harvest rainwater and leave soils exposed to severe winds, flood erosion and evaporation. Many rural farmers cling to these practices – despite increasingly disappointing yields – due to poor education and lack of knowledge about climate-smart methods, such as conservation agriculture. The result is that the production of northern Namibia’s staple crop, dry land pearl millet, achieves average yields of only 230 kilograms per hectare, which are among the lowest in the world.⁶² Namibia currently imports most of its staple cereals, and far too many households – particularly orphan and female-headed ones – rely on “emergency” food relief programmes for long-term food security.

At the same time, the local resources necessary to improve yields, such as training on climate-smart methods, quality seed, permanent soil cover and tractors capable of pulling CA tillage implements, remain in short supply and high demand. Currently, it is difficult for farmers to acquire quality staple crop seeds because seed producers and suppliers (e.g., smallholder farmer seed co-operatives) have themselves been badly affected by worsening climate conditions. There is also a critical shortage of the 4x4 tractors and rip furrowing implements needed to introduce CA on smallholder farms. This is due, in part, to the exclusion of many farmers from the formal economy and the banking sector, and thus access to productive credit.

The lack of development in the agricultural sector has had – and continues to have – devastating impact at household, community and national levels. Trapped in a cycle of poverty and food insecurity, farming-dependent households suffer from persistent malnutrition, extremely high HIV/AIDS prevalence rates, widespread unemployment, limited rural economic activity and few opportunities for advancement. These already bleak circumstances are exacerbated in female-headed farming households, which generate an average monthly income equal to only half that of their male counterparts.

⁶²Special Report FAO/WFP Crop, Livestock and Food Security Assessment Mission to Namibia (2009) Washington, FAO

Introduction to conservation agriculture (CA)

Evidence shows that the intensive tillage practices characteristic of conventional farming methods lead to soil degradation, erosion and desertification.⁶³ Conservation agriculture (CA) is increasingly being recognised as a productive adaptation alternative to these destructive methods.⁶⁴ CA has a twofold advantage in that it makes farms more productive and profitable while protecting the environment.⁶⁵

Indeed, key CA goals are to increase yields, improve food security and livelihoods for farmers, and contribute to sustainable agriculture and rural development through the application of the three core CA principles: (i) minimal soil disturbance; (ii) permanent soil cover; and (iii) crop rotation. Although these three principles are widely applicable, effective CA implementation requires that techniques and technologies are adapted to site-specific agro-ecological, socio-economic and cultural conditions.⁶⁶ CA is widely recognised as best practice for rain-fed, subsistence agriculture production, and its adoption in the project area aims to facilitate a widespread transition from extractive and exploitative traditional farming practices, such as disc harrowing, to Namibia-Specific Conservation Tillage (NSCT), which is a proven adaptation strategy for coping with increasingly harsh and variable climatic conditions.

Background of Proposed Project – History of NCAP in Namibia: The proposed project's foundation has been built over the last ten years through the work of various NCAP 2 partners. Each of the projects, which built the proposed project's foundation in the target area, is discussed briefly below:

The Conservation Tillage Namibia Project (CONTILL) (2005–2011): The CONTILL project was launched, in 2005, through the leadership of NCAP partner NNFU, among others to work with farmers to trial various CA methods in the Omusati region, with NSCT – the proposed project's primary tillage strategy – emerging as the method preferred by farmers. The CONTILL project expanded to five northern regions in 2008 when the EU provided additional financial support. CONTILL ended in 2011, with NSCT having proven not only a farmer-preferred CA method, but also an effective tool for increasing yields despite negative climate change impacts.

The Community Based Adaptation Pilot Project (CBA) (2009–2012): In 2009, NCAP partner CES began implementing the UNDPGEF-SGP Community Based Adaptation to Climate Change ("CBA") pilot project in five northern Namibian regions. Like the proposed project, the CBA project utilized Self-Help Groups (SHGs) to raise awareness and adoption of CA methods through peer-to-peer learning on both the NSCT and Hand-Hoe Basin methods. A strong best-practice model was thus created, and calls for up-scaling came from both farmers and government.

⁶³Thiombiano L., Meshack M, *Scaling-up conservation agriculture in Africa: strategies and approaches* (2009), FAO Sub-regional Office for East Africa, Addis Ababa.

⁶⁴Kassam A, Friedrich T, Shaxson F, Petty J *The spread of conservation agriculture: justification, sustainability and uptake*(2009), International Journal of Agricultural Sustainability 7(4):292-320.

⁶⁵*Climate Smart Agriculture Sourcebook* (2003),FAO

⁶⁶Erenstein O, Sayre K, Wall P, Hennlin J, Dixon J, *Conservation agriculture in maize- and wheat-based systems in the (Sub) tropics: lessons from adaptation initiatives in south Asia, Mexico and southern Africa* (2012) J Sustain Agric 36(2):180-206

The current NCAP Project (2012–June 2015): The current project began implementation in 2012 as an emergency response to severe drought that year, with financial support from the USAID Office of Foreign Disaster Assistance. It is during this first phase of the NCAP project that the proposed project's main components, outputs and activities were designed, tested and effectively employed. It is also during the 2012- 2015 phase that the need for upscaled implementation, enhanced cross-sectoral partnerships and a focus on CA service providers became apparent, each of which has been incorporated in the proposed project.

Each of the participants in the proposed project has gained invaluable experience through ground-up lessons learnt on adaptive strategies in the project area. To date, NCAP partners have produced thousands of CA-trained farmers, yields exceeding 500% greater than the national average, more than 4,100 hectares under CA cultivation and financed 20 brand new 4x4 John Deere tractors fitted with CA implements currently operating in the project area.⁶⁷ The stage is now set to capitalise on the knowledge and local capacity progressively developed through the CONTILL, CBA and current NCAP projects.



NCAP Lead Farmer Haliana Thomas in her CA demonstration plot, Oshikoto region

⁶⁷ Thompson, S., Conservation agriculture goes green... and yellow (25 Nov 2014), The Namibian

Project objectives

NCAP 2 is designed to promote and facilitate the widespread adoption of Namibia-specific CA farming methods in Namibia's seven northern dry-land crop producing regions in order to achieve the following **main objectives**, namely to:

- Foster climate change adaptation
- Build resilience
- Reverse soil degradation
- Improve food security
- Promote family health
- Increase smallholder farmers' incomes
- Capacitate small business owners
- Spur rural development
- Create employment opportunities for rural poor
- Empower female and orphan-headed households

The intended beneficiaries are rural smallholder farmers (mostly women) with less than 20 hectares under cultivation. The targeted food crops, pearl millet, sorghum, cowpea and maize, are vital staple foods for household and national food security.

NCAP 2 will enhance, expand and build upon bottom-up, participatory CBA approaches designed to meet local needs and self-replicate for sustainability through farmer-to-farmer knowledge and technology transfers. The proposed project's approach to climate change adaptation has already been tested in the project area and proven a powerful tool for meeting the proposed project's **specific objectives**, which include:

- Improving soils using CA methods
- Increasing the number of hectares under CA cultivation
- Up-scaling and enhancing the training of smallholder farmers on CA methods
- Improving farmers' access to CA inputs and implements
- Increasing the number of people providing CA services in their own communities through CA training, business planning guidance and access to low-cost development loans
- Creating a formal committee within the NNFU for farmer-to-farmer sharing
- Utilising data collection, research, advocacy and media to disseminate lessons learnt on the ground; and
- Promotion of CA as an effective adaptive strategy.

Ultimately, the proposed project aims to build on the sustainable and solid foundations laid for smallholder farmers to achieve positive environmental, economic and social outcomes in their own communities despite worsening climate change impacts.

Project components and financing

Project financing is based on 50% AF funding and 50% co-funding. All costs (project activities cost, project execution cost and project management fee) for implementing the project will be equally shared between AF funding and co-funding.

Table 7: Project components, outcomes and budget

Project Components	Expected Outcomes	Expected Concrete Outputs	Amount (USD)
1. Increase rural small-holders' capacity to adopt CA through education, training, field support and access to enabling resources	1. 13,052 rural small-holder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions	1.1 502 Lead Farmers trained on climate change impacts and Namibia-specific CA methods	66,275
		1.2 502 Lead Farmers having trained 12,550 of their neighbours on climate change impacts and Namibia-specific CA methods through four on-farm training sessions per crop season during three years	1,684,119
		1.3 LFs and ACAFs having brought 10,000 hectares of staple grains under CA cultivation and having achieved a minimum average yield of 1,670 kg per hectare for staple grains	40,622
		1.4 Four no-till field trials undertaken together with LFs	34,433
Sub-Total Component 1			1,825,449
2. Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital	2. Fully-capacitated small business owners provide CA inputs and services in their own local communities to meet small-holder farmers' demand	2.1 180 small business owners educated on climate change impacts, adaptation strategies and markets for their services	10,000
		2.2 Small business owners' and rural communities' access to start-up capital, CA inputs and CA equipment improved in order to meet CA farmers' demands	435,398
		2.3 Technical and business support provided to small business owners who are providing CA inputs and services in their own communities	42,820
Sub-Total Component 2			488,218
3. Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts	3. Improved awareness and knowledge locally, regionally and globally regarding ground-up lessons learnt, best climate change adaptation practices, intervention strategies, project success stories and opportunities for participation	3.1 Project research, data and lessons learnt on best practices, documented and disseminated to stakeholders locally, regionally and globally	188,637
Sub-Total Component 3			188,637

Project Activities Cost (A)	2 502 304
Project Execution Cost (B)	262,673
Total Project Cost (A+B)	2, 764,977
Project Management Fee (C)	235,023
Amount of Financing Required (A+B+C)	3,000,000
Amount of Co-financing [0.5*(A+B+C)]	1,500,000
Amount of AF Financing Requested [0.5*(A+B+C)]	1,500,000

Table 8: Breakdown of Adaptation Fund financing requested

Project Component	Amount USD
0.5 x Project Activities Cost (0.5A)	1,251,152
0.5 x Total Execution Cost (0.5B)	131,336
0.5 x Total Project Cost [0.5(A+B)]	1,382,488
0.5 x Project Management Fee (0.5*C)	117,512
Amount of AF Financing Requested [0.5*(A+B+C)]	1,500,000

Projected calendar

The following table lists NCAP 2 milestone events and the expected date that each milestone will be reached:

Table 9: Projected calendar

Milestones	Expected Completion
Start of project (Inception workshop)	January 2016
Mid-term evaluation	September 2017
Project closing	June 2019
Terminal evaluation	April 2019

PART II: PROJECT JUSTIFICATION

A. Project Components – Concrete Adaptation Activities for Climate Resilience

The project's objective is to strengthen the adaptive capacity and climate change resilience of smallholder farmers in rural northern Namibia in order to improve food security, with a special focus on vulnerable subsistence farming households.

NCAP 2 is designed to achieve this objective by utilising a community-based adaptation (CBA) approach to CA knowledge and technology transfer, which has a proven record of success under the current NCAP project. Indeed, each of the project components, outcomes, outputs and activities builds on lessons learnt from the Executing and Implementing Entities' experience on previous CBA projects / programmes.

Specifically, this approach has three main components, namely to:

- Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources;
- Capacitate small business owners to provide CA services in their own communities through technical and business training, field support and access to start-up capital; and
- Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts.

As described in greater detail throughout this section, each of the project components is aligned with the overall goals and objectives outlined in the AF Results Framework, namely to:

- Ensure that project components, outputs and activities are cohesive among themselves, harnessing cross-sector expertise and synergies wherever possible;
- Undertake adaptation measures that are suited to the unique climate threats present in northern Namibia; and
- Account for non-climatic barriers to achieving the project objective whenever relevant.

The following sections provide a detailed description of the project components, outcomes, outputs and concrete adaptation activities, as well as describe how activities will help with adaptation to climate change and improved climate resilience.

Component 1: Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources

Each of the Component 1 Outputs and Activities is designed around the principles of targeted community engagement and ownership building. In Namibia, it is recognised that local level impacts can only be reached when working directly and dedicatedly with communities and smallholder farmers.⁶⁸

NCAP 2's approach to increasing rural smallholder's capacity to adopt CA is based upon the Executing Entities' prior CBA work in the seven northern Namibian regions, which has shown that setting up and working with voluntary Self-help Groups (SHGs) can be a successful way of mobilising motivated community members.

An SHG is a voluntary village-based group of 15–25 community members, youth and adults, who are all subsistence farmers. An SHG regularly meets regularly for mutual problem solving, knowledge sharing, savings and lending, and enterprise creation. This approach focuses on establishing self-help groups based on interest and motivation, and entails the setting up of peer learning structures.

As described in the specific Component 1 Outputs and Activities below, NCAP and NCAP 2's approach is to train and capacitate a small number of locally-influential farmers, who bring a portion of their own land under CA cultivation – with project assistance – and use it as a training ground for an SHG consisting of their neighbours.

It is envisaged that these SHGs will turn smallholder farms into learning hubs for the rest of the farming community, thus creating a sustainable method of learning and passing on best practices related to climate change resilience building. Critical aspects of work with communities, such as overcoming barriers and resistance to absorption of new farming techniques, technologies, and approaches will specifically be addressed by such an approach, and the power of peer learning will be harnessed.

Outcome 1: 13,052 rural smallholder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions

Both droughts and floods are ever-present threats for communal farmers' food security. Their harvests depend directly on predictable and sufficient rainfall. However, climate change is already negatively impacting these farmers through droughts, floods, unpredictable rainfall, soil degradation and soil erosion. As a result, the FAO estimates that approximately one million of Namibia's 2.1 million people are considered "undernourished persons," giving Namibia one of the highest rates of undernourishment in the world at 42.3%⁶⁹.

⁶⁸ The IPCC ARWG5 report specifically stresses the importance of working with local people and applying community engagement approaches that truly empower the farmers on the ground to learn about climate change adaptation and build their own adaptive capacities.

⁶⁹ *Interactive Hunger Map* (2015), FAO; <http://www.fao.org/hunger/en/>

The situation is unlikely to change given worsening climatic conditions and the persistence of maladaptive agricultural practices. As a result, the uptake of climate adaptive farming practices is critically important.

The first step is to train farmers, which, as discussed below, will be accomplished by training 502 “lead farmers” in local communities, who will then be responsible for training a combined anticipated total of 12,550 of their neighbours. In this way, the spread and uptake of climate-smart agriculture will be locally-driven, sustainable and replicable across approximately 10,000 hectares to be brought under CA cultivation via Outcome 1.

Output 1.1: Train 502 Lead Farmers on climate change impacts and Namibia-specific CA methods

NCAP and NCAP 2’s CA adoption strategy is based upon farmer-to-farmer transfers of information, knowledge, experience and resources. Lead farmers (LFs), who are locally-influential farmers, are vital to this process. Under NCAP 2, the LFs will be responsible for training their neighbours on climate change impacts and risks, as well as CA methods for mitigating them. Accordingly, a critical first step involves training LFs.

Specifically, NCAP 2 field trainers will work directly with LFs to educate them on climate change impacts, as well as CA methods relating to soil improvement, long-term field management and land preparation utilising tractors (“Namibia Specific Conservation Tillage” or “NSCT”), draught animal power and the hand-hoe CA basin method. Each of these components is detailed below:

Soil improvement

No-cost fertilisation through crop rotation of legumes with pearl millet, maize sorghum, coupled with composting of plant residues has worked well in combination with ripping and furrowing. In-field water harvesting resulting from ripping and furrowing practices has contributed to continuous growth even with inadequate rains during the farming season. Moreover, in torrential downpours (resulting from variable rainfall attributed to regional climate change), fields where conservation agriculture was applied have not been waterlogged, soils have been less alkaline and have retained less moisture for a longer period of time.

Long-term field management

Early rains make nutrients available and if a crop is planted some weeks later, much of this nutrition is leached away or becomes unavailable before it can be used by crop plants. Good management practices will be employed that ensure critical growth stages are less impacted by harsh climatic conditions such as mid-season droughts or temperature peaks, by modifying the length of the growing period, and changing planting and harvesting dates. The project will utilise CA strategies to overcome this barrier.

CA land preparation methods

Lead farmers will be trained on one or more of the following climate-smart land preparation methods, depending upon local needs, desires and circumstances:

Namibia-Specific Conservation Tillage (NSCT): This approach to land preparation utilises tractors fitted with specialised rip furrowing implements that crack open the increasingly problematic hard plough-pan, and create ridges for in-field rain water harvesting, which guides water to the planting lines and enables water infiltration for deep plant root development under both drought and flood conditions.

Draught Animal Power: Utilisation of animal power as a rip furrowing implement, which is designed to achieve the same outcomes as the NSCT methods when 4 x 4 tractors fitted with rip furrowing devices are unavailable.

Hand-Hoe Basin: This method utilises uniformly spaced planting holes (or planting basins), which are opened through field residue in the otherwise undisturbed soil. The planting basins are organized in a line across the field's main slope to maximize in-field water retention.

LFs will be trained in each of these areas, as appropriate, in order to ensure that this first critical link in the farmer-to-farmer knowledge transfer chain is a solid one, which is vital to ensuring the long-term success and sustainability of the programme's CBA approach.

LF training will take place in two distinct ways: First, NCAP 2 will train 70 new LFs to increase overall CA uptake. Second, NCAP 2 will conduct enhanced training sessions for the existing 432 LFs to ensure the continuing quality and depth of their climate adaptation and CA knowledge, as well as their teaching abilities. Each of these is discussed more fully in the concrete adaptation activities below.

Activity 1.1.1: Conduct regional training sessions for 70 Lead Farmers

NCAP 2 field trainers will train and support 70 LFs across Namibia's seven northern regions, with 10 LFs per region. Each of these 70 LFs will be converting at least one hectare of their land from conventional, maladaptive practices to CA farming practices. As incentives to participation, each LF will receive seed sufficient to plant one hectare of staple grain and legumes, CA training and continuing field and technical support.

As discussed in greater detail in Output 1.1 above, NCAP 2 field trainers will educate these farmers on climate change, the three main pillars of CA, and CA land preparation and planting methods through training sessions. Practical training materials and a mentoring approach will be applied to ensure effective knowledge transfer from NCAP 2 field trainers to LFs. The 70 LFs will be trained in two regional training sessions during the first year of the project.

As described more fully in Output 1.2 below, these 70 LFs will, in turn, be responsible for training their neighbours on CA methods for success. This activity is the first vital step in NCAP 2's CBA approach, which relies on farmer-to-farmer knowledge transfers for long-term sustainability.

Activity 1.1.2: Conduct enhanced regional trainingsessions for 432 current Lead Farmers already trained under the current NCAP

The proposed project will continue working with the 432 already NCAP-trained LFs through advanced regional trainingsessions to strengthen their current CA knowledge and teaching capacity. As discussed above, LFs form the basis of the project's CBA approach to teaching and training. It is therefore critical to ensure not only that NCAP trains more LFs, but also that the project continues to ensure that its currently-participating LFs remain up-to-date and informed on the latest teaching and training information and methods. Accordingly, the proposed project is designed to have a strong continuing education component for LFs through this activity.

Table 10: NCAP Lead Farmers by region and constituency

Kavango East

Constituency	Total	F	M
Bagani	9	5	4
Hans Kannyinga	8	1	7
Kapupaghedi	8	3	5
Mashare	14	8	6
Marwaneno	10	4	6
Ndiyona	10	4	6
Shadikongoro	3		3
Shighuru	7	2	5
Total	69	27	42

Ohangwena

Constituency	Total	F	M
Engela	11	5	6
Ongenga	10	8	2
Endola	10	5	5
Omulonga	8	5	3
Ohangwena	5	3	2
Ondobe	5	4	1
Okongo	6	4	2
Eenhana	5	3	2
Total	60	37	23

Oshana

Constituency	Total	F	M
Ongwediva	7	6	1
Okatana	2		2
Oshakati West	3	2	1
Oshakati East	1	1	
Ompundja	2		2
Okaku	10	7	3
Ondangwa	12	7	5
UukwiyuUushona	18	15	3
Okatyali	2	2	
Uuvudhiya	5	5	
Total	62	45	17

Kavango West

Constituency	Total	F	M
Kapako	8	6	2
Rundu Rural	1		1
Tondoro	28	20	8
Mpungu	12	4	8
Nkurenkuru	4	1	3
Total	53	31	22

Omusati

Constituency	Total	F	M
Anamulenge	4	3	1
Okalongo	7	4	3
Oshikuku	2	2	
Ogongo	3	2	1
Elim	10	8	2
Outapi	2	2	
Tsandi	7	7	
Onesi	7	5	2
Ruacana	4	3	1
Otamanzi	8	7	1
Okahao	3	3	
Etayi	6	6	
Total	63	52	11

Oshikoto

Constituency	Total	F	M
Omuthiya	5	3	2
Eengodi	3	2	1
Okankolo	11	6	5
Olukonda	7	6	1
Onyaanya	4	3	1
Omuntele	12	10	2
Oniipa	8	4	4
Onayena	8	4	4
Nehale	5	1	4
Total	63	39	24

Zambezi

Constituency	Total	F	M
Katima Rural	8	3	5
Kabbe	11	7	4
Sibbinda	13	10	3
Linyati	12	6	6
Kongola	18	11	7
Total	62	37	25

Total lead farmers 432

Total female lead farmers 268

62% women, 38% men

Specifically, 11 regional training sessions will be held focusing on advanced CA, recent CA development in no-till and for LFs to share experiences across the regions on lessons learned as LFs training their neighbours.

Output 1.2: 502 Lead Farmers train 12,550 of their neighbours on climate change impacts and Namibia-specific CA methods

The project's CBA approach relies heavily upon farmer-to-farmer transfer of knowledge and experience, which has proven under the current NCAP to promote practical adaptive processes to participating rural smallholders, as well as overall sustainability and replicability.

Specifically, fully trained and capacitated LFs (rather than NCAP 2 field staff) are responsible for training their own neighbours on climate change impacts and Namibia-specific CA methods. The primary mechanisms for achieving this Output are LF Demonstration Plots (Activity 1.2.1) and Farmer Field School training (Activity 1.2.2), each of which is discussed more fully in the concrete adaptation activities below.

Activity 1.2.1: LFs establish 502 Demonstration Plots

Each LF will establish a one-hectare demonstration plot on his or her land utilizing CA methods (these plots will be re-established during three crop seasons). NCAP 2 will provide the necessary seed and CA land preparation services as incentives to participation. The purpose of demonstration plots is twofold: First, to encourage CA uptake by providing tangible examples of CA benefits in local communities; and second, to establish a physical space on which LFs can train their neighbours on CA methods.

Specifically, the project finances rip furrow land preparation and seed for the demonstration plots, and LFs are responsible for planting, maintaining the plots and harvesting. NCAP 2 will also provide composted manure both from composting pilots and the procurement of composted manure for 25% of LFs outside the cattle grazing areas.

Demonstration plots are critical to the widespread uptake of CA methods across rural communities as they serve as tangible examples of CA benefits in local communities by showing positive CA results despite climate change impacts, such as droughts and floods. As discussed under Activity 1.2.2 below, demonstration plots will also serve as training grounds for LFs to instruct their neighbours on climate change impacts and risks, as well as Namibia-specific CA methods, through self-help groups (SHGs).

NCAP 2 will also introduce moringa trees to demonstration plots. .

Moringa is nutritional dynamite, its products having literally hundreds of uses for this tree. Encouraging its growth thus offers nutritional, medicinal and economic hope to communities with the NCAP 2 project area.

Moringa trees have been used to combat malnutrition, especially among infants and nursing mothers. The NGO, Komeho Namibia, which has been a pioneer in championing its use, have recorded success in reducing malnutrition and conditions of stunt among San children at the Bravo Resettlement Project through supplementing diets with moringa leaves.

Optima of Africa, Ltd., a group that has been working with the tree in Tanzania, has found that “25 grams daily of moringa leaf powder will provide a child with the following recommended daily allowances: protein 42%, calcium 125%, magnesium 61%, potassium 41%, iron 71%, vitamin A 272%, and vitamin C 22%”. These numbers are particularly encouraging as this form of nutrition is available when other food sources may be scarce.

Moringa is also known to stabilise water levels, control salinity and act as filter against contaminants to improve water quality, absorb carbon dioxide and some pollutants and reduce soil erosion.

The planting of moringa will thus serve to bring benefits for soil conservation and deforestation as well as restoring environmental biodiversity and ensuring availability of these valuable indigenous genetic species.

Activity 1.2.2: Each LF trains 25 of his/her neighbours through Farmer Field School (“FFS”) training sessions on their Demonstration Plot

Each LF is responsible for leading a Self-Help Group (SHG) in his/her local community, which will serve as the driving force behind farmer mobilisation. These SHGs are known as Farmer Field Schools (FFS).

FFSs provide an opportunity for interested community members to come together for training on climate change impacts and adaptation, low-tillage agriculture, conservation agriculture and multipurpose crops, farm planning and management, nutrition and crop diversification. These informational and educational sessions are conducted on each LF’s Demonstration Plot and are attended by the LF’s neighbouring farmers (“Aspiring Conservation Agriculture Farmers” or “ACAFs”).

Specifically, each LF is responsible for training 25 ACAFs on climate change impacts and risks, as well as CA methods for mitigating them. FFS training groups are usually composed of 25 smallholder farmers, the majority of whom are women. NCAP 2 project management and field trainers will provide field-based support and feedback regarding FFS trainings, including training and information packages and materials.

FFS training sessions provide tangible, local-level demonstrations to develop visible and practical adaptation learning, which can be directly used and applied by other constituencies, extension services in the regions and local and regional government representatives, as well as by other communities. In this way, the FFS approach achieves positive outcomes that are local, sustainable, replicable and exponential (by a factor of 25) due to its village and community-based approach.

FFS training sessions take place both before planting and after harvest at which LFs train their neighbours (ACAFs) on the three main pillars of CA: (1) minimum soil disturbance; (2) permanent soil cover; and (3) crop rotation.

Specifically, FFS training sessions will undertake the following activities:

- Identifying and demoting commonly-employed maladaptive practices, such as disc harrowing and mono-cropping;
- Training farmers on Namibia-specific CA methods and strategies for shifting to adaptive practices and investments, including:
 - Producing and applying compost-based fertilizer (manure) to improve soil fertility;
 - Adopting soil improving management methods, such as crop rotation;
 - Creating in-field water harvesting through deep ripping and furrowing land preparation methods to increase water infiltration;
 - Increasing the water-holding capacity of soils by enhancing soil organic matter (SOM);
 - Utilising crop cover to retain soil moisture and combat soil erosion and compaction, which leads to poor water infiltration, runoff water loss and soil erosion from wind and floods; and
 - Using mulching to improve seed germination

- Training farmers on marketing and financial management.

It is through these FFS training sessions that NCAP 2 will make a broad-based impact, with each NCAP 2-trained LF training 25 of his/her neighbouring smallholder farmers. This CBA approach not only ensures that NCAP 2's reach extends far beyond the number of farmers that NCAP 2 field trainers are capable of working with directly, but it also ensures that LFs and participating farmers in their community have a strong sense of ownership and participation, which will ensure both long-term replicability and sustainability.

Output 1.3: LFs and ACAFs bring 10,000 hectares of staple grains under CA cultivation and achieve a minimum average yield of 1,670 kg per hectare for staple grains

NCAP and NCAP 2's training and support activities are designed to make real impacts in the rural smallholder informal farming sector. Accordingly, it is critical that NCAP 2 have in place measurable targets, as well as strategies and methods for ensuring that those targets are met.

With NCAP training and support, LFs have already successfully established 432 demonstration plots, trained 10,800 ACAFs on CA methods, and brought approximately 2,000 hectares of staple grains under CA cultivation. While this data represents a significant intervention, up-scaling and enhancement are vital to achieving a broader impact. Accordingly, NCAP 2 aims to achieve the following specific targets, namely to:

- Increase the total number of hectares under CA cultivation from the current 2,000 hectares up to 10,000 hectares across Namibia's seven northern regions
- Achieve a minimum average yield of 1,670 kg per hectare for staple grains vital to household and national food security.

The specific methodology that NCAP 2 will employ to measure progress toward these targets is discussed fully in the following concrete adaptation activities immediately below.

Activity 1.3.1: Measure the number of hectares under CA cultivation in the project area

The number of hectares brought under CA cultivation is a critical data point for NCAP 2, as it provides a clear gauge for assessing overall project outreach. As CA cultivation is generally recognised to be more productive than conventional methods utilised in the project area, data regarding the number of hectares under CA cultivation is also directly related to overall household and national food security. Accordingly, it is vital that NCAP 2 carefully and methodically collect and analyses such data.

In order to measure the number of hectares brought under CA cultivation through NCAP 2 in all seven project regions, the project will need to focus upon two categories of project participants: (1) LF farms; and (2) LF's neighbouring farms (ACAF farms). The proposed project will work directly with LFs and indirectly with ACAFs through FFS training. Accordingly, separate and distinct measurement tools and strategies will be used for LF and ACAF farms due to their differing involvement with NCAP 2 and its field trainers.

First, as described in Activity 1.2.1 above, NCAP 2 will work directly with each LF to establish a one-hectare demonstration plot on each LF's farm. Accordingly, field trainers will have first-hand access to data regarding the number of hectares brought under cultivation by LFs, including both demonstration plots and additional hectares prepared using CA methods on each LF's farm. This data will be collected by NCAP 2 field trainers using specialised forms designed for LFs.

Second, in order to collect and measure data regarding the number of hectares brought under CA cultivation by LFs' neighbouring farmers (ACAFs), the proposed project will utilise affordable satellite tracking systems with NCAP 2-participating tractors fitted with tracking devices, which will collect the exact number of hectares ripped using CA methods, as well as the times and geographic locations of that work. This vital information is recorded for instant download via internet, and will be collected by NCAP 2 partner CLUSA Namibia on a daily basis during the land preparation season.

NCAP previously tracked the number of hectares ripped by CA service providers using a combination of GPS co-ordinates and surveys. This has proved to be extremely difficult and time consuming. Accordingly, the cost of installing the satellite tracking devices will be borne as a Monitoring and Evaluation cost, as discussed in greater detail in Part III C: Project Monitoring and Evaluation Arrangements and Budgeted Plan and Part III E: Detailed Budget, Implementing Entity's Management Fee Use, and Execution Costs".

Tractor owners have a strong interest in using satellite tracking devices as well. An all too common occurrence in the project area is that tractor drivers will rip additional fields without informing the tractor owner. Tractor drivers do this in order to "pocket" fees for land preparation services and supplement their incomes, which makes tractor owners' businesses less profitable. For example, if a driver "pockets" the income for one additional hectare each day (not uncommon), then the tractor owner loses more than USD 1,000 per month.

Tractor owners are therefore keen to use these devices to know exactly how many hectares have been serviced for the purposes of assessing both their revenue and expenses (e.g., diesel fuel), this information being made available to tractor owners on their mobile phones by the satellite tracking company. Accordingly, tractor owners will be responsible for paying a monthly subscription fee to the satellite tracking company (approximately USD 20 per month during the land preparation season), which represents a very small portion of their revenue as participating service providers, and which will encourage a strong sense of tractor owner involvement and ownership in the satellite tracking system.

In all cases, specific internal forms and data management systems will be established to ensure the efficient collection, storage, monitoring, evaluation and dissemination of data regarding the number of LF and ACAF hectares brought under CA cultivation by participating farmers.

Activity 1.3.2: Measure staple grain yields per hectare using the FAO Agri-Gender Toolkit

According to a United Nations Joint Programme and FAO baseline study of 2009, the baseline for the current yield of Namibia's staple food cultivated by approximately 160,000 subsistence farmers is 230 kg per hectare⁷⁰. In the absence of updated figures on average yield per hectare, this figure will serve as a baseline for comparison with NCAP 2 participants. Accurate measurement of staple grain yields per hectare will be carried out on 20 farms per region, producing yield data on a total of 140 farms for each year of the project.

The method that will be utilised to measure yields per hectare is as follows: Field consultants will demarcate 10 x 10 metre squares in the most evenly developed areas of a field. The farmer must then guarantee that when she/he harvests, all grain panicles from that square are dried and threshed separately in order to be weighed. During this time, field consultants will be available to farmers to provide guidance, assistance and support during the harvesting and weighing process. In order to determine the yield per hectare, we multiply the yield weight by 100 in order to arrive at yield per hectare (1 hectare = 10,000 metres²).

In keeping with gender makeup of LFs, the farmers selected to participate in yield measurements will also consist of a 60:40 female/male ratio. In each region 12 women LFs and 8 men LFs will be selected to participate in this process, rendering a sample that consists of 84 women and 56 men, a total of 140 LFs.

In previous years the task of measuring staple grain yields per hectare has proven to be both difficult and time consuming for a variety of reasons. NCAP has experienced enormous challenges with on-farm yield measurements as farmers sometimes forget to keep the demarcated harvest separate, other times they are away and so on. Based on lessons learned, the upscaled NCAP 2 would improve accurate measurement of staple grain yields per hectare by utilising field consultants to work more closely with farmers participating in yield measurements at the time of harvest.

In addition to taking yield per hectare measurements, Data Item 3 of the FAO Agri-Gender Toolkit is specifically designed to collect gender-disaggregated data related to both agricultural yield and household food production⁷¹. Using the Production and Productivity section of the FAO Agri-Gender Toolkit (Table 7), field consultants will survey all 502 LFs and a statistically significant number of ACAFs on the below data points, which relate specifically to production.

⁷⁰ Communal farmer harvest bumper mahangu crop (2011), Economist Namibia

⁷¹ *Agri-Gender Statistics Toolkit Data Items*, FAO <http://www.fao.org/gender/agrigender/agri-gender-toolkit/en/>

Table 11: Production and Productivity (Data Item 3) of FAO Agri-Gender Toolkit

D 3.1	Food and cash crop production and productivity by sex of holder or sub-holder
D 3.2	Horticultural production and productivity by sex of the head of household/holder or sub-holder
D 3.3	Animal production and productivity by sex of the household member or head of household
D 3.4	Aquaculture production and productivity by sex of holder or sub-holder
D 3.5	Agro-forestry activities by sex of holder or sub-holder
D 3.6	Hunting and gathering activities by sex of holder or sub-holder
D 3.7	Production constraints faced by agricultural producers by sex of holder or sub-holder

Field consultants will complete the full FAO Agri-Gender Toolkit survey with all 502 LFs and compare the results to survey data collected from ACAFs in order to gain a clear picture of NCAP 2's impact on CA-practicing farmers.

Output 1.4: Conduct trial of no-till field preparation, which has never before been done in Namibia

While the ultimate goal of the proposed project is to significantly increase the uptake of CA in Namibia's northern regions, we also recognise the long-term importance of moving toward fully self-sufficient, climate-smart agricultural methods, such as no-till agriculture. Accordingly, this output is designed to trial no-till methods in northern Namibia, which has never been done before.

The goal is to put theory into practice in a part of the world where these methods have never been formally trialled, and the proposed project will do so on a small scale. The data on no-till agriculture in other parts of the world is promising, and the goal of long-term sustainability of agricultural systems is a vital one. Accordingly, the proposed project will trial no-till agriculture in the project area, as discussed in greater detail in Activity [1.4.1] below, in order to gather baseline data, test no-till equipment and measure no-till agriculture results over the project timeline.

Activity 1.4.1: Train and support 4 no-till field preparation trials

The proposed project will train and support four LFs in no-till field preparation trials, which has never been done in Namibia. This approach will utilise no-till implements, fenced fields and permanent soil cover in order to determine whether such strategies can improve yields whilst reducing farmers' costs and reversing soil degradation.

Specifically, this will involve work on-farm twice annually with the four LFs who will be trained in-depth on the concept of soil cover and no-till, and will be carried out by a contracted specialist service provider. Together, they will trial the practice and maintenance of soil cover (from 30% to 100%) and minimum-tillage (ripping with the ripper wings removed). New and improved technology will be tested intensively in order to establish best practice for Namibian conditions. Documentation of soil moisture levels, soil compaction, organic matter in soil and yields will be carried out continuously.

Component 2: Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital

The proposed project will train, capacitate and support small business owners, co-operatives and local economies to provide for themselves the CA services that they increasingly demand. Long-term project success and sustainability demand that local business owners develop capacity to deliver the CA inputs and services that farmers will need long after NCAP 2 completes its work.

Small business owner participation will be incentivised and achieved through enhanced and up-scaled education, technical and field support, access to specialised microfinance loans and pilot programmes designed to build local CA capacity.

Outcome 2: Fully-capacitated small business owners provide CA inputs and services in their own local communities to meet smallholder farmers' demand

Despite widespread interest from farmers to practice CA, one of the biggest obstacles to successful and sustainable CA adoption has been a complete absence of rip furrowing services to farmers available in the project regions. This is due to a deficiency of basic infrastructure and development in northern Namibia such that farmers lack access to the services they need in order to be successful without outside intervention. Prior to CLUSA Namibia's involvement, there was a close to 100% lack of service providers who had access to adequate, good condition 4x4 medium sized tractors that were additionally fitted with the proper ripper implements.

NCAP 2 seeks to solve this sector-wide problem, which is persistent and prevalent in all project regions, by making it relatively easy for small business owners already operating in the private sector (as well as new start-up businesses) to become profitable with project support. Specifically, NCAP 2 will provide the necessary education, training, support and access to capital and equipment through existing systems and cross-sector synergies.

Without continued support to the private sector for it to be able to provide professional rip furrowing services to project participants, the impetus and skills necessary for the private sector to continue to accommodate CA practicing farmers after the close of the project will evaporate – taking with it sustainable access to CA services. NCAP 2 seeks to train and equip enough private sector farmers with the ability to continue providing CA-specific rip-furrowing services, in addition to creating a market for these services. This not only stimulates rural development, but also ensures that the successes and accomplishments of the project will last long after it has come to an end.

Output 2.1: Educate and train small business owners on climate change impacts, adaptation strategies and markets for their services

Critical to encouraging small business owners to provide CA services in their own communities is first educating them on climate change impacts and adaptation strategies. Like smallholders, NCAP 2 will train small business owners on climate change impacts, as well as CA methods relating to soil improvement, long-term field management and land preparation.

Small business owners will receive specialized training focusing upon CA inputs, such as seed, and land preparation methods, such as Namibia Specific Conservation Tillage (NSCT) and draught animal power tillage. It is in these areas where vital inputs and services are most lacking, and making small business owners aware of this potential market for their services is therefore critical to ensuring their inclusion as participants in this market.

Activity 2.1.1: Conduct regional training sessions for small business owners

NCAP 2 training for small business owners will impart all the necessary information required to plan and market their CA inputs and/or services businesses in their local communities. Specifically, small business owners aspiring to develop a new market or business in the CA farming sector will receive instruction in the following areas:

- Climate change impacts and climate change outlook;
- Adaptation strategies, with a special focus on CA inputs (e.g., seed) and land preparation methods (e.g., deep furrow ripping using a 4x4 tractor);
- NCAP's work with farmers, including success stories and demonstrations; and
- Opportunities for creating new markets for inputs and services in the burgeoning CA sector.

Kongalend, as executing entity, will contract specialist practical training for this purpose which will be designed to encourage and entice small business owners to participate economically in the growing CA sector, as well as to provide them with the information and knowledge needed to establish a solid business plan, access capital and acquire the inputs and equipment necessary to undertake a profitable business providing inputs and services to rural smallholder farmers practicing CA in Namibia's seven northern regions.

Output 2.2: Improve small business owners' and rural communities' access to start-up capital, CA inputs and CA equipment in order to meet CA farmers' demands

NCAP 2 has heeded the call from CA farmers demanding improved access to CA inputs and equipment. Meeting their demands is vital to CA uptake and overall climate change adaptation in Namibia.

Namibian entrepreneurs – rather than international donors – must ultimately meet these demands to ensure long-term sustainability. It is not enough to simply place tractors in the project area using donor funds; rather, only a stable and undistorted financial sector and market for CA equipment and services will facilitate long-term sectoral development. As such, NCAP 2's approach to the development of local communities is rooted in the idea that only the private sector can meet farmers' demands for CA inputs and services.

This approach has already proven effective in the project area. For example, NCAP entered into partnership in 2014 with Kongalend Financial Services, who designed affordable loan packages to enable local entrepreneurs to purchase CA inputs and equipment for the purpose of serving CA farmers in their own local communities. Through this initiative, Kongalend clients were able to place 18 brand-new John Deere 4x4 tractors fitted with CA implements in the project area while NCAP ensured that the tractors were kept busy on participating farmers' fields, with approximately 4,100 hectares brought under CA cultivation by those tractors in the 2014-5 planting season. This has proven to be not only economically profitable for tractor owners and drivers, but also vital to the uptake among CA-trained farmers desirous of bringing their fields under CA cultivation.

Accordingly, NCAP 2 will undertake the following activities in an effort to foster the market conditions necessary for Namibian entrepreneurs to deliver the supply of CA inputs and services necessary to meet Namibian farmers' demands:

- Working with financial institutions to develop tailor-made solutions to meet local entrepreneurs' and farmers' needs.
- Increasing the number of CA appropriate tractors operating in the project area by improving awareness of the availability of affordable credit, as well as profitable business opportunities available through providing CA land preparation services in the project area.
- Increasing the number of Community Draught Animal Power Promoters (CDAPPs), who provide training on vital CA land preparation methods in cases where tractors are unavailable or cost prohibitive.
- Training and supporting CA service providers, including tractor owners, tractor drivers and draught-animal power land preparers, through marketing and business training to ensure the viability of their enterprises.
- Training and supporting seven farmers' co-operatives to trial unique seed breeding, retention and multiplication methods for high-demand seed, which is a critical first step in addressing the current lack of quality seed in the project area.

Each of these is discussed more fully in the concrete adaptation activities detailed below.

Activity 2.2.1: Work with financial institutions to develop instruments necessary to capitalize small business owners and local communities

Namibia's financial institutions, particularly development-centred microfinanciers such as Kongalend (which has already made significant inroads to support CA farmers through its Lima Power and special tractor financing loans), are best positioned to provide small business owners and local communities with the start-up capital needed to provide CA inputs and services to rural farmers. Such institutions are capable of providing viable demand-driven financial services by reacting to an ever-changing environment, as opposed to long development programmes that rely mainly upon donor support for implementation.

Indeed, a stable and undistorted financial sector facilitates development more than a subsidised, albeit well-meant, project consisting of handouts, and financial products have increasingly made their entry into programme design in the last few decades.

However, Namibians are relatively underserved by the formal banking sector, with many relying upon exploitative cash lenders operating mainly on salary based loan products. As a result, one key barrier to achieving widespread adoption of climate resilient smallholder agriculture is lack of access to capital. This prevents groups of smallholders and small business owners from accessing the CA inputs and services needed for success.

The CBA projects implemented by NCAP partners NNFU, CLUSA Namibia and CES have shown that smallholders and small business owners will effectively utilise development microfinance loans, to solve these problems for themselves, if given the opportunity.

For example, the current NCAP project has a proven record of solving these problems through synergies with microfinance institutions and manufacturers. In 2014, Kongalend developed a special small agri-business loan for tractors and rippers, in addition to its Lima Power loan for agricultural inputs and services. This loan package specifically designed for small-scale farmers enabled 18 John Deere 5530 models to be handed over to Kongalend clients in November 2014, just in time for the sowing season.⁷² These tractors came ready equipped with rippers uniquely designed and manufactured locally to achieve CA-specific land preparation, as well as being designed to comply with best practices such as NSCT.

Accordingly, NCAP 2 will continue to work with its financial partners to develop loan and credit products tailor-made to local needs in the project areas, such as tractors and rip furrowing CA implements. This will be achieved in several ways, as described immediately below.

As an initial matter, small business owners who participate in NCAP 2 training will be exposed to existing microfinance lending packages, such as the ones currently offered by Kongalend and Agribank. However, additional forms of financing are needed to ensure broad access to capital and an efficient market for affordable loans.

NCAP 2 will work co-operatively with the financial sector, including implementing partner Kongalend, to undertake the following activities in order to ensure that small business owners and local communities are able to meet CA farmers' demands for CA inputs and services:

⁷² Thompson, S., Conservation agriculture goes green... and yellow (25 Nov 2014), The Namibian

- Introduce soft loan packages, which are suitable for smallholder farmers to promote replication and up-scaling of adaptive practices and technologies.
- Develop new, innovative forms of collateral, such as agricultural insurance policies for farmers to invest in appropriate land preparation, weeding and harvesting technologies, inputs and safer storage facilities.
- Form co-operatives for easier access to loans, in line with Kongalend's existing group loan offering which extends productive credit to support the development and expansion of small enterprises.

In this way, NCAP 2 will harness the existing (but untapped) economic power of local communities to provide CA inputs and services in their own communities utilising affordable and accessible loan products designed to meet their unique needs. Such enterprises have proven economically profitable to participating service providers, as well as vital to meeting farmers' existing demand for CA inputs and services.

Activity 2.2.2: Facilitate the acquisition of 60 privately owned and operated 4x4 tractors with rip furrowing implements through microfinance loan packages

The proposed project will increase the number of participating 4x4 tractor owners with rip furrowing implements from 20 currently to 60 in total through improved access to microfinance development loans and synergies with CA input and implement manufacturers and suppliers.

Several national financial institutions, such as Kongalend Financial Services and Agribank of Namibia, have developed specially designed small agri-business financing packages for conservation agriculture tillage service providers. To date, Kongalend's loan packages have helped to place 20 brand-new 4x4 John Deere 5503 tractors fitted with rip furrowers. Last season, 4,100 hectares were rip furrowed between November and January by the Kongalend clients and a handful of service providers who already had tractors and rip furrowers.

NCAP 2 will work in local communities to raise awareness regarding the availability of microfinance lending packages, such as the Kongalend and Agribank products, to promote increases in the numbers of small business owners owning and operating 4x4 tractors outfitted with rip furrowing implements in the project area. This is vital to meeting farmers' demands in the project area for CA land preparation services, and it is therefore also critical to overall CA uptake and project success.

The specific goal is to facilitate the acquisition of 60 such tractors, which will operate in the project area to provide much needed CA rip furrowing services to NCAP 2 participating farmers.

Activity 2.2.3: Train and Support 60 Tractor Owners and Drivers

It is not enough to simply facilitate the acquisition of agricultural equipment, such as tractors and CA implements, through affordable financing tailored to rural needs. NCAP 2 must also train and provide technical support to participating tractor owners and drivers, whose work is vital to providing the CA land preparation services that CA farmers need.

Accordingly, executing entity CLUSA Namibia will harness its years of experience working with tractor owners and drivers in the project area to ensure the profitability and long-term sustainability of these CA service-providing entrepreneurs.

This will involve three training sessions (to be conducted during the winter, one in each project year) and mentoring/support on the ground as soon as land preparation activities commence (which should be straight after harvest). CLUSA will also GPS verify fields where animals/tractors without tracking devices rip furrow.

Additionally, tractor owners and drivers will benefit from business, marketing and logistics training and support, which is described fully in Activity 2.3.1 below.

Activity 2.2.4: Train and support 60 Community Draught Animal Power Promoters

NCAP 2 will train and support 60 Community Draught Animal Power Promoters (“CDAPPs”) on CA land preparation methods, which are appropriate when tractors are unavailable, disfavoured or cost prohibitive. Draught animal power land preparation is one of the three climate-smart land preparation methods that farmers will be trained on, along with Namibia Specific Conservation Tillage (NSCT) and the Hand-Hoe Basin method.

Consistent with the CBA approach and emphasis upon farmer-to-farmer knowledge transfers, CDAPPs will, in turn, be responsible for training 600 draught animal power owners on CA tillage methods. Specifically, each CDAPP will be responsible for training 10 others on CA and draught animal power methods.

As under Activity 2.2.3, this will involve three training sessions (to be conducted during the winter, one in each project year) and mentoring/support on the ground as soon as land preparation activities commence (which should be straight after harvest). CLUSA will also GPS verify fields where animals/tractors without tracking devices rip furrow.

Activity 2.2.5: Train and support seven farmers’ co-operatives to trial unique seed breeding, retention and multiplication methods for high-demand seed

In addition to the lack of CA equipment and services, quality CA inputs, such as seed, is also in short supply in the project area. Currently, it is difficult for farmers to acquire quality staple crop seeds because seed producers and suppliers (e.g., smallholder farmer seed co-operatives) have themselves been badly affected by worsening climate conditions.

Seed of a number of local food crop landraces is retained by smallholder farmers but not multiplied as foundation or certified seed. *In situ* seed or gene banking is virtually non-existent. Farmers are already experiencing difficulties in accessing the preferred high yielding indigenous long-season seed varieties for their main crop, pearl millet, and other food crops. The few existing seed multipliers are only breeding short season improved or imported varieties, which are not favoured by farmers. Three major classes of seed, namely: breeders’, foundation and commercial certified seed are currently being produced, albeit in small volumes. Foundation seed is multiplied by government research stations.

Accordingly, NCAP 2 will support seven farmers' co-operatives to collaborate with the MAWF to introduce high-demand indigenous seed varieties as foundation seed for multiplication and certification. The MAWF trains farmers in seed multiplication as part of its seed breeding programme.

Ultimately, the goal is to demonstrate that local resources can be economically brought to bear to meet local demand in a way that is profitable to the seed supplier and productive for the farmer.

Output 2.3: Provide technical and business support to small business owners providing CA inputs and services in their own communities

Once a small business owner has taken advantage of NCAP 2's training and access to microfinance lending to purchase CA inputs or equipment, it is vital to the project's long-term success and outcome sustainability that small business owners continue to receive support. In most cases, sustainability will demand continued support to service providers once they are operating in the field.

Specifically, marketing, logistical and business support will be needed, at least initially, in many cases. NCAP 2 will utilise its unique mix of marketing, business and banking expertise – combined with attendant cross-sector synergies – to ensure the long term success of participating small business owners and CA input and service providers. This will be achieved in several ways, as explained more fully in the concrete adaptation activities below.

Activity 2.3.1: Provide ongoing marketing, logistics and business support to CA service providers through regional trainingsessions and one-on-one *ad hoc* support

Once a small business owner has become a NCAP 2-participating service provider through training and capital investment, the project will continue to provide support through regional trainingsessions to ensure that service providers employ best practice to ensure the long-term viability of their enterprises.

Training will focus on effective marketing techniques, best practices for allocating CA inputs and services across geographic areas and time, basic accounting and bookkeeping principles, and equipment upkeep and maintenance. All of these factors are vital to successful business operations as CA input and service providers, and NCAP 2 will ensure that farmers have access to the knowledge and resources needed to succeed in these areas of their businesses.

This training, which will be conducted twice a year by sub-contracted specialists, will enhance participants' understanding of the agri-business landscape and how this can be fully explored and exploited.

Another critical component will be training tractor owners and drivers on the use of satellite tracking devices, which as discussed in greater detail under Activity 1.3.1 above, will be used to track the number and location of hectares prepared using rip furrowing implements. This will not only ensure that CA service providers are compensated for the services they provide in the project target area, but it will also prove critical in measuring the number of hectares brought under CA cultivation for monitoring and evaluation purposes.

Activity 2.3.2: Create and capacitate a CA Committee within project partner, NNFU, to assume NCAP 2's training and support responsibilities upon project completion

As described in the activities above, project staff will provide CA input and service providers with technical, business and marketing training, as well as field support. This will be undertaken to ensure a solid foundation for the establishment of profitable local businesses providing CA services to local farmers in the project area.

While NCAP 2 will initially provide all such training and support, for replicability and sustainability purposes, it is vital that local institutions be developed to provide these services in the long term.

Accordingly, the project will provide CA service providers with technical field assistance, logistics co-ordination, and marketing and business advice during the first year of the project. However, in project years 2 and 3, the responsibility to provide support to CA service providers will ultimately be transferred from NCAP 2 to a newly-created and capacitated committee within the NNFU.

This Committee, the NNFU Conservation Agriculture Committee (NNFU CAC), will be formed to support both CA farmers and CA service providers for sustainability following the successful conclusion of this intervention. Specifically, responsibility for the following activities will be transferred from NCAP 2 to NNFU CAC beginning in the second year of the project:

- Providing business and marketing training to CA service providers and CA farmers, with a focus on long-term business strategy and management.
- Providing on-going logistic and technical field support to CA service providers and CA farmers, with an emphasis upon efficient allocation of CA resources throughout the project area.

The NNFU is particularly well-suited to serve CA farmers and CA service providers through a committee dedicated to meeting their ongoing needs due to NNFU's over 20 year history of serving the communal agriculture sector in the project area.

Component 3: Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts

NCAP and previous interventions have shown that rural smallholder farmers embrace and adopt climate-smart adaptation methods when they are exposed to information and develop knowledge about climate change impacts – which they already experience in their fields – as well as climate change adaptation strategies.

However, most Namibian farmers continue to employ maladaptive practices that actually reduce yields and further damage the already poor soil. Major contributing factors are lack of information about climate change impacts, inadequate knowledge of adaptation-based agricultural methods, and lack of awareness about projects, such as NCAP, which work with communities to solve these problems.

Accordingly, a critical NCAP 2 component is promoting CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts. As described more fully below, this will be achieved through efficient research and data collection and management methodologies and systems, as well as strategic and focused information dissemination initiatives utilizing synergies, existing contacts and media.

Outcome 3: Improved awareness and knowledge locally, regionally and globally regarding ground-up lessons learnt, best climate change adaptation practices, intervention strategies, project success stories and opportunities for participation

While NCAP has been very successful in direct interventions with farmers thus far, it must strengthen its efforts to promote CA as a preferred adaptation strategy more broadly – both within and without the project area. Experience has shown that a solid base of awareness and knowledge regarding climate change impacts and adaptation strategies is necessary to achieve positive intervention outcomes through its implementation activities.

Accordingly, knowledge management is a critical part of the upscaling and enhancement of NCAP. As the AF has noted in its Results Framework: “communication campaigns backed-up by effective knowledge management efforts have been critical to develop and improve pandemic preparedness plans worldwide.” This is precisely what NCAP 2 aims to do by adding a major knowledge management aspect to the project, which will be implemented through this Component 3.

Specifically, research, data collection and information dissemination will be utilised to encourage broad-based participation and far-reaching support for its implementation activities, as well as support for project participants’ underlying adaptation objectives, such as global climate change adaptation and food security. No intervention – in Namibia or elsewhere – can succeed without a broad base of awareness, information sharing and support.

Output 3.1: Track project research, data and lessons learnt on best practices, and disseminate that information to stakeholders locally, regionally and globally

To ensure broad-based support and long-term sustainability, NCAP must strengthen what it lacked under its current formulation, namely, highly structured and efficient data collection, storage, management and dissemination methods and strategies.

Accordingly, NCAP 2 will develop tailor-made electronic data storage and management tools for tracking project research, data and lessons learnt on best practices. Also critical will be generating reports, success stories and media campaigns designed to promote CA as an effective adaptation strategy for providing food security and alleviating poverty, as well as share project learning on best practices locally, regionally and globally.

As described more fully in the following concrete adaptation activities below, this project component is vital to ensuring that unique project learning is not lost upon project conclusion, and that it is shared among stakeholders both within and without the project area to ensure maximum outreach and impact.

Activity 3.1.1: Develop a practical strategy to support CA promotion and information dissemination activities

The research and data captured through work in the project areas is unique and highly valuable on both local and global levels. Indeed, we are well positioned to measure the impact that CA is capable of making despite some of the most severe and negative climate change impacts worldwide, as experienced by farmers in the project area.

This information is vital to educating farmers and service providers operating in the project area in support of the concrete adaptation activities identified under Component 1 and Component 2 above. The collection and analysis of project data and research is also critical to ensuring that lessons learnt and best practices are adopted not only in the project area, but also incorporated in climate change adaptation dialogue and project planning globally, as described in Activity 3.1.3 below.

Accordingly, NCAP 2 will develop methods and strategies for utilising electronic data management and usage to track the following project research and data:

- Agricultural research and data collection, such as hectares under CA cultivation using GPS coordinates and Google Maps, as well as yields using the FAO Agri-Gender toolkit;
- Economic research and data, such as credit utilisation and increases in income due to increased CA agricultural production;
- Social research and data, such as creating a story bank for collecting project success stories utilising the Consumer's Union model;
- Establishment of an internal information dissemination system that collects information from the Executing Entities operating on the ground and disseminates that information to all project partners, including the Project Co-ordinator and Executing Entity, for review on a monthly basis; and

- Creation of a framework and partnerships for generating success stories, lessons learnt, best practices and broader exposure about opportunities for stakeholders' future participation.

In all cases, knowledge management strategies will be consistent with the AF's Results Framework, and specific forms and electronic data management systems will be established to ensure the efficient collection, storage, monitoring, evaluation and dissemination of project data. The specific strategies and methodologies the Project will utilize are discussed in greater detail in each of the concrete activities below, as well as Part II, Section G: Learning and Knowledge Management, Part III, Section C: Monitoring and Evaluation and Part III, Section D: Results Framework”.

Activity 3.1.2: Utilise media to disseminate project learning, best practices and opportunities for participation

Critical to the success of NCAP 2's climate change adaptation implementation activities (see Components 1 & 2) is awareness, knowledge and appreciation of the underlying negative climate change impacts, as well as Namibia-specific climate change adaptation strategies to mitigate them. It is axiomatic that successful implementation cannot occur without an adequate base of information and knowledge, or awareness of opportunities for participation.

Accordingly, NCAP 2 will promote CA locally, nationally, regionally and globally as a preferred climate change adaptation method for improving yields, increasing food security and combating poverty through targeted and strategic research, media and advocacy activities. The project will utilise existing media contacts locally, nationally and internationally to place success stories and share best practices on lessons learnt. These efforts are designed to reach farmers within the project area, as well as climate change adaptation stakeholders more broadly.

NCAP's experience to date has proven the effectiveness of utilising media to disseminate adaptation learning and success stories and thereby encourage project support and participation. For example, during the promotion of a Farmer's Field Day event held for prospective CA farmers and MAWF officials, several promotional strategies were utilised. These included an interview with an NCAP field consultant on the Namibian Broadcasting Corporation (NBC) current affairs programme *Good Morning Namibia*, an article in the *New Era* national daily newspaper⁷³ and an announcement of the event on NBC Radio. These efforts proved so successful, and interest in the event so high, that the cellphone of one NCAP field consultant crashed following a flood of messages and calls. Unsurprisingly, the event itself was also a success – demonstrating keen interest on the part of Namibian farmers to explore alternative agricultural methods when provided the knowledge and the opportunity⁷⁴.

While this strategy has proven very effective in the final year of the current NCAP project, significant upscaling and enhancement of its currently-limited media and outreach efforts is needed to support core implementation activities. To achieve this, NCAP 2 will undertake the following:

⁷³ *Success despite drought* (7 Apr 2015), New Era

⁷⁴ *Farmers' field day in north huge success* (21 Apr 2015), New Era

- Strengthening of information dissemination across the project region regarding floods, droughts, pests and forecasted rainfall;
- Utilisation of existing NCAP synergies with content providers and publishers to promote CA success stories (especially ones involving orphans and women) through traditional and online media, both nationally and internationally;
- Research, write and publish advocacy pieces concerning negative climate change impacts and the best Namibia-specific adaptation practices for combating them;
- Development of an online presence for NCAP 2, which links to relevant climate change adaptation resources and information on best practices, with a special focus on making online content easily accessible via mobile phone, as most farmers do not possess personal computers; and
- Entrenchment of the inclusion of local, regional and national government in NCAP 2 initiatives and successes in order to foster continued and broadened support for CA activities.

Through these activities, a base of awareness and knowledge regarding climate change impacts, adaptation strategies, success stories and opportunities for project participation will be developed.

Activity 3.1.3: Contribute to regional and global knowledge and learning regarding climate change and CA adaptation strategies

NCAP 2 entails a strong focus on adaptation learning and best practices formulation. These lessons will not only be integrated locally into project implementation, but also disseminated more broadly in order to contribute to regional and global knowledge and learning regarding climate change and adaptation strategies through external linkages, synergies and partnerships.

Indeed, NCAP 2 is designed to generate valuable information on which approaches, practices, techniques and technologies effectively contribute to climate-smart agriculture and climate resilience building in local communities. It is vital that this information be shared with stakeholders more broadly than the project area. The act of openly sharing lessons learnt on best practices will also facilitate a two-way dialogue between project implementers and regional and global stakeholders, such as universities, CBOs, NGOs, think-tanks and governments, which will, in turn, foster improved connectedness. Examples of climate change adaptation stakeholders include the Adaptation Fund, USAID, the EU, UNDP, GEF, FAO, ICRISAT, IFAD, WFP and the International Treaty for PGRFA.

In order to achieve this goal, NCAP 2 will undertake the following concrete activities:

- Share project information, experience and lessons learnt on best practices with universities with which NCAP currently has relationships, such as the University of Namibia, the Swedish Royal Institute of Technology, the University of Texas and the George Washington University in Washington DC;
- Develop linkages with universities on the forefront of climate change adaptation and conservation agriculture, such as the University of Namibia and Cornell University;

- Communicate project learning, knowledge and experience to NGOs and CBOs operating in Namibia, such as the Desert Research Foundation of Namibia, to promote broader information sharing and learning; and
- Share project information, experience and lessons learnt with policy makers (Parliament) and policy implementers (relevant Ministries and Regional Councils), utilising bottom-up channeling of knowledge and best practices generated on the ground.

The ultimate goal is to contribute regionally, nationally and globally through research, data and lessons learnt on best practices. This will further not only the success of NCAP implementation locally, but also contribute toward achieving the goal of adapting to forthcoming climate change impacts, food insecurity and rural poverty globally.

B. Project Benefits – Economic, Social and Environmental Impacts, including Vulnerable Community Impacts

The proposed project expects to directly and immediately impact stakeholders across sectors of the economy by promoting CA as an effective adaptation strategy for achieving positive, sustainable outcomes. Significant economic, social and environmental benefits will result for direct beneficiaries and indirect beneficiaries alike, as discussed immediately below.

Direct Beneficiaries

Direct project beneficiaries are 13,052 rural smallholder farmers (mostly women) in the Ohangwena, Omusati, Oshana, Oshikoto, Kavango East, Kavango West and Zambezi regions of northern Namibia. Smallholder farmers in these regions are all negatively affected by climate change impacts, such as increases in temperature, erratic rains and droughts interspersed with floods, which cause failed harvests, low yields and widespread food insecurity.

The project's direct beneficiaries rely on dry-land, rain-fed subsistence farming methods, such as mono-cropping, disc harrowing and removal of crop residues on eroded and nutrient-poor soil, all of which exacerbate climate change impacts. These farmers achieve some of the world's lowest average pearl millet yields, and are thus trapped in a cycle of poverty characterized by food insecurity, low incomes, poor health, high unemployment and little (if any) opportunity to alleviate their dire circumstances.

Indirect Beneficiaries

In addition to the more than 13,000 smallholder farmers who will directly benefit from this intervention, NCAP 2 will also indirectly benefit three main groups:

- Approximately 65,260 members of participating farmers' households;
- Approximately 180 participating small business owners, who will provide CA inputs and services in their own local communities; and
- More than 100,000 members of the rural communities in which the project will operate.

Each of these is discussed immediately below.

For every one of the 13,052 participating farmers, it is estimated that there are ±five dependent individuals per household, who rely on the head of the household for food and economic security. Most of these are children. Accordingly, NCAP 2 expects to indirectly benefit the more than 65,260 members of participating farmer households. In this way, it is the participants themselves who will ensure that the social and economic benefits, such as improved food security and household incomes, are distributed broadly across local communities.

NCAP 2 also expects to capacitate 60 small business owners through training, technical and field support, and improved access to capital and CA inputs and equipment. These thriving rural businesses will not only provide the CA services that rural farmers are already demanding, but they will also provide incomes for the business owners themselves, as well as the members of their communities that they employ, such as tractor drivers and repairers.

By facilitating the expansion of supply to match existing (and growing) local demand for CA inputs and services, the project will help to create economic activity in rural communities where unemployment and poverty run rampant. The communities in which NCAP 2 will operate consist of well over 100,000 people. Increased economic activity will benefit these individuals through improved farming productivity, jobs in the CA service industry and downstream economic benefits to other local businesses.

Environmental Benefits

NCAP 2's main goal, as the project's title reveals, is to build adaptive capacities and climate change resilience for improved food security for smallholder farmers in northern Namibia. Accordingly, the project's environmental benefits are significant and include the following:

- Improved knowledge about climate change and adaptation strategies in local farming communities;
- Increase in farmers utilising CA methods and strategies, with fewer farmers continuing to employ maladaptive farming practices that further degrade the soil;
- Greater numbers of farmers employing resilient farming practices, which are less susceptible to droughts and floods;
- Improved soil quality and fertility;
- Reduced vulnerability of communities and food-production systems to changes in mean climatic conditions and climatic variability; and
- Enhanced ability to plan for and respond to climate change impacts on the household, community and national levels.

Economic Benefits

NCAP 2 is geared toward adapting farming practices to changing and variable climatic conditions for a very specific reason – to improve food security for smallholder farmers (and their households) in northern Namibia. The CBA approach to achieving that goal relies heavily upon small business owners' and local communities' involvement at all levels, which means that the economic benefits will be distributed broadly among participating farmers, small business owners and the rural communities in which they live and work. Some of the economic benefits that will result include:

- Higher yields on smallholder farms, thus increasing household food security and household incomes;
- Reduced economic losses associated with climate variability and climate change;
- Greater numbers of female-headed households practicing CA and producing surpluses and incomes;
- Greater numbers of small business owners providing CA services in the rural communities in which they live through improved access to microloans and CA inputs and equipment;
- Improved rural access to CA inputs and services;
- Greater community-driven rural economic development, including smallholder farmers participation in local market systems; and
- Development microfinance and technical, logistic and business support.

Social Benefits

As NCAP 2 is primarily designed to benefit smallholder farmers and their families, the project is also designed to achieve both near-term and long-term social impacts. A special focus will be placed on women and children, the former heading a significant majority of households in the northern regions of Namibia, where there are also considerable numbers of orphan-headed households. The following include some of the social benefits that these groups will enjoy:

- Health improvements due to increased staple grain production and household food security;
- Improvements in human capacity, especially among women, children and other vulnerable groups; and
- Women's empowerment through improved access to information, training and decision-making with respect to productive farming decisions.

These immediate and direct impacts will, in turn, create significant opportunities for positive, long-term outcomes, such as climate change resilience in rural farming communities, improved food security, higher incomes, better family health, greater numbers of local businesses serving rural CA communities, and the empowerment of orphan and female-headed CA farming households.

In all cases, NCAP 2's monitoring system will track these environmental, economic and social benefits, as described more fully in Part II G: Knowledge Management and Part III C: Monitoring and Evaluation.

C. Project Cost Effectiveness

Eighty-two percent (82%) of the budget is dedicated to field implementation, including working directly with rural smallholder farmers, small agri-business owners and local communities. Eighteen percent (18%) is dedicated toward project management, reporting, monitoring and evaluation.

A primary driver for NCAP 2's cost effectiveness is that the project is designed around Namibia-specific best practices and lessons learnt in the project area by project partners over the last decade. During this period has NCAP has developed deep understanding and knowledge of successful intervention strategies, as well as lessons learnt on less effective methods.

Indeed, its goals and strategies are firmly rooted in CBA methods that have been thoroughly tested, proven effective and become increasingly demanded by smallholder farmers in the project area. The Executing and Implementing Entities have developed significant expertise employing these CBA methods in co-operation with northern Namibia's smallholder farmers, and no steep learning curve or trial-and-error approach will be necessary. The result is a project that is cost effective in terms of both project design and implementation.

Monetary

In April 2015 the Office of the Prime Minister reported that 417,944 Namibians were in immediate need of drought relief to be provided by Government. As documented in surveys carried out by CES and NNFU, subsistence farmers across the target regions reported an average of 6.6 months of food self-sufficiency when using conventional farming methods, and when having switched to CA practices their yields would last till the next harvest, i.e. an increase to 12 months.

The proposed project targets 78,312 direct and indirect beneficiaries, which translates into 18.7% of the number of Namibians currently in need of drought relief. The proposed project is thus cost effective as subsistence farmers would become food self-sufficient and thus not relying on drought relief which is both costly, and in the long-term, unaffordable for the state. As an example, Government spent USD 79.3 million in 2013 through its emergency drought relief response plan to support almost 25% of the population.⁷⁵ Drought relief is also unsustainable as food production is dropping in cereal exporting countries due to climate change impacts, leading to a global drop in sustainable food exports and an increase in food prices.

Furthermore, as documented by von Hase, CA farmers in northern Namibia “expressed positive beliefs about CA being cheaper and a better way of doing land preparation than the traditional method”, meaning that CA is cost effective and creates household savings⁷⁶. “The new method was also seen as a positive development (i.e. modernisation) that brings dignity and peace in the household and enabled informants to provide for school fees and the needy (such as orphans and elderly).”

⁷⁵Desertification Eating up the Land – Nambahu, The New Era, 23 June 2015

⁷⁶Fabian von Hase, *Facilitating Conservation Agriculture in Namibia through Understanding Farmers' Planned Behaviour and Decision Making*, Master Thesis in Agricultural Sciences, Swedish University of Agricultural Sciences, 2013

Health

Food security and access to a balanced and nutritious diet translates directly into a healthier population, which means less costs for the state for health care and a healthier work-force. It impacts positively on school-going children's' ability to concentrate and learn in school. It is also vital for people on HIV/AIDS antiretroviral and/or TB treatment as a regular and stable diet is vital for successful treatment.

Social

Female farmer informants participating in von Hase's study repeatedly reported that: *"If you have food in the house then you have peace."* Women in the project target areas are to a large extent responsible for food staple food production and feeding the family. Household food security thus means less tension and frustration at household level, and, as reported by some informants, less instances of domestic violence.

As CA farmers market surplus produce, smallholder incomes are steadily increasing, meaning increased capacity of sending children to school, investing in household expenditure, and, in the long term, investments in farming to transfer to small scale commercial farming. The latter is not possible when practicing conventional, soil destructive and low yielding farming methods.

Environmental

CA is a long-term method of improving and conserving soils. This leads to less top-soil losses and lessens the vulnerability of productive land to desertification and the associated impacts of less production and hunger. In addition, as farmers take up CA, they build up soil fertility and water holding capacity of the land they are already cultivating. This means that they do not have to abandon land that has been rendered unproductive after a few years of conventional farming methods and move onto forested land where they practice slash and burn which leads to deforestation and, in the end, desertification.

D. Project Consistency with Sustainable Development Strategies

NCAP 2 is designed to make a significant impact on food security, poverty reduction, community-based capacity and climate change resilience building, and sustainable use of Namibia's natural resources. Each of these goals – as well as the methods and strategies for achieving them – have been designed in accordance with Namibia's national and sub-national principals, priorities and long-term development strategies, as well as internationally-recognized development strategies.

On the national level, Parliamentary Acts, policies, strategies and plans have guided its design, goals and strategies for implementation. Chief among these are the following:

- National Climate Change Policy (2011)
- National Agricultural Policy (1995)
- National Disaster Risk Management Policy (2011)
- National Gender Policy (2010-2020)
- National Rural Development Policy (2011)

The Ministries charged with enforcing these national priorities are the Ministries of Agriculture, Water and Forestry (MAWF), Environment and Tourism (MET), Gender Equality and Child Welfare (MGECW) and that of Poverty Eradication and Social Welfare (MPESW).

As NCAP 2 works closely with smallholder farmers on the local level, constituency and regional-level government also drives its design and implementation. NCAP has laid a solid collaborative foundation with regional and local government, traditional and faith-based authorities who will also drive NCAP 2's implementation. Specifically, constituency based councillors and traditional leaders are involved in mobilising project beneficiaries for information sharing meetings, on-farm training and Farmers' Field Days as food security is a direct and urgent concern to their offices. Their standing and influence in their respective communities positively impacts buy-in from the farmers.

The above authorities also avail storage space for seed and implements, meeting spaces when training is held indoors, and assist with land preparation co-ordination, registration of especially vulnerable farmers to benefit from rip furrowing subsidies and seed distribution. Many councillors and traditional as well as faith-based leaders are themselves practicing CA, thus leading by example.

The MAWF constituency-based Agricultural Development Centres have been assisting to inform farmers about NCAP and referring interested farmers to the project, as the MAWF does not offer CA training and rip furrow services. This relationship will continue.

The following table identifies Namibian legislation, policies, plans and strategies that are relevant to the project and explains how it is consistent with and furthers them.

Table 12: Project Consistency with Relevant National Policies

Relevant Policies and Plans	Description of Project Consistency with Policies and Plans
National Climate Change Policy (2011)	The goal of this policy is to contribute to the attainment of sustainable development through strengthening of national capacity to reduce climate change risk and build resilience for any climate change shocks. NCAP 2 will work directly toward this goal by strengthening the capacity of smallholder farmers to adopt climate resilient agricultural methods.
National Agricultural Policy (1995)	The overall goal of this policy is to increase and sustain the levels of agricultural productivity, real farm incomes and national and household food security, within the context of Namibia's fragile ecosystem. NCAP 2's goals are directly aligned with this national standard. Specifically, programme implementers will work to improve smallholder agricultural yields and increase household incomes and food security through climate-smart agricultural methods designed specifically for Namibia's unique and fragile climate.
National Disaster Risk Management Policy (2011)	Severe droughts and floods are common sources of natural disaster risk in Namibia, with the government taking natural disaster emergency measures in 2008, 2009 and 2011 for flooding, as well as 2013 and 2015 for drought. NCAP 2 is consistent with the National Disaster Risk Management Policy because it works toward building natural disaster coping capacities through the up-scaling of climate-smart CA methods, which reduce the effects of droughts and floods, thus strengthening disaster preparedness at the community level.

<p>National Gender Policy (2010-2020) and National Gender Plan of Action (1998)</p>	<p>This policy is aimed at closing the gaps between genders created by the socio-economic, political and cultural inequalities that existed previously in Namibian society.</p> <p>NCAP 2 is designed to further this goal by empowering female-headed smallholder farming households through improved yields, household income and food security. More than half of participating farmers are women. The programme will also empower female entrepreneurs to start new businesses as CA service providers in their own communities through improved access to capital markets, as well as technical and business trainings and support. Currently, approximately one-third of NCAP participating service providers are women, and it is a major goal of the proposed project to increase that figure. In this way, NCAP furthers the goals and objectives articulated in the National Gender Policy, with a specific focus on Sections 4.1 through 4.3, as well as Sections 4.5 and 4.8.</p>
<p>Decentralisation Policy (1997) and the Decentralisation Enabling Act (2000)</p>	<p>The Policy and Act are designed to, among others, transfer responsibility for local development from the national government to regional and local government.</p> <p>NCAP 2 is consistent with the Policy and Act's objectives because it is designed to operate from the bottom-up in local communities. This includes working closely with Regional Councils and local authorities through coordination, participation and sharing information on best practices and lessons learnt.</p>
<p>National Policy on Climate Change and the Community Based Adaptation Country Programme Strategy (CBA CPS)</p>	<p>The objective adopted by Namibia's CBA CPS is to build capacity among natural resource dependent-communities to sustainably manage resources in the face of climate change. In furtherance of this goal, the policy aims, among other things, to build awareness regarding climate change risks and adaptation options, as well as increase the resources available to enable climate change adaptation.</p> <p>NCAP 2 directly contributes to the goals articulated in Namibia's CBA CPS by working with natural resource-dependent farmers to build climate change adaptation awareness, facilitate the widespread adoption of climate smart agricultural methods as a preferred adaptation option.</p>
<p>National Climate Change Strategy and Action Plan (2013)</p>	<p>The Strategy and Action Plan focuses upon promoting climate change knowledge and awareness, as well as climate change mitigation and adaptation strategies.</p> <p>Similarly, NCAP 2 is designed to promote climate change awareness and the widespread adoption of Namibia-specific climate-smart agricultural methods.</p>
<p>National Development Plan 4 (2012/13 - 2016/17)</p>	<p>The Fourth National Development Plan has adopted three overarching goals: high and sustained economic growth, increased income equality, and employment creation.</p> <p>NCAP 2 is designed to further each of these goals, and it is thus aligned with this Plan. Specifically, the programme will facilitate increased economic growth and help to create viable new businesses in the agriculture sector, with a special focus on female and orphan-headed households in rural areas.</p>
<p>Environmental Management Act (2007)</p>	<p>The Act is designed to promote the sustainable management of the environment and the use of natural resources.</p> <p>In furtherance thereof, NCAP 2 is designed to not only sustainably manage natural resources, but actually improve them through climate-smart adaptation methods, which utilize rainfall only for irrigation. The result is improved soil, plant and human health consistent with this Act.</p>
<p>The New Equitable Economic Empowerment Framework (NEEEF)</p>	<p>The NEEEF has the general objective of creating "an equitable and socially just society, in which the distribution of income becomes far more equitable than it is at present."</p> <p>NCAP 2 directly furthers this objective because the project is designed to promote the economic empowerment of rural smallholder farming household, which are mostly headed by women and comprised of children and the elderly. By working to increase these farmers' yields and household incomes, it will be contributing directly toward a more equal distribution of income as envisaged in the NEEEF.</p>
<p>Namibian Constitution</p>	<p>Chapter 11 of the Namibian Constitution provides for the principles underlying</p>

	state policy. Chief among these is promoting the welfare of the people. NCAP is designed to further this vital guiding principle by undertaking a project designed to improve the welfare of rural farmers and local farming communities through the timely adoption of climate smart agricultural methods in the face of increasingly negative climate change impacts.
Vision 2030	Namibia's Vision 2030 includes several relevant strategies and objectives: To transform Namibia into a healthy and food-secure nation. To promote the creation of a diversified, open market economy. To reduce inequalities and move the nation significantly up the scale of human development. And to build capacity through partnerships between government, communities and civil society. NCAP 2 works on all of these levels to further the objectives underlying Vision 2030. The proposed project will promote family health, food security and economic equality through the adoption of productive CA farming methods in rural areas, and it will also harness cross-sectoral partnerships to develop open markets for CA agriculture, thereby fostering sustainable rural development.

NCAP 2 has also been designed to be consistent with and in furtherance of international development goals and strategies promulgated by stakeholders for food security, community-based adaptation and climate change resilience. Such stakeholders include AF, UNDP, GEF, FAO and WFP, among others. The relevant policies, plans and strategies include the following:

- **Millennium Development Goal 1:** This goal is focused upon eradicating extreme poverty and hunger. The proposed project will work directly toward this goal by promoting increases in household income and food security through the adoption of productive, climate smart agricultural methods.
- **Millennium Development Goal 3:** The proposed project is strongly aligned with this goal of promoting gender equality and the empowerment of women. Indeed, most of the farmers that NCAP 2 will work to educate, train and capacitate are women, and a significant percentage of small business owners capacitated to date have also been women.
- **Millennium Development Goal 7:** This goal is designed to ensure environmental sustainability – a goal that the proposed project shares and furthers through its focus on climate change education, climate change adaptation strategies and soil improving CA methods.

NCAP 2's design, implementation, monitoring, evaluation and review methods and strategies are also consistent with the AF policies applicable to all AF projects, as well as the United Nations Framework Convention on Climate Change decisions giving rise to the AF and establishing its guiding principles, modalities and activities. These include the following, among others:

- Adaptation Fund Board, Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund (Amended in October 2014)
- Adaptation Fund Board, Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, Annex 1: Strategic Priorities, Policies and Guidelines of the Adaptation Fund Adopted by the CMP
- Adaptation Fund Board, Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, Annex 3: Environmental and Social Policy
- Decision 10/CP.7 (establishing the AF)
- Decision 5/CMP.2 (establishing guiding principles and modalities for the AF)

- Decision 5/CP.7 (outlines AF implementation activities)
- Decision 1/CMP.3 (creating AF board)
- Decision 3/CMP.1 (modalities / procedures for a clean development mechanism)

In this way, the proposed project is not only consistent with relevant international, national and sub-national policies and plans, but it also furthers their specific objectives as described throughout the foregoing section.

E. Project Consistency with National Technical Standards

Addressed in this section are the nationally-mandated technical standards, such as those regulating communal land use, environmental protection and standards for environmental assessment. Also discussed are the industry-mandated technical standards concerning best practices in the proposed project's fields of work, such as conservation agriculture.

In many ways, the relevant technical standards are relatively minimal because the project operates very locally, working directly with subsistence farmers on communal lands in rural areas and utilising farmer-to-farmer knowledge transfer. Regulations governing project activities are therefore limited. At the same time, NCAP 2 is designed to meet the national and sub-national technical standards that do apply. Specifically, the Project will meet relevant national standards and best practices in the relevant areas listed below:

Communal Lands – National Technical Standards: More than two thirds of Namibians – and all project participants – live in communal areas, and development of communal land has been a key objective of the Namibian government since independence.⁷⁷ However, a century of colonialism produced significant economic imbalances between freehold (commercial) landowners and Namibians residing on communal land.

A number of relevant national standards have been put in place to right this imbalance, and which enable participants of the proposed project to bring their lands under conservation agriculture cultivation as envisioned in the proposed project's outputs and activities. Chief among these is the Communal Land Reform Act (2002). Specifically, the Act established a tenure system for Namibians making use of land in communal areas. Under this scheme, smallholders are permitted to make use of communal lands under two separate legal doctrines: customary land rights and leasehold rights.⁷⁸ The customary land right is for the natural life of a holder and can be inherited by a surviving spouse and children. The leasehold is for a maximum of 99 years and is also transferable. Accordingly, these laws are designed to mimic a freehold estate by providing the communal smallholder with the right to develop communal land in line with the Communal Land Reform Act's underlying objective of eliminating the imbalance between freehold and communal land estates. This national standard is the law that enables smallholder farmers on communal land to lawfully farm – including applying climate-smart agricultural methods – on the communal land they currently occupy.

⁷⁷ Establishing Communal Land Registration in Namibia: The Process, Benefits and Challenges, World Bank

⁷⁸ Communal Land Reform Act (Act No. 5 of 2002)

Environmental Protection – National Technical Standards:The foundation for Namibia’s environmental policy framework and laws is Article 95 (l) of the Constitution, which stipulates that the state shall actively promote and maintain the welfare of the people by adopting policies, which include the: “maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefits of all Namibians.” The relevant policies include the following:

- National Agricultural Policy (1995)
- Desertification and Biodiversity Policy Review (MET, 2005)
- Environmental Assessment Policy (1995) (discussed further immediately below)
- National Drought Policy (1997)
- Proposed Climate Change Policy (2009)

Critically, the proposed project is not subject to reporting or auditing under Namibia’s **Environmental Assessment Policy** (1995), as none of the proposed project’s activities fall within the categories of activities that require a formal environmental impact assessment. These activities are listed in Annex B of the Environmental Assessment Policy, and include operations such as mining, nuclear power and deforestation projects, among others. While not strictly governed by the Environmental Assessment Policy, the proposed project’s goals and methods are entirely consistent with the Policy.

Moreover, the proposed project is not only consistent with national environmental protection policies, but it is consistent with national laws as well. The following Acts represent national laws applicable to the project activities, and a brief explanation of the proposed project’s consistency with each is provided below:

- **Fertilizers, Farm Feeds, Agricultural Remedies And Stock Remedies Act (1947-06 No. 36):** This national law regulates the use of chemical fertilisers, pesticides and herbicides. The proposed project does not implicate this law because it utilizes deep rip furrowing land preparation, rainwater retention and natural organic ground cover rather than chemical farming solutions, which are environmentally destructive and unaffordable for most project participants.
- **Soil Conservation Act (No. 76 of 1969) (with subsequent amendments):** This Act addresses the issue of soil erosion and proscribes certain activities that result in soil erosion, none of which the proposed project will undertake. Accordingly, the proposed project is entirely consistent with this applicable national law.

The proposed project will forward the underlying goals and abide the technical requirements of each of the above-mentioned national environmental protection standards by educating and capacitating farmers on climate-smart agricultural methods, which promote and enable positive climate impacts, such as improving the soil for increased productivity, discouraging deforestation, and enabling in-field water retention to reduce flooding in times of heavy rainfall and prevent evaporation in times of drought.

Conservation Agriculture – National Best Practices: In some cases, as with soil conservation and climate smart agriculture, project partners, such as NNFU, CLUSA Namibia and CES, have been responsible, at least in part, for developing the national best practices standards. These include applications of Namibia Specific Conservation Tillage (NSCT) and Hand-Hoe Basin methods, which have proven to be the farmer-preferred methods in the project area. For example, NSCT was born out of previous projects undertaken by NNFU, CLUSA Namibia and CES, among others. These previous efforts resulted in successful trials of the NSCT and Hand-Hoe Basin methods, significant adoption of those methods in many areas, and now, calls for significant upscaling from government and farmers alike. In this way, the proposed project's CA strategies and methods have become the gold standard in Namibia.

Specifically, NSCT is an approach to land preparation, which utilises tractors fitted with specialised rip furrowing implements to crack open the increasingly problematic hard plough-pan. This creates ridges for in-field rain water harvesting, which direct water to the planting lines and enable water infiltration for deep plant root development under both drought and flood conditions. Similarly, the Hand-Hoe Basin method is designed to maximize rain water penetration and retention, as well as root development, by manually digging uniformly spaced planting holes (or planting basins), which are opened through field residue in the otherwise undisturbed soil. The planting basins are organized in a line across the field's main slope to maximize in-field water retention.

Both of these farmer-preferred methods have proven effective in creating healthier harvests and healthier soils, and they represent the applicable national technical standard in terms of conservation agriculture methods for soil conservation.

Knowledge Management: Consistent with the Adaptation Fund's Environmental and Social Policy, all monitoring, evaluation and reporting will address environmental and social risks during project assessment, design and implementation. Annual, midterm and terminal evaluation reports will include status updates on project success with respect to these environmental and social risks.⁷⁹

Use of a standardised and widely-recognised reporting format, such as the FAO Agri-Gender Statistics Toolkit, was developed in line with the framework of the World Programme for the Census of Agriculture. Use of this toolkit will improve the production of reliable, sex-specific agricultural data needed in the formulation and planning of agricultural and rural development. Use of the Toolkit will also add to the global knowledge base by providing a consistent framework with which to compare data across countries, regions and continents on a wide range of intersecting issues, including agricultural populations and households, access to productive resources, production and productivity, labour and time-use, food security and poverty indicators, among other things.⁸⁰

⁷⁹ Environmental and Social Policy (2013), Adaptation Fund

⁸⁰ *Agri-Gender Statistics Toolkit Data Items*, FAO <http://www.fao.org/gender/agrigender/agri-gender-toolkit/en/>

The proposed project's knowledge management components conform to international standards, such as the United Nations Department of Economic and Social Affairs' Best Practices Knowledge Management Framework outlined in Table 13 below, and they have been adapted to conform to the Namibian context and specific project activities.⁸¹

Table 13: Best Practices Framework

Objectives / Activities	Target Audiences / Users	Instruments
Awareness-building	Informed public Media Media professionals Decision-makers	Dissemination of success stories and before / after photos Newspaper articles Relevant use of social media
Networking & Information Sharing	Decision and policy-makers Practicing professionals Training and leadership development institutions	Best Practice Databases Publications / Articles Web-pages, Newsletters Listserv
Learning tools and capacity-building	Training and leadership development institutions Local authority associations Professional associations	Best Practice Case Studies Best Practice Casebooks Issue briefs and articles Training materials
Peer learning	Small-holder farmers Networks of NGOs/CBOs International organisations	Demonstration plots LFs and ACAFs Transfer guides, methods and tools Match supply / demand for expertise Conferences and seminars Advisory services

⁸¹ Best Practices Knowledge Management Framework, United Nations Department of Economic and Social Affairs
<http://unpan1.un.org/intradoc/groups/public/documents/un/unpan030516.pdf>

F: Project Duplication (if any) with Other Funding Sources

NCAP 2 will not duplicate any other projects in the target regions. Indeed, the project is unique in northern Namibia for three main reasons: First, NCAP is the only project in Namibia working toward rural development in farming communities from both a supply and demand perspective. NCAP 2 thus seeks to build farmer demand for CA services through education, training and capacity building, as well as supply those services by training and capacitating local entrepreneurs. This market-based approach to incentivizing and promoting climate change adaptation and rural development is holistic, cross-sectoral and unique in the project area.

Second, the initial 2012-2015 NCAP phase is the largest CA up-scaling project to ever have been implemented in Namibia. There are no other large-scale projects or programmes serving the same farmers or communities in the project area.

Third, lessons that project partners have learnt on best practices in the project area have been meticulously incorporated into the proposed project's design. Specifically, NCAP 2 builds on the experience and best-practices from the CONTILL, CBA projects and current NCAP projects. Several activities under Outcome 2 and (in particular) Outcome 3 are specifically aimed at strengthening and adding project components based on lessons learnt from the three previous adaptation interventions.

The projects outlined in Table 14 below operate to a greater or lesser extent in the project regions, and have also been taken into account in NCAP 2's design in order to ensure that best practices are employed, as well as to eliminate any significant duplication or overlap. The below listed interventions' contribution in terms of support to the agricultural sector is significant, as these projects deal with issues of capacity at systemic and institutional levels. They add up to a useful baseline for Component 1 in particular, and a two-way interaction with NCAP 2 is foreseen.

Table 14: Ongoing projects and programmes in the proposed project target regions.

Ongoing projects / programmes	Objectives	Geographic areas	Agencies	Lack of overlap / complementarity
<p>The SCORE Project: Scaling up community resilience to climate variability and climate change in Northern Namibia</p> <p>2015 - 2019</p>	<p>Reducing vulnerability to droughts and floods for 4,000 households. 80% of participating households are women-led, and children from 75 schools are also participating.</p> <p>The project's specific objectives are:</p> <p>(i) Reducing vulnerability to droughts and floods by restoring wells and enhancing floodwater pools for food security;</p> <p>(ii) Strengthening small-holders' capacity to adopt climate resilient agricultural practices; and</p> <p>(iii) Mainstreaming cli-</p>	<p>Limited to selected constituencies in Kavango East, Kavango West, Ohangwena, Omusati, Oshana and Oshikoto regions.</p> <p>The SCORE project focuses mainly on women and children in very concentrated clusters, where the participants practice several adaptation strategies simultaneously. SCORE also has a very strong lobbying component designed to influence government policies and</p>	<p>SCCF, GEF, UNDP, Ministry of Environment and Tourism, local government, institutions of higher learning and NGOs.</p>	<p>The SCORE project will complement NCAP 2 by working with government to mainstream climate change adaptation into government policy and planning, which will benefit all farmers through improved government services on the ground, such as diverting flood water.</p> <p>No SCORE participants will also participate in NCAP 2, thus eliminating the possibility of overlap on the individual level.</p>

	mate change considerations into national agricultural strategy, policy and budgets.	planning through cooperation with MAWF.		
NNFU union farmer support services Policy Education and Advocacy; Institutional Strengthening and Capacity Building; Business Advisory and Trade links unit Ongoing since 1992	<p>Ongoing union activities, which promote small-scale farmers' participation in the design, drafting and implementation of policy regarding agriculture, water, land and credit, among other things.</p> <p>Supporting local farmers' associations and regional farmers' unions on planning and leadership.</p> <p>Assisting farmers to organise for bargaining power, economies of scale, and small-scale collective marketing purposes.</p>	Nationwide with a special focus on communal and emerging farmers.	Namibia National Farmers Union (NNFU)	NNFU's activities will complement NCAP 2's activities by addressing farmers' rights, trade links and capacity for local farmers' union groups.
The Rangeland and Marketing Development Support Project (RMDSP – NCA) 2015 - 2018	Train livestock farmers in holistic range-land management in 30 grazing areas. Small CA component limited to demonstrations in a restricted number of areas.	Kunene North, Omusati, Oshana, Ohangwena, Oshikoto and Kavango East and West	Meatco Foundation and Co-operative Agriculture Namibia	<p>There is no overlap with NCAP 2, as the project focuses almost exclusively upon rangeland management for livestock.</p> <p>The added cropping component operates on such a small scale that it makes use of its own tractors rather than private sector ones.</p> <p>This project includes only farmers who are cooperative members, and non-members are excluded from participation.</p>
The Dry-land Crop Production Programme 2010 - ongoing	This government programme offers subsidized seed and fertilizer, non-CA land preparation services (disc harrowing) and weeding in communal land areas on a limited basis.	Kavango East, Kavango West, Kunene, Ohangwena, Omusati, Oshana, Oshikoto and Zambezi regions	Ministry of Agriculture, Water and Forestry	The Dry-land Crop Production Programme does not offer CA trainings or rip furrowing to farmers. Thus, NCAP 2 will complement this programme.

<p>The Mahangu Marketing Plan 2014 - 2019: Mahangu Procurement Unit</p>	<p>Procures pearl millet from subsistence farmers for national food reserves.</p> <p>The Mahangu Marketing Plan's objectives are to develop strategies for promoting surplus production, improving the marketing system and promoting value addition and product development in the mahangu sector.</p> <p>Specific project activities include establishing mahangu collection points and encouraging the creation of privately-owned mahangu processing facilities.</p>	<p>Kavango East, Kavango West, Ohangwena, Omusati, Oshana, Oshikoto and Zambezi regions</p>	<p>Namibia Agronomic Board (NAB)</p>	<p>The Mahangu Marketing Plan is an excellent marketing opportunity for CA farmers participating in NCAP 2 to sell their excess supply and improve household incomes.</p>
<p>Community Forestry in Namibia: Phase Two Project</p> <p>Nov 2013 – Nov 2016</p>	<p>Small scale uptake of CA by farmers living in conservancies and community forests. Focuses on draught power animal drawn rip furrowing and the CA basin method.</p>		<p>Directorate of Forestry (MAWF): Community Forests</p>	<p>NCAP 2 does not operate to a large extent in conservancies, except for in the Zambezi region. Thus, the potential for overlap is very minimal.</p>
<p>Comprehensive Conservation Agriculture Programme for Namibia</p> <p>June 2015 – 2019</p>	<p>Will mainly focus on documentation, research on CA methods and information dissemination on CA practices through the MAWF.</p>	<p>Kavango East, Kavango West, Kunene, Ohangwena, Omaheke, Omusati, Oshana, Oshikoto, Otjozondjupa and Zambezi regions</p>	<p>FAO and MAWF</p>	<p>Will be complementary to NCAP 2. No overlapping is foreseen as the programme focus is on up-scaling uptake of CA. NCAP 2 will also complement the FAOMAWF project as it is also focused on strengthening the private sector offering services and inputs to subsistence farmers.</p>

G. Project Management and Dissemination of Learning and Knowledge

The efficient management and dissemination of project learning and knowledge are vital to overall project success, and the proposed project has been designed to significantly upscale and enhance NCAP's current knowledge management and dissemination capabilities. This section describes specifically how project learning and knowledge will be managed internally, as well as disseminated externally.

NCAP 2 will be uniquely positioned in northern Namibia to collect, manage and disseminate data and research concerning conservation agriculture, climate change adaptation, gender equality, rural development, micro-finance initiatives and community-based projects. A strong focus on project management and dissemination of learning and knowledge is therefore vital.

As described more fully in Part IIIC: Monitoring and Evaluation and the Component 3 Activities, several tools for the collection and management of project learning and knowledge will be utilised. These include the following:

- The FAO Agri-Gender Toolkit, which provides an internationally recognised standard for collecting project learning and knowledge regarding agricultural households, agricultural productivity, rural labour, household incomes and expenditures, food security and poverty indicators, among others;
- Commercial satellite tracking devices and subscription services, which will provide critical data on CA service providers and the total number of hectares brought under CA cultivation;
- Constant co-ordination and communication between field staff and project management for the purpose of identifying and tracking lessons learnt on the ground; and
- A tailor-made electronic database, which will serve as the central repository for all project data and research, and which will be backed up through significant redundancies.

One result of these learning and knowledge management efforts will be three key reports, which will serve as the basis for systematic learning to be undertaken under NCAP 2. These are as follows:

- Collection of Baseline Data report;
- Annual Project Review report; and
- Success Stories and Lessons Learned report.

Each of these three reports is designed to monitor and evaluate NCAP 2 progress in real time. However, each report is also designed to facilitate the dissemination of project knowledge and learning externally.

Significant outreach efforts will be undertaken throughout project implementation (as part of Component 3) in order to form collaborative knowledge-sharing relationships with CBOs, NGOs, government bodies, academic institutions and international research and development entities. Specifically, knowledge and lessons learnt will be shared with other development and agriculture-oriented researchers. The proposed project's use of internationally-recognized tools, such as the FAO Toolkit, will further this objective.

Efforts will also be undertaken to identify, analyse and share lessons learnt that might be beneficial in the design and implementation of similar future projects. In this way, NCAP 2 will encourage, initiate and foster a two-way flow of information between this project and other projects of a similar focus.

The project will contribute regionally, nationally and globally by disseminating project data, case studies and information on best practices, consistent with the Fund's knowledge management framework. By dedicating resources and staff to this function in the up-scaled project, global dialogue on effective climate change adaptation strategies will be enriched.

In order for CA to become a more widely adopted practice in Namibia and beyond, it is vital that unique project learning is not lost upon project conclusion, and that quantitative data, qualitative data and corresponding analysis is shared among stakeholders both within and without the project area to ensure maximum outreach and impact. The dissemination of project methodology, data and research is also critical to ensuring that lessons learnt and best practices are adopted not only in the project area, but also incorporated in climate change adaptation dialogue and project planning globally to serve as an example of a successful community-based adaptation approach.

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums, including radio, the most widely accessed medium in the country. This outreach will promote CA as a strategy, both locally and nationally, that Namibian farmers can use to adapt to undependable rains. Going forward, the project will build upon these efforts and identify and participate, as relevant and appropriate, in international, scientific, policy-based and/or any other networks, which may be able to offer advice during its implementation that will, in turn, benefit from lessons learnt during implementation.

The ultimate goal underlying the proposed project’s knowledge management and dissemination components is to promote and support the development and climate change adaptation efforts of governments, CBOs and NGOs, as well as adaptation stakeholders for food security, such as the Adaptation Fund, the USAID, the EU, UNDP, GEF, the International Treaty for PGRFA, FAO, ICRISAT, IFAD and WFP

H. Consultative Process

The entities responsible for working directly with CA farmers and CA service providers under the proposed project – namely, NNFU, CLUSA Namibia and CES – have worked intensively with local communities, government and non-government partners in the project area to build adaptive capacities over the last decade. Through these previous projects, project partners have continuously worked together with farmers to identify best practices based upon local needs and preferences.

The proposed project represents the culmination of these efforts, and embodies more than a decade of trials, development of Namibia-specific methods, and up-scaling in response to demands from government and farmers alike. Accordingly, consultation with stakeholders began many years ago, not merely when the AF’s call for proposals was heard, as NCAP 2 partners hold ongoing interactions with farmers as well as local and regional stakeholders.

The following table provides specific examples of consultation with stakeholders during project preparation.

Table 15: Consultation with Stakeholders

Entity / Group Consulted	Date	Supporting documents, if any
NCAP CA farmers	432 on-farm sessions	Signed attendance registers

	from mid 2014 to January 2015 (7 regions)	
NCAP participants, regional councils, traditional and religious leaders, representatives from institutions of higher learning	11 Farmers' Field Days from April to May 2015 (6 regions)	Signed attendance registers

The stakeholders identified and consulted during project preparation will continue to be involved with project implementation. The Project's design incorporates activities and mechanisms to ensure on-going and effective stakeholder participation, including the following:

- A Project Inception Workshop will promote stakeholder awareness from the start of project implementation. This multi-stakeholder workshop will provide an opportunity to provide all stakeholders with the most updated information on the project and the project work plan. It will also establish a basis for further consultation as the project's implementation commences.
- A Project Steering Committee (PSC) will be constituted to ensure broad representation of all key interests throughout the project's implementation. The representation, and broad terms of reference, of the PSC are further described in Part III A: Project Implementation Arrangements of this document.
- Project communications will be utilised to facilitate on-going awareness of project activities both internally and externally. The project will develop, implement and maintain both an internal and external communications strategy to ensure that all stakeholders are informed on an on-going basis about the project's objectives and activities; overall project progress; and the opportunities for involvement in various aspects of the project's implementation.
- Project activities are focused on building the capacity – at the systemic, institutional and individual levels – of institutions, NGOs, and other stakeholders to ensure the sustainability of initial project investments and the continued involvement of all stakeholders.

In this way, NCAP 2 is not only designed around best practices learnt on the ground by NCAP partners and driven by local preferences and demands, but also designed to ensure that the stakeholders who have helped to design and motivate the proposed project will continue to be a guiding force for its implementation.

I. Justification for Funding Request

In this section, justification for the request to fund NCAP 2 is explained by comparing the current baseline situation in northern Namibia with the scenario that will arise through implementation of each of the three project components, each of which is discussed below.

Component 1: Baseline without NCAP 2 Intervention

This section presents the current situation in northern Namibia, as evidenced by existing baseline data, and describes the scenario that will persist if NCAP 2 Component 1 is not implemented. For reference, Component 1 and Outcome 1 are as follows:

- **Component 1:** Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources
- **Outcome 1:** 13,052 rural smallholder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions

The current environmental situation in northern Namibia is increasingly desperate as smallholder farmers, eager for better yields, continually apply harmful conventional agricultural methods to already-degraded soil in the context of increasingly variable climatic conditions. Continued use of destructive methods will lead to desertification of the land as soil nutrient loss reaches a point of no return, and soil biodiversity surpasses its natural ability to regenerate itself. Land degrading agricultural practices intensify the environmental havoc caused by climate change by decreasing the soil's ability to hold water: producing more severe flooding and less resiliency in droughts.

According to the FAO hunger map, over 42% of Namibians are undernourished, an increase of 7% since last year, signalling that Namibians are increasingly unable to produce enough food. Namibia's inability to feed itself will lead to a situation where the population will become more reliant on hunger relief and food imports.

Female-headed households with disproportionately high dependency ratios (disproportionate compared to national averages and non-project regions) run a large percentage of these subsistence-level farms. All of the project regions exceed the national average in terms of main income source derived from farming and pensions. Combined with added economic, social and health-related hardships of this particular cross-section of Namibian society, without strategic intervention this perfect storm locks the future generation of northern Namibia's population into a cycle of poverty that their children will be doomed to repeat. Business as usual is not only unsustainable, it is likely to become impossible as increasing crop failures will force more households to abandon subsistence agriculture.

Component 1: Adaptation Alternative with NCAP 2 Intervention

CA methods have a proven ability to reverse soil degradation, improve soil health and biodiversity and increase the ability of the soil to support thriving crops as well as withstand climate shocks such as droughts and floods. More importantly, practice of adaptive farming methods such as CA can drastically improve the lives of farmers and their dependents. NCAP participants in the past have seen significant increases in their household food security, indicating a potential to move beyond subsistence farming and into marketing surplus staple grains. Most farmers do not know of available farming alternatives and simply practice what they were taught by their mothers. NCAP 2 intervention, which targets female subsistence farmers, aims to break this cycle of desertification, low yields, hunger and gender inequality by equipping female farmers with the knowledge and tools they need to move themselves from barely scraping by to robust and confident producers in the rural economy.

Beneficiaries to Component 1 include the 13,052 farmers as well as members of their households, estimated at approximately 65,260 people. Adoption of CA will mean that as many as 78,312 Namibians will experience less hunger as a result of project intervention. These beneficiaries also gain knowledge of CA practices, and as described below in Component 2, will also gain sustained access to smallholder specific financial services and the CA implements they need to continue practicing CA.

Component 2: Baseline without NCAP 2 Intervention

This section uses existing baseline data to describe how the current situation will persist without intervention through NCAP 2 in the form of Component 2 implementation. As background, Component 2 and Outcome 2 are as follows:

- **Component 2:** Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital
- **Outcome 2:** Fully-capacitated small business owners provide CA inputs and services in their own local communities to meet smallholder farmers' demand

The lack of rip furrowing services in the north of the country is the biggest logistical obstacle to full CA adoption for nearly all farmers that have been introduced to CA via ACAF training on LF demonstration plots. This is due to a deficiency of basic infrastructure and development in Namibia in general and the project regions in particular. Prior to CLUSA Namibia's involvement, there was close to a 100% lack of service providers who had access to adequate, good condition 4 x 4 medium sized tractors that were also fitted with the CA rip-furrowing implements. Farmers who are aware that climate change and conventional agricultural methods are the reason for increasingly low yields, are forced to revert back to or continue using soil-degrading practices due to the current lack of access to CA inputs.

Through partnership with Kongalend, 18 tractors fitted with proper CA implements were introduced to the rural economies of the project regions via tailor-made loan packages created by Kongalend. While the introduction of 18 tractors capable of providing CA services was a significant accomplishment, it's far from enough to ensure sustained access for all farmers in need of rip-furrowing services, especially because these farmers are thinly spread across the 148,116 square kilometres that make up the project regions.

NCAP's work has significantly contributed to the increased demand for rip furrowing services, effectively outstripping the ability of northern Namibia's rural economy to meet the demand. As LFs and ACAFs compare CA fields to those using conventional agriculture, an increasing number of ACAFs are eager to make the switch. ACAF demand for CA services has created a business opportunity for tractor owners and aspiring small-business owners who only need access to CA implements in order to capitalize on this demand. Without support to the private sector, it is unlikely that demand for rip furrowing services will be met and farmers will be forced to revert back to conventional agricultural methods with full knowledge that better alternatives exist, yet remain elusive.

Component 2: Adaptation Alternative with NCAP 2 Intervention

By capacitating small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital, Component 2 will meet the rising demand for CA implements and services created by the project. Additionally, this will stimulate sustainable economic growth in rural northern Namibia in a way that promotes food security and enhances environmental conservation. By capacitating small business owners through access to start-up capital, CA inputs and CA equipment, Namibian small business owners and entrepreneurs can profit from ACAF demand.

Supportive measures to the private sector will ensure that CA services are available after the project comes to a close. Based on lessons learnt, Component 2 is grounded in the knowledge that access to CA implements and financial services will ensure that farmers who wish to use CA farming methods have the ability to do so – thus securing project success and sustainability. CA results speak for themselves, and farmers looking to increase their yields in the coming years will switch to CA if the knowledge and opportunity are accessible.

Component 3: Baseline without NCAP 2 Intervention

This section presents the current situation in northern Namibia, as evidenced by existing baseline data, and describes the scenario that will persist if NCAP Component 3 is not implemented. For reference, Component 3 and Outcome 3 are as follows:

- **Component 3:** Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts
- **Outcome 3:** Improved awareness and knowledge locally, regionally and globally regarding ground-up lessons learnt, best climate change adaptation practices, intervention strategies, project success stories and opportunities for participation

NCAP staff currently work on an ad hoc basis with local, regional and national media outlets and journalists to promote CA as a climate change adaptation method capable of improving yields. However, they currently do so opportunistically. In the past, promotion of CA as a climate change adaptation strategy has been piece-meal and accomplished by NCAP staff working outside of their full-time responsibilities. These staff members have done so out of a passion for sharing the environmental benefits of CA as well as a desire to eliminate the rampant hunger in their communities. Unfortunately, national media outreach has thus far been an afterthought patched together when staff time or resources become available.

Additionally, the lack of a dedicated staff tasked with sharing success stories has meant that the spread of CA has been a painfully slow process – with farmers only being introduced to CA knowledge directly as LFs, ACAFs or neighbours and friends of NCAP participants. Seeing the advantages of CA has only been able to happen one growing season at a time, and at the expense of farmers travelling great distances to see the results with their own eyes. Given the project's short duration, it is vitally important that farmers nationwide, and especially in the crop producing regions, have access to information about CA as an adaptive measure to adjust to climate change and improve food security.

International outreach in terms of sharing lessons learnt, intervention strategies, best practices and project success stories has been done informally if at all, and is virtually non-existent. Without intervention, these important experiences will be lost and will force other organisations interested in the project regions or in doing similar work in other parts of the world to reinvent the wheel in terms of development approaches and climate change adaptation strategies. Unless NCAP 2 continues with the addition of Component 3, lessons learnt, community-based adaptation strategies specific to Namibia, and CA success stories will evaporate almost instantly.

Component 3: Adaptation Alternative with NCAP 2 Intervention

With NCAP 2 intervention, dedicated staff will be tasked with addressing all of these issues and improving local, regional and national knowledge of CA as an adaptive measure to address climate change and reduce hunger. Component 3 will address the lack of CA uptake beyond NCAP participants by creating opportunities for future participation and generating a sustained national demand for CA. By building information-sharing partnerships with stakeholders, ministry officials, development workers and agricultural organisations, the project will promote CA as an alternative to conventional methods that degrade soils, increase desertification and decrease food security.

Through effective knowledge capture and dissemination Component 3 will improve knowledge about climate change and CA in Namibia, promote CA uptake by sharing success stories and opportunities for future participation. By sharing project lessons learnt on best practices with local, national and international stakeholders, NCAP 2 will enable stakeholders to benefit from the unique knowledge generated over the course of the project. By inserting CA into the national conversation about hunger and food security, the project will create a national demand for CA as a strategy for improving yields, increasing food security and combating poverty despite negative climate change impacts

J. Project Sustainability and Replicability

The project approach is holistic, participatory, inclusive of local support systems and rooted in farmer-to-farmer knowledge and technology sharing. It is based on ten years of best CBA practice experience from the CONTILL, CBA and current NCAP projects, which have operated continuously in Namibia's northern regions.

First and foremost, NCAP 2 will continue to build CA capacity on a local, village-based level by utilising FFS training to mobilise large numbers of rural, smallholder farmers. This farmer-to-farmer approach leads to exponential and replicable growth in the number of CA farmers and fields under CA cultivation.

NCAP 2 is also designed to develop new markets for CA services and capacitate small business owners to meet smallholder farmers' increasing demands for CA inputs, implements and services. In furtherance of this goal, the project will provide CA, business and logistical services and trainings to CA farmers and service providers alike, as well as local support networks through the FFS system and the creation of the NNFU CAC. By developing local CA markets and capacitating and supporting local business owners to serve them, NCAP 2 will help to create a sustainable and self-replicating system of CA stakeholders operating for profit under market conditions. The outcome will be higher yields, improved food security, better family health and thriving small businesses, thereby developing and empowering local systems that will ultimately render project support unnecessary.

Sustainability

NCAP 2 links with government, NGOs, the private sector and community initiatives and programmes that work toward improving food security through climate smart agricultural practices and assistance to communities to cope with droughts and floods. The project will upscale existing activities by adding and/or enhancing a climate change adaptation component to already existing initiatives. The project relies on Regional Councils, traditional village structures, CES and other similar community organisations to identify community development issues, problems, and needs, and to participate in devising practical solutions, moving away from a strictly programmatic solution to problems and needs, relying instead upon the concept of a sustainability strategy as the means to achieve sustainable community development objectives.

Environmental sustainability will be promoted through the project primarily within Component 1 by facilitating a broad-based transition within the project area from maladaptive farming practices – which degrade and erode the soil – to climate smart agricultural methods that put nutrients and water back into the land. This will ensure that adaptation efforts will exceed its lifespan. In the development of partnerships with the non-government sector the project will develop sustainable financing models that can continue beyond the project and include value chain development in order to maximise returns from climate-resilient livelihoods.

Institutional sustainability will be achieved through capacity building at all levels, following the principle of making an impact and improving the livelihoods of the more than 13,000 smallholder households the project has been designed to reach. The capacity building components of this project empower stakeholders at all levels, from local level smallholder farmers, to regional authorities, governmental and non-governmental organizations to deal with climate change impacts and enhance overall adaptive capacities beyond the project's horizon.

Social sustainability will primarily be enhanced by working through existing (government and non-government) organisations in the six project zones, explicitly targeting women and other vulnerable groups. Women are often left behind while men migrate to seek employment, so their engagement in the project is recognized as critical to sustainability. As above, the approach of starting small with demonstration activities, such as training and demonstration plots, following by scaling-up promotes a momentum and allows the project to generate more support, improving the targeting of benefits. NCAP and NCAP 2's focus on women is also a well-known means of producing sustainable results.

"The surest way to keep people down is to educate the men and neglect the women. If you educate a man you simply educate an individual, but if you educate a woman, you educate a whole nation." This quote by James EmmanKwegyirAggrey, an intellectual and missionary who worked in what is now Ghana, is a cliché in African development circles for a reason – it's a timeless truth. A development project that neglects women is not a sustainable project. NCAP 2 focuses on women because women are traditionally responsible for farm management and are therefore the primary practitioners of CA. Their daughters will be the next generation of farmers – having learned everything they know from their mothers. By building on and utilising this traditional division of labour, the project ensures both social sustainability as well as empowering rural women and girls.

Replicability

The design principles outlined in the Project Components, Outputs and Activities are specifically set out to foster replicability through up scaling of adaptation learning and mainstreaming into policy processes. As the project relies upon farmer-to-farmer transfer of knowledge and the involvement of private sector service providers, a high degree of ownership of its outcomes is foreseen – a good foundation for replication. Overall, the design of this intervention is focused on upscaling and improving climate smart agricultural adaptation options, which can be replicated in terms of approach and technologies tested in other communities and regions. Indeed, the SPA/CPP and CBA pilot programmes participants showed a high demand and enthusiasm for the strategies NCAP 2 will employ.

The barriers are know-how, technical and institutional support which this project will address; aiming to make a systemic shift in the way smallholder farming is supported through promotion of evidence-based policy development and project/budget planning. The systematic documentation of adaptation learning, as well as the tracking of impacts of project outputs and activities is a key to establishing a knowledge basis from which replication can take place. Knowledge management is thus a key component of NCAP 2.

The focus on capacity building will generate a pool of technical experts, which can be utilised for future replication in other parts of the country.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Project Implementation Arrangements

The project will be implemented over three years in order to achieve full up-scaling and realisation of all outcomes and will, it is anticipated, commence in November/December 2015 and conclude in December 2018.

The project will be overseen at the national level by the Designated Authority (DA), which is the Ministry of Environment and Tourism (MET)'s Environmental Commissioner. Specifically, the DA will be the government of the Republic of Namibia's focal point for the Adaptation Fund Board/Secretariat. The DA further has responsibility for the endorsement of project proposals to the Adaptation Fund on behalf of the national government.

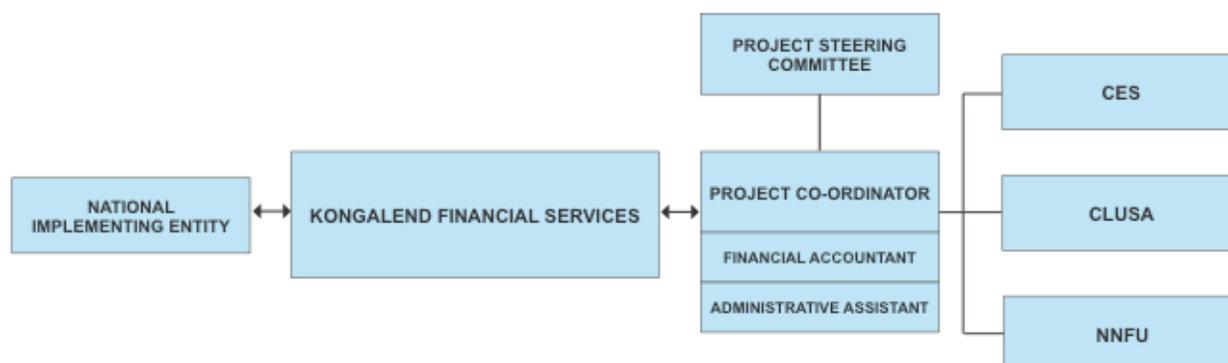
The Desert Research Foundation of Namibia (DRFN) will act as the National Implementing Entity (NIE). The NIE will bear full responsibility for the overall management of the projects and programmes financed by the Adaptation Fund in Namibia, and will bear all financial, monitoring and reporting responsibilities.

Project implementation will be undertaken through the support and efforts of the following entities:

- Executing Entity - Kongalend Financial Services
- Project Steering Committee (PSC)
- Project Co-ordinator (PC), Project Financial Accountant and Project Administrative Assistant, who will be positioned at Kongalend Financial Services
- Executing Partners:
 - Creative Entrepreneurs Solutions (CES)
 - CLUSA Namibia; and
 - the Namibian National Farmers Union (NNFU)

The roles and responsibilities of each of these entities with respect to implementation are outlined graphically in Figure 9 below.

Figure 9: Project management consortium and reporting structure



In summary, the above diagram (Figure 9) depicts the consortium, institutional framework, project implementation and reporting structures.

Implementing Entity – Kongalend Financial Services

The Implementing Entity, Kongalend Financial Services, a development-centred commercially-driven microfinance institution, is 100% owned and managed by indigenous Namibian professionals with backgrounds in the banking, finance, asset management auditing and publishing sectors.

Among its basket of financial service offerings, Kongalend extends unique and affordable agribusiness development loan packages tailor-made to support the uptake of CA by making land preparation services and other inputs available to farmers. It will continue to make available affordable, development-oriented loan packages throughout the AF project in order to meet the demands of the growing CA community of rural smallholder farmers and CA service providers.

As the Implementing Entity, Kongalend Financial Services will create an NCAP2 project division to be based at its Windhoek head office. The rationale in creating a dedicated division is to ensure that project funds are ring-fenced and are utilised solely for NCAP 2 related costs and are accounted for in a transparent and auditable manner. The NCAP2 project division will comprise of three key administrative personnel, namely, the Project Co-ordinator, the Financial Accountant and an Administrative Assistant. The key roles and responsibilities of the Executing Entity will thus include, to:

- Oversee and provide overall project leadership and direction in the execution and attainment of project milestones, ensuring cost effective utilisation of financial resources and be accountable to the National Implementing Entity;
- Recruit and appoint qualified personnel and establish the NCAP 2 project division within Kongalend, to be headed by a Project Co-ordinator;
- Consummate service level agreements with each of the three Executing Partners detailing the scope of responsibilities, timelines and costs associated with their levels of work;
- Constitute the Project Steering Committee;
- Chair the proceedings of quarterly Project Steering Committee meetings;
- Deliver quarterly progress reports to the National Implementing Entity;

- Monitor the executing partners’ work, ensuring that they adhere to agreed-upon project schedules, deliverables and costs; and
- Ensure effective project monitoring and internal evaluation of project deliverables;

Project Steering Committee

A Project Steering Committee (PSC) will be constituted to serve as the NCAP 2’s decision-making body. The PSC will ensure that the project remains on course to deliver the desired outcomes in a cost-effective manner and remains consistent with targets, budgets, national development strategies and national technical standards. The PSC is the group responsible for making consensus-driven, management decisions.

Specifically, the PSC will provide guidance to the Project Co-ordinator, make recommendations to the Implementing Entity, and secure NIE approval of project plans and revisions, if necessary. In order to ensure the **Project Consortium’s** ultimate accountability, PSC decisions will be made guided by the principles of good governance that ensure management and delivery of impactful results, through cost effectiveness, fairness, integrity, transparency. In case a consensus cannot be reached within the PSC, final decision shall rest with the Implementing Entity.

The PSC will meet quarterly each year during the tenure of NCAP 2 to discuss work plans and annual budgets, evaluate ongoing actions, and validate the quarterly and annual project reports being prepared.

The composition of the PSC will be made up of two representatives from the Executing Entity, one representative from each of the three Executing Partners and two like-minded adaptation independent professionals to be drawn from the agricultural and environmental sectors.

The PSC will be chaired by the Implementing Entity. Any member of the Project Steering Committee shall have the right to convene an urgent PSC meeting on an ad hoc basis to discuss and provide solutions to impediments and challenges faced by any one of the executing entities.

Project Co-ordinator

The Project Co-ordinator (PC) shall be under the direct supervision of (and will report directly to) the Executing Entity, Kongalend Financial Services. The PC will be responsible for the day-to-day management of the project, with a focus upon technical quality, timely implementation, project financial management and procurement of goods and services. The PC shall directly report to Kongalend Financial Services.

The duties and responsibilities of the PC shall include, but not be limited to the following:

- Co-ordinate all project activities with Executing Partners to ensure appropriate execution of project outputs and activities while ensuring adherence to Kongalend’s and the Adaptation Fund’s procedures;
- Monitor project activities by undertaking regular inspection visits to Executing Partners at project sites;

- Prepare annual work and monitoring plans in line with the budget and the responsibilities of the Executing Entity and the Executing Partners in consultation with PSC;
- Prepare the project visibility and communications plan for the entire duration of the project in consultation with the Executing Entity and PSC;
- Collect and compile narrative and data-based reports from all Executing Partners on a monthly basis for purposes of preparing a monthly monitoring and evaluation report;
- Prepare periodic progress reports on implementation, including financial and monitoring reports. The information and data in these reports would be sourced from the Executing Partners;
- Prepare annual project reports for consideration and validation by the PSC for submission to the National Implementing Entity;
- Manage project expenditure according to the project budget;
- Carry out project procurements of goods and services while adhering to Kongalend Financial Services and the Adaptation Fund's procurement policies and procedures;
- Supervise the Project Financial Accountant and Administrative Assistant;
- Establish and promote linkages with relevant national and international related projects and programmes;
- Liaise with the National Implementing Entity and other stakeholders on projected related matters;
- Ensure adequate and timely requisition and allocation of funds to executing entities;
- Be the focal point contact between the NCAP2 project and government ministries and private sector institutions with interest in agriculture and adaptation matters;
- Facilitate the design and develop of an online presence for NCAP2, which links to relevant climate change adaptation resources and information on best practices, with a special focus on making online content easily accessible via mobile phone, as most farmers do not possess personal computers; and
- Document impact throughout the tenure of the project in conjunction with the Executing Partners;

In this role, the Project Coordinator will serve as a vital link between the entities responsible for project management, monitoring and evaluation and the entities responsible for project execution on the ground.

Project Financial Accountant

The Project Financial Accountant shall be responsible for the overall financial administration and the compilation and upkeep of up-to-date accounting records of the project, under the supervision of the Project Co-ordinator. Both the Project Co-ordinator and Project Financial Accountant will be placed with the Executing Entity, Kongalend Financial Services, in order to take advantage of and synergize with Kongalend's superior institutional resources and established special purpose funds management expertise.

The Project Financial Accountant's responsibilities include, but are not limited to, the following:

- Ensure that all procurements and disbursements are carried out in accordance with Kongalend Financial Service's and the Adaptation Fund's policies, procedures and requirements;
- Ensure that project-related disbursements are carried out in a timely and efficient manner;
- Ensure the smooth flow of funds to enable the timely implementation of project activities, including the timely replenishment of the project account;
- Provide secretarial services to the PSC;
- Maintain a logical and comprehensive record of financial transactions, with supporting documentation, for reference and audit purposes;
- Compile the quarterly and annual financial reports in a timely manner, with a focus on project cost effectiveness;
- Prepare a monthly project bank reconciliation and produce management accounts;
- Provide the necessary assistance and documentation for the statutory audit of annual financial statements; and
- Perform all other duties that are requested by the PC or necessary and relevant to the assignment.

The Project Financial Accountant will serve a vital role in ensuring timely implementation, monitoring and evaluation, as well as ensuring transparency, the overall financial integrity cost effectiveness and accountability of the project.

Project Administrative Assistant

The Administrative Assistant shall be responsible for the provision of administrative and secretarial services to the NCAP 2 project division, ensuring that all logistics, such as stationery and project resources, are available. She/he will also provide a helpful hand to the PC in the gathering and compilation of project reports.

The Administrative Assistant's responsibilities include, but are not limited to, the following:

- Provision of administrative and secretarial services to the NCAP2 project team by arranging appointments and managing the calendar for PC appointments and PSC meetings;

- Operating the mini-switchboard and administering the inflow and outflow of communication from the project division to other stakeholders, such as executing partners and the NIE;
- Provision of book keeping services and assistance to the financial accountant in the compilation of monthly accounting reports;
- Perform general clerical duties to include but not limited to; photocopying, faxing, mailing and filing of project records;
- Manage, organise, and update relevant data using database applications;
- Be in charge of ordering stationery and office consumables, ensuring that perishable items, such as printer cartridges are held at minimum levels, and to reorder when required in consultation with the Financial Accountant; and
- Ensure excellent and professional customer care by providing timely information and follow up on any project related queries to customers and stakeholders alike;

Executing Partners

The Executing Partners will operate under the Executing Entity through sub-grant agreements with clear deliverable schedules. They will report to the Project Co-ordinator on a monthly basis as described in their respective sub-grant agreements. These reports will include narrative, as well as monitoring data, on verifiable activities and deliverables as stipulated in the sub-grant agreements and annual work plans.

Creative Entrepreneurs Solutions (CES)

CES is a Namibian non-profit NGO based in northern Namibia. It was founded and incorporated in 2008. It has seven years of experience working closely with subsistence farmers in the northern communal land areas implementing Community Based Adaptation (CBA) strategies, with a focus on sustainable climate-smart agriculture methods. CES has implemented a range of CA/adaptation projects financed by the UNDP, GEF-SGP, the Africa Adaptation Project, CPPISLM, and the Environmental Investment Fund of Namibia.

Namibian National Farmers Union

The NNFU is a national federation of regional farmers unions, founded in 1992, to represent Namibian communal and emerging farmers. It aims to encourage increased food production for household security, enhance marketing of farming products to increase household income, increase participation and recognition of women in farming, and contribute to environmental protection and sustainable utilisation of natural resources. In recent years, NNFU has strengthened the implementation of its mandate by providing services directly to farmers, as well serving an advocacy function for smallholders. NNFU has been directly involved in implementing CA projects since 2005.

CES and NNFU will execute the proposed project on a day-to-day basis under Kongalend Financial Services' financial and managerial guidance, with a focus upon Component 1 Outputs and Activities ("Increasing rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources"). The project area will be divided between CES and NNFU for implementation purposes based upon each entity's unique experience and expertise working in those regions.

Specifically, CES and NNFU will be responsible – in their respective project target regions – for facilitating the local and regional implementation of the project with participating farmers and the relevant regional and constituency level government structures. CES' and NNFU's roles and responsibilities will include the following:

- Identify 70 additional Lead Farmers (LFs) to participate in the project, profile each of them, and collect GPS coordinates for their farms;
- Coordinate and execute regional beginner and advanced trainings for 502 total LFs;
- Facilitate the establishment of 502 LF demonstration plots in line with the appropriate farming calendar demarcating these using GPS and co-ordinating timely rip furrow land preparation with CLUSA Namibia;
- Work closely with LFs to ensure timely seed distribution, and that crop rotations are clearly demonstrated;
- Provide technical support and mentoring to 502 LFs to ensure that they become successful trainers and teachers through Farmer Field Schools (FFS) where they will be responsible for training their neighbours, who are otherwise known as Aspiring Conservation Agriculture Farmers (ACAFs);
- Provide CLUSA Namibia with geographic details and registration lists for 10,800 ACAF's in the target regions, who have already registered with NCAP for rip furrow land reparation services;
- Profile an additional 1,750 ACAF's, including project registration and geographic details;
- Ensure that LFs provide four on-farm FFS quality trainings per crop season to neighbouring ACAF's – 12,550 ACAF's in total;
- Plan and arrange Farmer's Field Days with a special focus on CA for farmers, the general public, and other relevant stakeholders;
- Gather baseline and other monitoring data, and conduct yield measurements.

In addition, NNFU will be responsible for the creation of a CA working group comprised of CA farmers and other stakeholders and dedicated to meeting the needs of local CA communities.

As discussed above, CES and NNFU will be primarily responsible for implementing the Component 1 Outputs and Activities, which constitute NCAP's core concrete adaptation work on the ground with smallholder farmers. CES' and NNFU's previous work undertaking similar activities in the project target areas will therefore be critical to overall project success and successful realisation of critical Component 1 outcomes ("13,052 rural smallholder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions").

CLUSA Namibia

Founded in 1916, NCBA CLUSA (CLUSA) is a national membership organisation that serves America's diverse co-operative business community. Its membership includes over 400 co-operatives and federated organisations in farm supplies, agricultural processing and marketing, banking and finance, insurance, housing, health care, consumer goods, student services and worker-owned enterprises. Internationally, NCBA programmes generally assist communities or community-owned businesses in the following areas: (a) community management of health facilities or natural resources; (b) local government and civil society strengthening linked to income generation; (c) agri-business/farmer association production, processing and marketing; and (d) micro-enterprise development and micro-enterprise finance.

NCBA CLUSA's support to international communities began in 1945 when it participated in the founding of CARE (Co-operative for American Remittances to Europe) to aid in rebuilding war-torn Europe. In 1953, NCBA CLUSA began working with Indian farmers to form a co-operative helping to revolutionise the nation's fertilizer industry. Today, that co-operative known as the Indian Farmers Fertilizer Cooperative Limited (IFFCO), is the largest member-owned fertilizer co-operative in the world.

During the past 62 years, CLUSA has conducted development and international assistance activities and managed development projects and programmes in more than 80 countries worldwide. This experience includes implementation of over 200 long-term projects (many between five and ten year's duration) and hundreds of short-term consultancies. CLUSA's current portfolio worldwide includes 27 programmes in 15 countries throughout Africa, Asia, and Latin America. In Africa CLUSA has currently long term programmes in Namibia, Mozambique, Zimbabwe, Zambia, Malawi, Madagascar, Kenya, Uganda, Senegal, Niger and Burkina Faso.

CLUSA has an extensive history in Namibia, where it has been active since 2004 when it worked with USAID (United States Agency for International Development) and the World Wildlife Fund (WWF) to implement the agricultural enterprise component of a community-based natural resource management project in the Caprivi (now Zambezi) and Kavango regions. In addition, with financing from the Food & Agricultural Organisation (FAO), the European Union (EU), and other donors, CLUSA delivered services in conservation agriculture, cash-crop production and marketing, gardening, improved poultry and fish ponds, savings and credit co-operatives, and bulk marketing of surplus maize, natural products, and timber products to 3,000 households. CLUSA is currently operating in northern Namibia implementing two conservation agriculture programmes funded by USAID's Office of Foreign Disaster Assistance (OFDA) and has established offices and systems that will allow for efficient mobilization and quick project start-up.

CLUSA Namibia is assisting targeted smallholder farmers in undertaking conservation agriculture systems that are responsive to enhanced productivity of drought resistant crops. In most parts of Namibia, farming systems are characterised by low input, low yield-extractive farming practices that depend, to a large extent on exploiting the natural resource base. CLUSA Namibia is thus training farmers in conservation farming as an alternative farming method that will ultimately increase yields and address issues of food security

CLUSA Namibia's specific roles and responsibilities will include the following:

- Primary responsibility for co-ordinating 170 CA tillage service providers in the seven project target regions for LF's CA demo plots and for ACAFs;
- Provision of data on a monthly basis on the number of hectares rip furrowed by tractor owners and GPS co-ordinates via satellite tracking system;
- Provision of data on a monthly basis on the number of hectares rip furrowed by Community Draught Animal Power Promoters (CDAPPs) by establishing GPS coordinates in the field;
- Co-ordination and delivery of tractor driver and owner rip furrow practical training;
- Co-ordination and delivery of Community Draught Animal Power Promoters rip furrow practical training;
- Provision of in the field follow-up training and technical support to 80 tractor drivers and 90 CDAPPs to ensure correct and high quality land preparation;
- Co-ordination and delivery of business management training for rip furrow service providers in collaboration with Kongalend Financial Services.

CLUSA Namibia's work in the project target areas will primarily encompass Component 2: Capacitating small business owners to provide CA services in their own communities through technical and business training, field support and access to start-up capital. By capacitating CA service providers, however, CLUSA Namibia's work will prove vital to smallholder farmers' ability to access CA inputs/services and resulting ability to uptake CA in their fields in furtherance of the Component 1 and 3 Outcomes, Outputs and Activities.

Independent Entities providing project support

Independent auditors and consultants will carry out annual audits, verification of monitoring data by by-annual sampling, and project evaluation. Other technical assistance will be sourced from appropriately qualified Namibian entities as and when required.

Agro-environment specialists, agricultural appropriate CA technology provision and monitoring and evaluation specialists

Such services will be sourced through a transparent procurement system, where invitations for expressions of interest to provide specific services will be published in local dailies, including invitation for quotations to provide such services. The Project Steering Committee will evaluate the quality of proposals as well as ensuring that only competitive and cost effective bids are considered.

The Project Steering Committee will enter into formal commercial supplier of choice contracts with independent entities providing project support on an as required basis.

National Implementing Entity (NIE)

The NIE bears full responsibility for overall project management, monitoring and evaluation, including financial monitoring, and reporting responsibilities associated with the project. Specific roles and responsibilities of the NIE include, among others, to:

- Advise on and oversee project implementation
- Liaise with and report to AF
- Establish protocols for annual progress reporting
- Facilitate formal scheduled project evaluations
- Ensure compliance with the ESP of the AF, and other essential operational frameworks; and
- Disburse funds and monitor expenditure

The EE, through the Project Coordinator will inform the NIE on project performance through submission of quarterly reports. The EE and NIE will meet to discuss these reports within one week after the reporting period. The two entities will endeavour to maintain effective communication flow and will undertake *ad hoc* consultations as routine operational procedure.

The NIE will undertake periodic monitoring through site visits according to a predetermined schedule.

B. Financial and project / programme risk management

The NCAP 2 project will be implemented under the guidance of Kongalend Financial Services, a development-oriented, commercially-driven microfinance institution with an impeccable 15-year track record in the management of public funds as well as the execution of projects of national importance.

Its executives were responsible, through a five-year management mandate for the administration of a Solar Revolving Fund facility on behalf of the Namibian Ministry of Mines and Energy, capitalised at N\$12 million. The primary objective of this fund was to provide subsidised credit to individuals, predominantly from rural off-grid communities, to finance solar home systems. From 2004-9, Kongalend's Chairman also served as executive chairman of Diamond Marketing Consultants, contracted as Government Diamond Valuator (GDV) by the Namibian Government to provide diamond valuation services on its behalf of the Government in order to determine the true market value of Namibian diamonds before export for the calculation and determination of government royalties and taxes. During this period, the company valued diamonds in excess of USD 2.5 billion per annum.

At present, Kongalend has a 10-year mandate as Fund Managers of an unlisted Private Equity Fund in partnership with the Namibian Government Institution Pension Fund (GIPF), known as the Kongalend Renewable Energy Fund. The Fund was capitalised at USD 15 million, and commenced business in July 2010, investing in small, micro and medium enterprise loans, as well as the funding of renewable energy systems for households in off-grid communities for lighting and basic energy needs, the majority of whom are located in the northern parts of Namibia, the same regions where NCAP 2 will be implemented. The Fund under Kongalend also provides agribusiness loans to smallholder farmers who are participating in Climate Smart Adaptation projects, such as NCAP.

Kongalend's operations are guided by best practice and corporate good governance, where resources at its disposal are managed and deployed in a prudent and accountable manner, ensuring that all activities are conducted within the guidelines of clearly laid-down procedures and are documented to ensure their auditability. Over the last 15 years of engagement in the management of public funds and projects, Kongalend has not had its financial conduct, results and audited financial statements being qualified.

Kongalend's image and reputation has been built over a decade and a half of hard work and commitment to making an impactful contribution to the development of Namibia and its people, and to making a positive and sustainable dent on poverty. The same vigour and commitment will be brought to the fore when we assume responsibility over the NCAP 2 project to be funded with Adaptation Fund resources.

Specific measures for financial and project risk management would include, first, the ring-fencing of project funds, by opening a dedicated NCAP 2 project bank account to which all funds from the Adaptation Fund and other co-funding funders will be deposited. This special purpose account will be used to pay for all project permitted expenditure items.

The accounting for NCAP 2 will also be ring-fenced, not to be mixed with the Implementing Entity's other business activities and will be accounted for and audited separately, to ensure transparency and accountability. All tender documents and recommended award of tenders will be submitted to the NIE for approval in order to ensure that internationally-accepted procurement principles and practices are applied.

Kongalend in its capacity as Executing Entity will appoint three signatories to the ring-fenced NCAP2 project account, namely its Principal Officer, the Project Coordinator and the Project Financial Accountant, who will be charged with the responsibility of ensuring that project funds are disbursed to legitimately approved permitted expenditure project items and activities.

Although the project will be implemented in the field, it will not operate with cash. Most project transactions will be disbursed via electronic funds transfer, vendors and providers of services to the project being registered as suppliers on the management information systems and accounting systems, to mitigate the risk of loss or mishandling of cash by staff in the field.

Monthly financial reports on the utilisation of funds statements will be produced and circulated to all members of the Project Steering Committee. Quarterly financial and on-field activity reports will also be produced for appraisal and validation purposes, before submission to the National Implementing Entity.

In so far as project risk management is concerned, we are convinced that due to our high level of expertise and experience in the management of similar and bigger projects, there is little or no risk that is envisaged to derail project implementation due to institutional capacity or lack of commitment toward project success.

Table 16 overleaf identifies all general risk categories, considers their significance, and includes a plan for monitoring and mitigating them.

Table 16: Risk and risk mitigation

Risk	Rating	Risk Mitigation Measure
Financial	Low	<p>The financial risk is low because the proposed project is a continuation of an existing project with a high degree of ownership and participation by the project's direct beneficiaries.</p> <p>The consortium of institutions implementing and executing the project are all tested and experienced institutions with solid project management experience as well as infrastructure on the ground.</p> <p>Also reducing the financial risk is the fact that the Project's design and methods are based upon nearly a decade of lessons learnt on best practices by NCAP 2 partners and Executing Entities.</p>
Institutional	Low	<p>All of the Implementing and Executing Entities are legally registered entities in Namibia, hailing from the private and NGO sectors. Severally and collectively, they each have the significant technical and financial expertise required to undertake implementation.</p>
Environmental	Medium	<p>The project will mitigate the risk of droughts and floods through implementation of early land preparation and planting, and the planting of indigenous adaptive crops as well as early maturing crops in drier than normal years. The project will need to make use of existing weather and seasonal forecasting information from the MET Service.</p>
Social & Cultural	Low	<p>The current NCAP project is seeking additional funding largely in response to farmer demand for up-scaling and expansion. Only willing smallholder farmers will be included as project beneficiaries.</p>
Social & Cultural: Low Participation of Women, Children and Orphans	Low	<p>Women, youth and orphans participation will be targeted as direct beneficiaries. Experience shows that women are willing to participate in many developmental projects.</p> <p>Despite the fact that NCAP's 432 LFs, 60% are women, this figure remains under representative of women because traditionally women are primarily responsible for agriculture while men are responsible for animal husbandry responsibilities.</p>
Political	Low	<p>Namibia has a stable democratically elected government. We foresee to political unrest or lack of political will in supporting this project. NCAP 2 will compliment similar CA and Climate Smart projects.</p> <p>Roles and responsibilities will be clearly defined through a consultative process.</p>
Co-funding	Low	<p>Potential co-funding institutions will only be formally approached on approval of this proposal by the Adaptation Fund. We have already identi-</p>

C. Environmental and Social Risk Management, in line with the Environmental and Social Policy of the Adaptation Fund

Table 17: Environmental and social risk management

Risk / Class category	Level	Risk Management
Compliance with the Law	Low	The project is in compliance with domestic and international laws
Access and Equity	Low	The project activities are aimed at vulnerable subsistence farmers, with a special focus on female-headed households, in seven (7) northern Namibian regions. All participating households have an equal chance of gaining from the adaptation activities promoted by the project
Marginalized and Vulnerable Groups	Low	The project is inclusive of vulnerable farming households – women, girls, the elderly, people living with HIV/AIDS, people living with disability – who are exposed to negative climate change impacts, food insecurity and living close to or below the poverty line. The project aims to build the resilience and reduce the vulnerability of marginalised and vulnerable groups engaged in subsistence farming by introducing adaptation methods which increase yields and create economic benefits in the form of surplus for marketing
Human Rights	Low	The project does not violate human rights. It is in line with, and promotes, international human rights
Gender Equity and Women's Empowerment	Low	The project is designed to reflect the gender balance of crop farming practitioners in the seven target regions (60% women, 40% men) in a fair and equitable way. Both women and men will have equal rights to receive / create social and economic benefits Women, by tradition, bear the responsibility of crop farming but are usually marginalised and denied access to education and finance opportunities. The project thus aims promote and strengthen women's access to education, technology, micro-finance, and farming inputs and services
Core Labour Rights	Low	The project is in line with domestic Labour Law as well as rights as espoused by the International Labour Organisation
Indigenous Peoples	Low	The project is in line with the rights and responsibilities as set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments relating to indigenous peoples
Involuntary Resettlement	Low	The project does not include any aspect of resettlement
Protection of Natural Habitats	Low	The project does not involve conversion or degradation of critical natural habitats. On the contrary, it addresses the reversal of soil degradation and promotes soil conservation. The project is in line with domestic Acts and Policies on the protection of natural habitats
Conservation of Biological Diversity	Low	The project is designed to address soil conservation in combination with the farming of indigenous cereal and legume species. It does not adversely affect biodiversity in any way and it does not support introduction of invasive species
Climate Change	Low	The project will in no aspect contribute to increased GHG emissions, rather it will promote carbon sequestration through large-scale introduction of low and no till Conservation Agriculture methods

Pollution Prevention and Resource Efficiency	Low	The project does not include any use of herbicides, pesticides, chemical fertilizers or any other pollutants. Nor will it produce any polluting waste. The project maximizes energy efficiency by applying low or no till soil tillage practices which are more diesel / animal power traction efficient than conventional ploughing practices
Public Health	Low	The project does not contain any aspects that could be harmful to public health. On the contrary, the project aims to improve public health status by focusing on building resilience among subsistence farmers for them to increase yields for food security. The project also includes the cultivation of moringa trees in order to boost nutrition levels and health status at household level
Physical and Cultural Heritage	Low	The project is designed not to alter, damage or remove any physical cultural resources, cultural sites or sites with unique cultural value. It will not interfere with existing access and use of such physical and cultural resources
Lands and Soil Conservation	Low	Project Components and Outputs are entirely focused on, and based in, promoting wide-spread uptake of soil conserving methods as adaptation measures for creating resilience and food security among vulnerable subsistence farmer communities. The project aims to train farmers and strengthen the private agri-service sector in order for the farmers to be capacitated to the point where they can turn degraded and non-productive farm land, into productive farming units and, simultaneously, restore valuable agro-eco systems

D. Project Monitoring and Evaluation Arrangements and Budgeted Plan

The project will be monitored through the following M&E activities, and the M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework (Part III D) is aligned with the AFB/EFC.7/4.Rev.2 document “Annual Performance Report”, the “AF Evaluation Framework”, the “AF Results Framework and Baseline Guidance – Project level” and the “Guidelines for Project and Programme Final Evaluation” documents.

Project Inception Workshop: Held within the first month of project start with those with assigned roles in the project organisation structure to agree the annual work plan, this workshop will be a vital step in establishing and reinforcing ownership/responsibility for project activities and ensuing impact. Workshop proceedings will address a number of key issues, including:

- Ensuring that all partners to fully understand and take ownership of the project, detailing their respective roles, support services and complementary responsibilities.
- Discussing the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- Finalisation of the first annual work plan.
- Review and agreement on project indicators and targets and their means of verification, and rechecking of assumptions and risks.
- Agreement on mechanism for reporting, monitoring and evaluation requirement; and Monitoring and Evaluation work plan and budget.
- Discussion of and agreement on financial reporting procedures and obligations,.
- Schedule for Project Steering Committee meetings.

Project Inception Workshop Report: This report will act as a key reference document for both project partners and stakeholders and will be compiled and distributed within one month of the workshop in order to formalize various agreements and plans relating to project implementation and project monitoring and evaluation.

Collection of Baseline Data: While the main approach to building adaptive capacities is focused on vulnerable groups, particularly women and children, there is limited evidence to guide users in the selection of baseline data. Accordingly, NCAP will rely upon a strategic combination of baseline data collection activities and reliance upon best-available data, such as the FAO Agri-Gender Toolkit, where appropriate.

All 502 LFs and 1,305ACAFs, amounting to 10% of NCAP participating farmers, will complete a survey administered by NCAP 2 field consultants within the first three months of the project start date. The rationale guiding NCAP's research development has been a drive to produce data and analysis that measures project success, is easily shared in local and international networks and capitalizes on the project's access to rural subsistence farmers in Namibia, well over half of whom are women.

The following subsections contain a brief description of the nationally and internationally recognized baseline data and data collection methodology applicable to the project subject matter (i.e. rural subsistence farmers) and geographic area (i.e. rural Namibia), which NCAP2 will utilise to monitor and evaluate project outcomes.

Baseline of yield per hectare

Baseline yield per hectare was indicated at 230 kg/ha according to a 2009 FAO study⁸². The project will use these figures as a baseline with which to compare yields per hectare of 70 LFs (10 per region)

The following is an overview of the data items from the FAO Agri-Gender Toolkit to be collected by NCAP 2 field consultants at the start of the project, and their role in measuring project success.

FAO Data Item 1: Agricultural population and households

The vast majority of LFs participating in NCAP represent an intersection of some of the most marginalised groups in Namibia, namely: female heads of household, living in rural areas, supporting a large number of dependents and relying on subsistence agriculture as the primary source of income. Data Item 1 reveals basic household characteristics of this group. NCAP 2 does not seek to alter agricultural populations or household makeup and does not anticipate a significant change in this item.

⁸²Special Report FAO/WFP Crop, Livestock and Food Security Assessment Mission to Namibia (2009) Washington, FAO

FAO Data Item 2: Access to productive resources

The project directly addresses the lack of access to productive resources, specifically access to agricultural inputs, assets and technologies (see Part II: Component 2), as well as access to credit, extension services and training programmes. It is expected that project participants will see massive improvement on this research point throughout the 3 years of the project. Indeed, project leaders and partners were specifically chosen to address the lack of access to productive resources, namely: Kongalend will address the lack of access to credit (Activities 2.2.1 & 2.2.2) and in collaboration with Namibian appropriate technology manufacturers/suppliers will address the lack of access to implements (Activity 2.2.2), and CES and the NNFU will address the lack of access to education and training (Activities 2.1.1, 2.2.3 & 2.3.1).

FAO Data Item 3: Production and productivity

Gender disaggregated data on household production will generate a clearer picture of the household economy of rural subsistence farmers in north and north-central Namibia. It can be expected that if the project is successful, indicators will show an increase in the proportion of household income derived from farming activities.

FAO Data Item 4: Destination of agricultural produce

Currently, most farmers in the project area have food security for an average of 6.6 months, meaning that all produce is directly consumed before it will ever reach the marketplace. It is anticipated that with project success will come increased storage and sale of surplus produce (related to Output 1.3 & Activity 1.3.2).

FAO Data Item 5: Labour and time-use

Item 5 will elucidate a number of key areas that will be addressed by the project, including: household division of labour, remunerations by type and amount for labour, and time spent in domestic activities. All data will be disaggregated in respect to both sex and age. It is expected that with success of the project will come a decrease in the amount of labour-time dedicated to home-based farming and an increase in remunerations.

FAO Data Item 6: Income and agricultural expenditures

Under Item 6, the proposed project will make use of current baseline data on incomes and expenditure in the first year and also collect data on decision-making processes related to household income and expenditure, as such data can provide useful information on related intra-household management processes. The project will follow this up with data collection mid-term and at the end of the project. It is expected that participating households will increase incomes and decrease agricultural expenditure in relation to incomes.

FAO Data Item 7: Membership of agricultural/farmer organisations

Membership to agricultural organisations can benefit farmers by giving them opportunities to become involved in initiatives that provide services (such as NCAP and NCAP 2). Although the majority (60%) of LFs currently working with NCAP are women, this figure remains unrepresentative of the proportion of women currently engaged in subsistence agriculture as a primary source of income.

FAO Data Item 8: Food security

Data related to food security is of immense importance to the project, given that hunger and under-nutrition is rampant in northern Namibia. Additional data will be collected to supplement the information gathered in Data Item 8 in an effort to better quantify the number of months of food security before and after project intervention (Activity 1.3.2).

FAO Data Item 9: Poverty indicators

An integral aim of farmers, in particularly women, switching to climate-smart farming methods in order to adapt to changing climate conditions is poverty eradication through increase in food security, incomes and gender equality which will reflect positively on families and nations at large. Data Item 9 monitors the impacts the proposed project will have on poverty. Gender disaggregated data will provide greater insight into differences in poverty levels that may exist between female and male-headed agricultural households participating in the project. A decrease in poverty levels is expected.

Site Visits

The proposed project will carry out collection of baseline data and follow-up monitoring data during each of the three project years through site visits by Field consultants trained in data collection for Items 1 to 9 above.

Internal Progress and Monitoring Report: The Project Co-ordinator will collect narrative and data reports from all Executing Entities each month and prepare a quarterly report to the Implementing Entity to ensure consistent, while not cumbersome, project monitoring and evaluation.

Number of Hectares under CA Report: A monthly report will be produced that tracks the number of hectares under CA. This report will be generated by CLUSA Namibia. Specifically, NCAP 2-participating tractors will be equipped with a low-cost GPS tracking system, which will be utilised to accurately determine the number of hectares rip furrowed. This system is far more efficient than NCAP's current system of relying upon tractor service providers in seven different regions to self-report the number of hectares prepared to both NCAP 2 and the tractor owners. An electronic system will promote accuracy, transparency and fairness to tractor owners, tractor drivers and farmers alike.

CLUSA Namibia, with its technical expertise in this area, will be responsible for downloading GPS coordinates and generating a spreadsheet that shows the number of hectares prepared for planting using CA methods. The Project Co-ordinator, guided initially by a contracted agronomic and environmental specialist will be responsible for reconciling, interpreting and displaying the data in a usable manner so that it can be integrated into a monthly internal report to the Implementing Entity (as discussed in Part III A: Project Implementation Arrangements), as well as utilised in CA service provider training sessions (see Part II: Components 1 & 2).

Annual Project Review Report: Annual Project Review Reports are prepared to monitor progress made since project start and in particular for the previous reporting period. The Annual Project Review Report includes reporting on progress made toward project objectives and project outcomes. Results will be reported on in reference to indicators, baseline data, and end-of-project targets (cumulative). These reports will be organised around project outcomes.

The Annual Project Review Report will be informed by data collected during monthly Site Visit Reports, Number of Hectares under CA reports, and annual administering of the FAO Agri-Gender Toolkit Survey key data items over the course of the project.

Project Successes and Lessons Learned Report: Collected as part of a story bank, project successes and lessons learned will be collected on an ad hoc basis throughout the duration of the project. While the project is based on a decade's worth of lessons learned on best practices, NCAP 2 will continue this tradition of institutional learning.

Mid-term Project Progress Report: The project will undergo an independent Mid-Term Review at the mid-point of project implementation. The Mid-Term Review will determine progress made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization and timing of the mid-term review will be decided after consultation between the parties to the project document.

End of Project Report: An independent evaluation will take place three months prior to the final Project meeting and will be undertaken in accordance with AF guidance. It will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals.

Audit: This project will be independently audited in accordance with AF financial regulations, as well as the applicable AF audit policies and by independent auditors and in accordance with International Financial Reporting Standards (IFRS).

Table 18. M&E activities, responsibilities, budget and timeframe

Type of Monitoring and Evaluation Activity	Responsible Party	Time Frame	Budget (USD)
Project Inception Workshop	Kongalend	Within the first month of project start.	6,000
Collection of Baseline Data, follow-up data and yield measurements	CES, CLUSA Namibia, NNFU	Monthly	85,000*
Site Visits	CES, CLUSA Namibia, NNFU	Monthly	45,000*
No of hectares under CA Reports	CLUSA Namibia	Monthly	40,622*
Sampling Verification Reports	Independent Consultant	Bi-annually	15,000
Mid-Term Evaluation Report	Independent Consultant	Half-way through project	Financed from NIE fee
End of Project Evaluation Report	Independent Consultant	Three months prior to End of Project Meeting	Financed from NIE fee
Finance Audit	Independent Auditor	Annually	12,000

E. Project Results Framework

Data will be gender disaggregated, meaning that the proposed project will be able to collect and analyse data separately on males and females, which is vital to the proposed project's focus upon promoting women's empowerment in the agricultural sector.

Table 19: Project Results Framework

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
<i>Component 1: Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources</i>				
<i>Outcome 1:</i>	<i>13,052 rural smallholder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions</i>			
<i>Output 1.1: Train 502 Lead Farmers on climate change impacts and Namibia-specific CA methods</i>				
<i>Activity 1.1.1: Conduct regional training for 70 Lead Farmers</i>	70 new LFs trained* (60% women, 40% men)	Achieved in Year 1: recruit 70 new LFs (10 per project region). Train newly recruited LFs in 2 introductory training sessions in the first year	Attendance rosters from 2 introductory LF training sessions with participation monitored through monthly site visits of NCAP field consultants*	Since the interest in CA is high, the recruitment of 70 new LFs will be easily facilitated
		*Maintain or increase percentage of women LFs		

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
<i>Activity 1.1.2: Conduct enhanced regional training for 432 current Lead Farmers already trained under current NCAP</i>	432LFshaving attended enhanced training* (60% women, 40% men)	Achieved in Year 1: completion of 11 enhanced training for 432 current NCAP LFs to be held in the off-farming season	Attendance rosters from enhanced LF training compiled by NCAP field consultants*	100% attendance by the 432 LFs is expected as the demands for enhanced trainings is from the farmers
		*Maintain or increase levels of participation of women as LFs		
<i>Output 1.2: 502 Lead Farmers train 12,550 of their neighbours on climate change impacts and Namibia-specific CA methods</i>				
<i>Activity 1.2.1: LFs establish 502 Demonstration Plots</i>	502 demonstration plots established by new and current NCAP LFs* (60% women, 40% men)	Achieved in Year 1: All 432 current NCAP participants will re-establish demonstration plots Achieved in Year 2: 70 new demonstration plots*	NCAP field consultants verify successful creation of demonstration plots during monthly site visits*	100% result is expected due to the increasing number of regionally based rip furrow service providers
		*Maintain or increase percentage of demonstration plots managed by women		
<i>Activity 1.2.2: Each LF trains 25 of his/her neighbours through Farmer Field School (“FFS”) training on the LFs Demonstration Plot</i>	12,550 neighbours having attended four (4) FFS training sessions per year* (60% women, 40% men)	All LFs will train at least 25 of their neighbours in four training sessions per year over the course of three years	Attendance rosters from FFSs collected by NCAP field consultants at monthly site visits*	Attendance might not be 100% at each on-farm FFS training session due to illness and farmers having to take temporary work due to poverty. However, by working closely with the traditional and local government authorities, LFs and Field consultants will ensure as high participation in trainings as possible.
		*Maintain or increase percentage of women attending FFSs		
<i>Output 1.3: LFs and ACAFs bring 10,000 hectares of staple grains under CA cultivation and achieve a minimum average yield of 1,670 kg per hectare for staple grains</i>				
<i>Activity 1.3.1: Measure the number of hectares under CA cultivation in the project area</i>	Number of hectares under CA cultivation in seven (7) project regions.	10,000 hectares of staple grains brought under CA cultivation	GPS monitors on tractors, areas of rip furrowed fields to be downloaded by CLUSA Namibia. Number of hectares rip furrowed by draught power animal owners to be measured by handheld GPS in the field by CLUSA Namibia.	The GPS satellite system monitors are reliable and the data processing is user-friendly. CLUSA Namibia together with Field consultants are to co-ordinate service providers to ensure maximum amount of hectares rip furrowed.

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
<i>Activity 1.3.2: Measure staple grain yields per hectare using the FAO Agri-Gender Toolkit</i>	Weight (kg) of harvest taken from an area of 10x10 metre squares, multiply that figure by 100*	Average yield of staple grain measures at no less than 1,670 kg per hectare	Field consultants work closely with LFs during harvest of 10x10 metre area, weigh staple grain*	Farmers participating in scientific yield measurements sometimes forget to keep the harvest from the 10x10 square demarcation separate.
		Scientific yield measurements collected on 70 LF farms; 10 from each region, 60% from women LFs		
<i>Output 1.4: Conduct trial of no-till field preparation, which has never before been done in Namibia</i>				
<i>Activity 1.4.1: Train and support 4 no-till field preparation trials</i>	Four farmers trained* (3 women and 1 man)	Achieved in Year 1: train 4 farmers in no-till and the practice of 100% soil cover. The farmers to set up the trial plots on 4 fenced onehectare trial plots. Trial crimper rollers for flattening green soil cover and trial ripping without the wings attached to the implement.	Attendance roosters. Research (soil moisture, soil compaction, soil organic matter content) and yield reports.	100% participation expected as farmers who have practiced CA for many years are interested in trialing no-till and soil cover. As the trial plots will be fenced there is minimum risk of animals eating the soil cover during the winter season.
		*Establish a gender ratio that is either equal or favours women farmers		
<i>Component 2: Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital</i>				
<i>Outcome 2:</i>	<i>Fully-capacitated small business owners provide CA inputs and services in their own local communities to meet smallholder farmers' demand</i>			
<i>Output 2.1: Educate and train small business owners on climate change impacts, adaptation strategies and markets for their services</i>				
<i>Activity 2.1.1: Conduct seven regional, educational training for 60 small business owners</i>	Seven regional, educational training conducted. (60% women, 40% men)	Conduct 7 regional, educational training for small business owners, in each target region	Attendance roosters.	100% attendance is expected as the regional demand for CA farming inputs outlets and services is high
<i>Output 2.2: Improve small business owners' and rural communities' access to start-up capital, CA inputs and CA equipment in order to meet CA farmers' demands</i>				
<i>Activity 2.2.1: Work with financial institutions to develop financing instruments necessary to capitalise small business owners and local communities</i>	Access to productive resources such as microfinance packages and other sources of credit as measured by Data Item 2.4 of the FAO Agri-Gender Toolkit*	Increased access to productive resources such as microfinance packages and other sources of credit	Baseline and annual use of Data Item 2.4 of FAO Agri-Gender Survey to measure access to productive resources throughout project*	Kongalend Financial Services and Agri-bank have created loan packages and are expanding those

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
<i>Activity 2.2.2: Facilitate the acquisition of 60 privately owned and operated 4x4 tractors with rip furrowing implements through microfinance loan packages</i>	Access to productive resources such as agricultural inputs, assets and technologies as measured by Data Item 2.3 of the FAO Agri-Gender Toolkit*	Increased access to productive resources, such as agricultural inputs, assets and technologies *Maintain or improve gender ratio to include more women tractor owners	Baseline and annual use of Data Item 2.3 of FAO Agri-Gender Survey to measure access to productive resources throughout project*	Kongalend Financial Services and Agri-bank have created loan packages and are expanding those
<i>Activity 2.2.3: Train and support 60 tractor owners and drivers</i>	Sixty (60) tractor owners and drivers trained* Access to productive resources such as measured by Data Item 2 of the FAO Agri-Gender Toolkit*	60 tractor owners and drivers trained in 3 training sessions to be held (1 in each project year) Field consultants to mentor tractor drivers and to ensure best quality rip furrowing services. Increased access to CA land preparation services in the target regions. *Maintain or improve gender ratio to include more women tractor drivers	Attendance rosters and monthly reports from the Field support consultants. Baseline and annual use of Data Item 2 of the FAO Agri-Gender Toolkit to measure access to productive resources throughout project*	100% attendance expected as loan packages are available / will be expanded for entrepreneurs who aim to establish CA land preparation services.
<i>Activity 2.2.4: Train and support 60 community draught animal power promoters</i>	Sixty (60) community draught animal power promoters trained* Access to productive resources such as measured by Data Item 2 of the FAO Agri-Gender Toolkit*	60 Community Draught Animal Power Promoters trained in three training sessions to be held (one in each project year) Field consultants to mentor tractor drivers and to ensure best quality rip furrowing services. Increased access to CA land preparation services in the target regions. *Establish a gender ratio that is either equal or favours women farmers	Attendance rosters and monthly reports from the Field support consultants. Baseline and annual use of Data Item 2 of the FAO Agri-Gender Toolkit to measure access to productive resources throughout project*	100% attendance expected as loan packages are available / will be expanded for entrepreneurs who aim to establish CA land preparation services.
<i>Activity 2.2.5: Train and support 7 farmers' cooperatives / farmers to trial unique seed breeding, retention and multiplication methods for high-demand seed</i>	Seven farmers' cooperatives / farmers trained* Access to productive resources as measured by Data Item 2 of the FAO Agri-Gender Toolkit*	Two regional training sessions to be held in Year 1. 7 hectares under seed multiplication. Increased access to indigenous high performing pearl millet, sorghum and cow-	Attendance rosters and field monitoring and mentor visits by the Directorate of Research and Training under the MAWF.	The risks of crop failure will be mitigated as the seed multipliers will apply CA

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
		pea seed in the target regions.		
Output 2.3: Provide technical and business support to small business owners providing CA inputs and services in their own communities				
<i>Activity 2.3.1: Provide ongoing marketing, logistics and business support to CA service providers through three regional training sessions and one-on-one ad hoc support</i>	180 CA service providers trained and mentored* (at least a 50% women and 50% men ratio)	Three regional training sessions to be held (one in each project year) Two one-on-one support meetings per service provider annually Increase access to inputs and services. Strengthening the business management of CA service providers	Attendance rosters and monthly field Support visits reports	Low risk of participation as CA Service providers have asked for business trainings and mentoring.
<i>Activity 2.3.2: Create and capacitate a committee within the project partner, NNFU, to assume NCAP's training and support responsibilities under project completion</i>	One committee specialised in the promotion of CA established	Committee to be legally formalised through by-laws under NNFU constitution	Legal documents and registration certificate	Assumption: Due to high interest in CA among NNFU constituency based member associations, all the regional NNFU farmers unions in the AF project area will join and support the proposed committee.
Component 3: Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts				
Outcome 3:	<i>Improved awareness and knowledge locally, regionally and globally regarding ground-up lessons learnt, best climate change adaptation practices, intervention strategies, project success stories and opportunities for participation</i>			
Output 3.1: Track project research, data and lessons learnt on best practices, and disseminate that information to stakeholders locally, regionally and globally				
<i>Activity 3.1.1: Develop a platform for information storage and analysis tailor made to support all CA promotion and information dissemination activities</i>	Information storage and analysis platform is developed and utilised regularly by M&E and communications staff	User-friendly information storage and analysis platform developed Platform is useful in tracking project information as well as the promotion of CA	Platform is relied upon by M&E and communications staff to promote CA and disseminate information	Access to electricity and internet is not dependable or readily available and can disrupt time-sensitive projects, initiatives and activities related to CA promotion and information dissemination
<i>Activity 3.1.2: Utilise media to disseminate project learning, best practices and opportunities for participation</i>	Media stories and articles disseminated in local, regional and national media	Generate public demand for and interest in CA as an adaptive measure to address climate change and increase agricultural yields	Source of demand for CA training, education and information derived from increased media presence	The most vulnerable people in target groups do not have access to radio or other sources of media, or are illiterate and will have difficulty accessing information despite best efforts to provide opportunities for

Project Objective	Indicator	Target	Means of Verification	Assumptions & Risks
				participation
<i>Activity 3.1.3: Contribute to regional and global knowledge and learning regarding climate change and CA adaptation strategies</i>	NCAP 2 successes, methods and lessons learned utilised and discussed in regional and global information sharing networks on climate change and adaptation strategies	CA practices in Namibia serve as a case study for successful climate change adaptation strategy using community-based adaptation approaches	Reference to NCAP 2's work in Namibia recognised in regional and international information sharing networks	The community-based approach developed to reach the Namibian farmer may not be functional or informative in other cultural or environmental contexts

F. Alignment of Project with the Results Framework of the Adaptation Fund

Table 20: Project Alignment with Adaptation Fund Core Impact Indicators

Project Objectives	Project Objective Indicators	Adaptation Fund Outcomes	Adaptation Fund Outcome Indicators
<p><i>Increase rural small-holders' capacity to adopt CA through education, training, field support and access to enabling resources;</i></p> <p><i>Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital; and</i></p> <p><i>Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts.</i></p>	<p>Number of rural small-holder farmers, especially women, participating in Farmer Field Schools where climate change and CA is taught;</p> <p>Number of smallholder farmers practicing CA methods;</p> <p>Number of households increasing household food security through practicing CA;</p> <p>Number of capacitated small business owners and NNFU members providing CA inputs and services in the seven target regions;</p>	<p><i>Outcome 2:</i> Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses.</p> <p><i>Outcome 3:</i> Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level.</p> <p><i>Outcome 6:</i> Diversified and strengthened livelihoods and sources of income for vulnerable people in target areas.</p>	<p>2.1: Number and type of targeted institutions with increased capacity to minimize exposure to climate variability risks.</p> <p>2.: Number of people with reduced risk to extreme weather events</p> <p>3.1.: Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses.</p> <p>3.2: Modification in behaviour of targeted population.</p> <p>6.1: Percentage of households and communities having more secured (increased) access to livelihood assets.</p> <p>6.2: Percentage of targeted population with sustained climate-resilient livelihoods.</p>

Project Outcomes	Project Outcome Indicators	Adaptation Fund Outputs	Adaptation Fund Output Indicators
<p>13,052 rural smallholder farmers trained on CA methods and practicing CA on 10,000 hectares across seven northern Namibian regions;</p> <p>Capacitate 190 small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital</p>	<p>Number of smallholder farmers trained;</p> <p>Number of hectares under CA practices in the 7 target regions;</p> <p>Number of increase in staple crop yields;</p> <p>Number of small business owners providing CA inputs and services</p>	<p>Output 2.2: Targeted population groups covered by adequate risk reduction systems</p> <p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 6: Targeted individual and community strategies strengthened in relation to climate change impacts, including variability</p>	<p>2.2.1: Percentage of population covered by adequate risk-reduction systems</p> <p>2.2.2.: Number of people affected by climate variability</p> <p>3.1.1.: Number and type of risk reduction actions or strategies introduced at local level</p> <p>6.1.1: Number and type of adaptation assets (physical as well as knowledge) created in support of individual or community-livelihood strategies</p> <p>6.1.2: Type of income sources for households generated under climate change scenario</p>
<p>Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts</p>	<p>Current data to be compared with project outcomes</p>	<p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p>	<p>3.1.2: Number of news outlets in the local press and media that have covered the topic</p>

Table 21: Project Alignment with Adaptation Fund Core Impact Indicators

Impact	Project Indicator
<p>2.1: Number and type of targeted institutions with increased capacity to minimize exposure to climate variability risks.</p>	<p>Direct beneficiaries: 180 agri-businesses and CA land preparation service providers trained and financially capacitated through development loan packages.</p> <p>Indirect beneficiaries: 54,000 farmers benefitting from improved CA services and farming inputs</p>
<p>2.2: Number of people with reduced risk to extreme weather events.</p>	<p>Direct beneficiaries: 13,052 farmers trained in and practicing CA, and having access to technology and farming inputs</p> <p>Indirect beneficiaries: 65,260 members of participating farmers' households</p>
<p>3.1: Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses.</p>	<p>Direct beneficiaries: 100% of 13,052 farmers trained in climate change awareness and practicing adaptation through CA methods</p> <p>Indirect beneficiaries: 75% of 65,260 members of participating farmers' households expected to be aware of adverse impacts of climate change, and of appropriate responses</p>
<p>3.2: Modification in behaviour of targeted population.</p>	<p>Direct beneficiaries: 13,052 farmers having switched from conventional, low-yielding and soil destructive farming methods, to soil conserving and high yielding CA methods</p>
<p>6.1: Percentage of households and communities having more secured (increased) access to livelihood assets.</p>	<p>Direct beneficiaries: 100% of 13,052 farmers trained in climate change awareness and practicing adaptation through CA methods, and 100% of 180 agri-business operators and CA land preparation service providers</p> <p>Indirect beneficiaries: 100% of 65,260 members of participating farmers' households expected to have access to sustainable household food self sufficiency and surplus for household / community incomes</p>
<p>6: Percentage of targeted population with sustained climate-</p>	<p>Direct beneficiaries: 100% of 13,052 farmers practicing CA methods, and 100% of 180 agri-business operators and CA land preparation service pro-</p>

resilient livelihoods.	viders Indirect beneficiaries: 100% of 65,260 members of participating farmers' households expected to have access to sustainable household food self sufficiency and surplus for household / community incomes
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Table 22: NCAP 2 milestones

ACTIVITIES	PROJECT OUTPUTS	YEAR 1				YEAR 2				YEAR 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
COMPONENT 1: Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources													
	Output 1.1: Train 502 Lead Farmers ("LFs") on climate change impacts and Namibia-specific CA methods												
1.1.1	Conduct regional trainings for 70 LFs												
1.1.2	Conduct enhanced regional trainings for 432 current LFs already trained under current NCAP												
	Output 1.2: 502 LFS train 12,550 of their neighbours ("ACAFS") on climate change impacts and Namibia-specific CA methods												
1.2.1	502 Lead Farmers establish 502 Demonstration Plots (3 seasons)												
1.2.2	Each Lead Farmer trains 25 of his/her neighbours through Farmer Field School trainings on the Demonstration Plots												
	Output 1.3: LFs and ACAFs bring 10,000 hectares of staple grain under CA cultivation and achieve a minimum average of 1,670 kg per hectare of staple grains												
1.3.1	Measure the number of hectares under CA cultivation by NCAP participants												
1.3.2	Measure staple grain yields per hectare using the FAOAgri-Gender Toolkit												
	Output 1.4: Conduct trials of no-till field preparation and 100% soil cover, which has never before been done in Namibia												
1.4.1	Train four LFs and support four no-till field trials												
COMPONENT 2: Capacitate small business owners to provide CA inputs and services in their own communities through technical and business training, field support and access to start-up capital													
	Output 2.1: Educate and train small business owners on climate change impacts, adaptation strategies and markets for their services												
2.1.1	Conduct regional training sessions for small business owners												
	Output 2.2: Improve small business owners' and rural communities' access to start-up capital, CA inputs and CA equipment in order to meet CA farmers' demands												
2.2.1	Work with financial institutions to develop financing instruments necessary to capitalise small business owners and local communities												
2.2.2	Facilitate the acquisition of 60 privately owned and operated 4x4 tractors with rip furrowing implements through microfinance loan packages												
2.2.3	Train and support 60 tractor owners and drivers												

2.2.4	Train and support 60 community draught animal power promoters													
2.2.5	Train and support seven farmers' co-operatives / LFs to trial seed breeding, retention and multiplication methods for indigenous high demand seed													
Output 2.3: Provide technical and business support to small business owners providing CA inputs and services in their own communities														
2.3.1	Provide ongoing marketing, logistics and business support to CA service providers through regional trainings and one-on-one <i>ad hoc</i> support													
2.3.2	Create and capacitate a CA Committee within project partner NNFU to assume NCAP's training and support responsibilities upon project completion													
COMPONENT 3: Promote CA as a preferred adaptation method for improving yields, increasing food security and combating poverty despite negative climate change impacts														
Output 3.1: Track project research, data and lessons learnt on best practices and disseminate that information to stakeholders locally, regionally and globally														
3.1.1	Develop a platform for information storage and analysis tailor made to support all CA promotion and information dissemination activities													
3.1.2	Utilise media to disseminate project learning, best practices and opportunities for participation													
3.1.3	Contribute to regional and global knowledge and learning regarding climate change and CA adaptation strategies													

G. Detailed Budget, Executing Entity's Management Fee Use, and Execution Costs

In consideration for the overall Management and Supervisory Services to be rendered to NCAP 2 project the Executing Entity shall be remunerated a flat fee equivalent to 9.5% of the total project budget, (exclusive of Value Added Tax), throughout the entire duration of the project.

The management fee shall be paid in equal monthly instalments, in arrears at the end of each month to which the said fee relates, commencing at the end of the first month following the Commencement date of the project. The Executing Entity shall raise and deliver to the NCAP 2 Project an appropriate tax invoice seven days prior to each payment date.

The fee so charged by the Executing Entity will be utilised to cover specific project operating costs to ensure its uninterrupted seamless progression. Costs to be covered by the management fee would include salaries for the Project Co-ordinator, the Financial Accountant as well as the Administrative Assistant, all of whom will be stationed at Kongalend's head office in Windhoek. The fee will also be used to cover project office operating expenses, such as stationery and computer consumables, project office occupation cost, communication costs (telecommunications and Internet connectivity), local travel and accommodation costs for NCAP 2 project trips, as well as field site visits and monitoring of Executing Partners' levels of activity, in relation to project schedules and milestones.

Furthermore, the Executing Entity will use the fee charged to cover expenses relating to the organisation and holding of quarterly Project Steering Committee meetings, payment of sitting fees of three Kongalend executive managers at PSC meetings, as well as for the provision of quarterly and annual progress and financial reports that will be submitted to the National Implementing Entity.

The three NCAP 2 project employees will be supplied with office equipment, including laptop computers, printers and scanners, as well as required licensed software. Their repair and maintenance will also be covered by the management fee. All items that will be deployed for the purpose of the NCAP 2 project will be recovered from the proceeds of the Management Fee. The NCAP 2 division station at the Kongalend head office will thus operate as an autonomous unit with its dedicated resources. A budget detailing the specific use of the Management fee is outlined in Table 22 below.

Table 23. Detailed project budget

Total estimated project cost for three years in USD					
Activities	Project Outputs	Unit / Item	Rate	Quantity	Cost (USD)
COMPONENT 1: Increase rural smallholders' capacity to adopt CA through education, training, field support and access to enabling resources					
Output 1.1: Train 502 Lead Farmers ("LFs") on climate change impacts and Namibia-specific CA methods					
1.1.1	Conduct regional trainingsessions for 70 LFs	Regional training, training materials, on-farm materials, facilitation fees covered under 1.2.2.	3,080	3	9,242
1.1.2	Conduct enhanced regional trainingsessions for 432 current LFs already trained under current NCAP	Regional training, training materials, on-farm materials, facilitation fees covered under 1.2.2.	5,185	11	57,033
Output 1.2: 502 LFS train 12,550 of their neighbours ("ACAFS") on climate change impacts and Namibia-specific CA methods					
1.2.1	502 Lead Farmers establish 502 Demonstration Plots (3 seasons)	Seed, land preparation, manure, tree saplings	221.4	502 x 3	111,175
1.2.2	Each Lead Farmer trains 25 of his/her neighbours through Farmer Field School trainingsessions on the Demonstration Plots	Field consultants, coordination, transport, allowances, lodging	42,517	36 months	1,572,944
Output 1.3: LFs and ACAFs bring 10,000 hectares of staple grain under CA cultivation and achieve a minimum average of 1,670 kg per hectare of staple grains					
1.3.1	Measure the number of hectares under CA cultivation by NCAP participants	Satellite data tracking systems, data downloading and compilation	1,128.00	36 months	40,622
1.3.2	Measure staple grain yields per hectare using the FAO Agri-Gender Toolkit	Costs included under field trainings / visits 1.2.1 and 1.2.2			
Output 1.4: Conduct trials of no-till field preparation and 100% soil cover, which has never before been done in Namibia					
1.4.1	Train 4 LFs and support 4 no-till field trials	Consultancy, seed, fencing, developing implements	5,739	6	34,433
Total Component 1					1,825,449

	COMPONENT 2: Capacitate small business owners to provide CA inputs and services in their own communities through technical and business trainings, field support and access to start-up capital				
	Output 2.1: Educate and train small business owners on climate change impacts, adaptation strategies and markets for their services				
2.1.1	Conduct regional training/ info sessions for small business owners	Facilitation and venues	1,429	7	10,000
	Output 2.2: Improve small business owners' and rural communities' access to start-up capital, CA inputs and CA equipment in order to meet CA farmers' demands				
2.2.1	Work with the financial sector to develop financing instruments necessary to capitalize small business owners and local communities	Kongalend in-kind contribution			
2.2.2	Facilitate the acquisition of 60 privately owned and operated 4x4 tractors with rip furrowing implements through microfinance loan packages	Kongalend in-kind contribution			
2.2.3	Train and support 60 tractor owners and drivers	Regional trainingsessions- x 3, on-farm support and mentoring		24 months	262,547
2.2.4	Train and support 60 Community draught animal power promoters	Regional trainingsessions x 3, on-farm support and mentoring		24 months	139,309
2.2.5	Train and support seven farmers' co-operatives / LFs to trial seed breeding, retention and multiplication methods for indigenous high demand seed	Regional trainingsessions x 2, training materials, on-farm materials, fencing on-farm mentoring		9 months	33,542
	Output 2.3: Provide technical and business support to small business owners providing CA inputs and services in their own communities				
2.3.1	Provide ongoing marketing, logistics and business support to CA service providers through regional trainingsessions and one-on-one <i>ad hoc</i> support	Regional trainingsessions x 3 and field support	2,818	12 months	33,820
2.3.2	Create and capacitate a CA Committee within project partner NNFU to assume NCAP's training and support responsibilities upon project completion	Legal and pilot costs	4,500	2	9,000
Total Component 2					488,218

	COMPONENT 3: Track project research, data and lessons learnt on best practices and disseminate that information to stakeholders locally, regionally and globally				
3.1.1	Develop a platform for information storage and analysis tailor made to support all CA promotion and information dissemination activities	Consultancies, research data compilation and analysis, production of promotion and information materials, translation of information materials, regional information sessions with stakeholders, video production, information dissemination			113,181
3.1.2	Utilize media to disseminate project learning, best practices and opportunities for participation	Consultancies, production of success stories and dissemination to national and international media, media training of Field consultants			37,728
3.1.3	Contribute to regional and global knowledge and learning regarding climate change and CA adaptation strategies	Consultancies, website management, publication production on project outcomes			37,728
Total Component 3					188,637
PROJECT ACTIVITIES COST (A)					2,502,304
PROJECT EXECUTION COST (B @ 9.5%)					262,673
TOTAL PROJECT COST (A+B)					2,764,977
PROJECT MANAGEMENT FEE (C @ 8.5%)					235,023
TOTAL FINANCING REQUIRED (A+B+C)					3,000,000

* These M&E costs are included under activities in Outcomes 1 and 2 as it forms part of implementation in the field.

Table 24: Executing Entity project co-ordination and management

Kongalend Financial Services	Cost in USD
Project Coordinator	90,000
Accountant	28,500
Administrative Assistant	24,000
Internal management and administration costs	51,373
Set-up cost including project inception workshop	6,000
Travel and accommodation	11,650
Communication	24,800
PSC meeting costs (venues and allowances)	26,350
TOTAL	262,673

Table 25: Implementing Entity project management and evaluation

Fee Category	Cost category	Total (USD)
Management fees	Project management, finance administration and office administration	131,770
Operating expenditure	Travel, daily subsistence allowances and workshops associated with project oversight and governance	28,484
Office services and supplies	Utilities, telecommunications and office supplies	30,222
Auditing and consulting	External auditing, project evaluation and technical support	44,547
Total		235,023

H. Disbursement schedule

The following disbursement matrix provides a schedule for disbursements, which will be made upon the completion of time-bound project milestones

Table 26: Timetable of disbursement of AF funding

	Upon signature of agreement	End Year 1	End Year 2	Total (USD)
Scheduled Date	Nov 2015	Jan 2016	Jan 2017	
Project Funds	460,829	460,829	460,829	1,382,488
Implementing Entity Fee	36,821	38,673	42,017	117,512

Table 27: Timetable of disbursement of co-funding

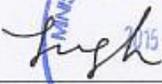
	Upon signature of agreement	End Year 1	End Year 2	Total (USD)
Scheduled Date	Nov 2015	Jan 2016	Jan 2017	
Project Funds	460,829	460,829	460,829	1,382,488
Implementing Entity Fee	36,821	38,673	42,017	117,512

Table 28: Time-bound milestones

Milestones	Expected Completion
Start of project (Inception workshop)	January 2016
Mid-term revue	September 2017
Project closing	June 2019
Terminal revue	April 2019

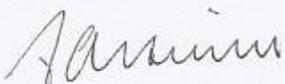
PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government⁶

<p>Mr. Teofilus Nghitila, Environmental Commissioner, Ministry of Environment and Tourism, Namibia</p>	<p>Date: 21 July 2015</p> <p>Signature: </p>
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B. Implementing Entity certification

<p>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 namely National Development Plan 4, National Policy on Climate Change for Namibia 2011 and National Climate Change Strategy and Action Plan 2013-2014 and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
<p></p> <p>S Aldrich Implementing Entity Coordinator</p>	
<p>Date: 23 July 2015</p>	<p>Tel.: +264811220671 E-mail: schreuderaldrich@hotmail.com</p>
<p>Project Contact Person: Dr M Schneider Tel. :+264812460379, or +26461377500 E-mail: martin.schneider@drfn.org.na</p>	

Project title: Namibia Conservation Agriculture Project 2 (NCAP 2) – Building Adaptive Capacities and Climate Change Resilience for Improved Food Security for Smallholder Farmers in Northern Namibia.

Executing entity: Kongalend Financial Services (Pty) Ltd

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.



ADAPTATION FUND

Letter of Endorsement by Government



Ministry of Environment and Tourism

21 July 2015

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for the project "Namibia Conservation Agriculture Project 2 (NCAP 2) – Building Adaptive Capacities and Climate Change Resilience for Improved Food Security for Smallholder Farmers in Northern Namibia"

In my capacity as Designated Authority for the Adaptation Fund in Namibia, I confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Namibia.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the Desert Research Foundation of Namibia (DRFN) and executed by Kongalend Financial Services (Pty) Ltd.

Sincerely,

Teofilus Nghitila
Environmental Commissioner



Understanding Farmers' Adoption of Conservation Agriculture in Northern Namibia

This is the summary of a study which interviewed subsistence farmers and other stakeholders on the adoption of Conservation Agriculture (CA) in the North Central Regions. Farmers want to adopt CA in their fields but there is a lack of tractors for ripping (tilling) the soil that is preventing them from doing so. NGO's and government have to address this by providing more information and support to existing and prospective private tractor owners.

Fabian von Hase - Master Thesis in Agroecology
June 2013 – Swedish University of Agriculture

Rain fed subsistence agriculture in Central Northern Namibia has been unable to feed the population due to low yields. These are a result of a number of factors, chief among which is the use of out-dated farming methods using disc harrows or mouldboard ploughs¹. These techniques pulverize and compact the soil, leave crops exposed to wind throw, floods and droughts and lead to dismal mahangu (Pearl Millet) yields of 230 kg/ha².



Fig. 1 An example of a CA field that was prepared by ripping the soil. Photo: Creative Entrepreneurs Solutions.



Fig. 2 With CA Bambara nuts grow better and need less maintenance. Photo: Fabian von Hase

A solution to this problem is urgently needed, especially as 300 000 Namibians are currently (2013) receiving food relief from government³. Namibia Specific Conservation Tillage (NSCT) is such a solution. It is considered to be a Conservation Agriculture (CA) technique and it boosts average mahangu yields to 1670 kg/ha. NSCT relies on a simple set of techniques that have been developed together with communal mahangu (pearl millet) farmers in the North⁴. Central to the method is the use of rippers instead of disc harrows or mouldboard ploughs. The method has been developed since 2005 by the CONTILL project, a collaboration between the Namibian National Farmers Union (NNFU), Namibia Agronomic Board (NAB), Ministry of Agriculture, Water and Forestry (MAWF), Namibia Resource Consultants (NRC) and the Golden Valley Agriculture Research Trust (GART) and funded by Sida. NSCT is now being promoted through the Namibia Conservation Agriculture (NCAP) project implemented by CLUSA and funded by the USAID. It relies on ripping the soil instead of old tilling methods

¹FAO (2009) Special Report FAO/WFP Crop, Livestock and Food Security Assessment Mission to Namibia. Washington, FAO.

²Mudamburi, B., Ogunmokun, A., Kachigunda, B. and Kaurivi, J. (2012) A Comparison of Conventional and Conservation Tillage Implements Used for Crop Production in Omusati Region of Northern Namibia. IPCBEE, (32), pg. 73-78

³Kazondovi, L. (2013) President Declares Drought Emergency. New Era Newspaper Article, 20th May 2013. Windhoek, Namibia

⁴NCBA (2012) Conservation Agriculture Program for Northern Namibia to Help Mitigate Drought Disasters - Program Description. Washington, NCBA CLUSA International Program.

and combined with simple planting techniques that improves yields and stabilises them against droughts, floods and high winds.

However, at the end of 2011 only 800 farmers were doing CA. Therefore, there is a dire need to upscale the adoption of CA across Northern Namibia where around 230 000 subsistence farming households derive their income from subsistence farming. This is especially important due to the fact that with CA, farmers can avoid the effects of droughts such as the one that is currently impacting the North. In order to upscale CA however, it is necessary for NGO's and the MAWF to understand what motivates farmers to try CA, how they take the decision and what helps and hinders this process. This is what this study aimed to find out. By understanding these factors it was possible to give recommendations to NGO's and government on how to improve the adoption of CA in the North Central Regions.

The study was conducted by interviewing 13 CA farmers, 3 non-CA farmers, 2 extension officers, 1 regional counsellor and 1 tractor owner. Interviews were held at homesteads and in offices in and around Ondangwa from January to March 2013. The reason why this study placed emphasis on the opinions of farmers was that it aimed to facilitate increased adoption of CA, thereby improving subsistence livelihoods. Only by listening to farmers describing their problems will it be possible to derive appropriate solutions to help improve their lives.

Through the interviews it was found that farmers held positive attitudes towards CA and therefore had the intention to adopt it. This was mostly because of easier weeding and better yields, even in drought years. Once people around a CA farmer saw the method in their field they became interested and supportive of CA. Therefore, it was socially and culturally acceptable to do CA. Farmers found it easy to learn about CA and to implement it and they felt empowered by its results. As a whole, farmers had strong intentions to adopt CA. However, the availability of tractors for ripping the land posed a

problem. This prevented most farmers from adopting CA even though they wanted to. Furthermore, farmers said that CA helped them to have enough



Fig. 3 Mahangu roots penetrate deeper when farmers use CA. Left: roots on ripped field 48 cm. Right: roots on disc harrowed field 26 cm. Photos: Creative Entrepreneurs Solutions.

food (and to sell some), improved their personal dignity, facilitated peace in the house and thereby enabled them to be proud farmers. These were important values and goals and by fulfilling them CA gained support from farmers. Respondents also said that information on the method was easily obtained from CA projects and farmer meetings, the radio or established CA farmers. Even though many said that CA was the only alternative to the old methods it was assessed positively by seeing the improved yields in other people's fields. Farmers often decided to try CA immediately upon hearing about its better yields, but they adopted it in increments to limit their risks if the method should fail. Failure of CA was however not reported by farmers. Instead, their expectations of yields were generally exceeded. They also found no problems with implementing CA. Resultantly, they were very happy with the method and all wanted to continue or even expand the area under CA. Overall, farmers easily made the decision to adopt CA and were content with the method once they had done so.

There was found to be a large market for provision of ripping services by private tractor owners. A number

of them already exist in the North Central Regions. Also, new financing options from Kongalend (a financing institution) and the Agribank are becoming available to purchase tractors and rippers. If tractor owners and investors could be persuaded to buy ripping implements they could help decrease the lack of ripping services and thereby boost adoption of CA. Another factor helping adoption was the strong interest from farmers as well as government support for the method. However, inefficiencies in the MAWF structure inhibit it from delivering ripping services. A lack of funds and support for extension officers and counsellors promoting CA is also hindering the government from successfully supporting CA.

Therefore, CA will need to be promoted by NGO's and the private sector. This is especially urgent in the provision of ripping services to farmers already doing CA and those that want to adopt it. Judging by its current performance, government is unlikely to meet the ripping needs of the large number of farmers across the North. Therefore, the private sector needs to be encouraged to fill the gap. In order to motivate existing and prospective tractor owners to invest in ripping implements and provide services to CA farmers the following will need to be done.

NGO's and government should provide tractor owners with information on business opportunities and put them in contact with farmers. The government needs to clarify its strategy of land preparation provision to farmers. At the moment it is promising land preparation for farmers at below-market prices (when ripped by government tractor) and subsidised prices (by private tractor). Neither the land preparation by government tractor nor the subsidy for private tractor owners is effective; this is leading to discouragement of the private sector and farmers not receiving ripping services. Therefore, it is recommended that government provide the ripping services it is promising (or stop promising them) as well as encourage the private sector through improving the subsidy system and avoiding competition with it through unrealistic prices. Lastly,

it is suggested that NGO's and the MAWF offer continuous training to farmers on CA. This would enable farmers to establish and run farmer to farmer learning networks that would spread the NSCT method across the North⁵.



Fig. 4 CA farmers are getting highly improved yields. Now they can feed their families and sell the surplus. Photo: Creative Entrepreneurs Solutions.



Fig. 5 This ripper implement was specifically developed for the NSCT method. Photo: Baufi's Agricultural Services.

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Fig. 6 Pictures of respondents and others helping with the study, my gratitude to you all. Please note that pictures could not be found for 3 farmers and the honourable counsellor. You have however not been forgotten, a big thank you to you also.

I would like to extend my gratitude to all the people that made this study possible. First and foremost I'd like to thank the farmers, extension officers, honourable regional counsellors and tractor owners for the opportunity to learn from them. My gratitude goes also to everyone at CES that helped me organise and understand the fieldwork and all the discussions and friendship. I would like to thank my supervisors Erik, Ellinor and Marie for all their guidance and support. Meme Sabina, Meme Maiya and Maggie

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A Comparison of Conventional and Conservation Tillage Implements Used for Crop Production in Omusati Region of Northern Namibia

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Abstract. Experiments were conducted to test and compare the performance of four tillage implements (two for Conventional Tillage (CV) and two for Conservation tillage (CT) used by farmers in Omusati conditions of Namibia. The two CV implements are the animal drawn plough and the tractor drawn disc harrow whilst the two CT implements are the animal drawn and the tractor drawn ripper furrowers. The parameters evaluated were draught force, draught power, effective field capacity, field efficiency, average depth and width of cut during the various operations. The research design was a randomised complete block design. Results showed that there are significant differences ($p = <0.001$) in mean depth, draught and effective field capacity among the tillage methods. They show that draught requirements vary with implement type, speed of operation and depth of operation.

Keywords: Comparison, Tillage, Performance, Draught Force, Draught Power, Effective Field Capacity

1. Introduction

Traditional soil cultivation systems, with intensive soil tillage, will generally lead to soil degradation and loss of crop productivity. (Derpsch, 2009, FAO 2009). World-wide the focus has shifted to conservation agriculture, and sound tillage systems are an integral part of it. Conservation tillage embraces all practices that minimise soil disturbance thereby embracing one of the principles of Conservation Agriculture (CA) to minimise soil movement. Conservation tillage is generally defined as any tillage sequence whose objective is to minimize or reduce the loss of soil and water. It is operationally defined as any tillage or tillage and planting combination which leaves 30% or more mulch or crop cover on the surface (ACT, 2005). Conservation tillage practices simultaneously conserve soil and water resources, reduce farm energy and increase or stabilise crop production (Mpangwa *et al* 2008). This is crucial for Namibia with a climate that can be described as semi-arid to arid. CA enhances water infiltration, improves soil water use efficiency, and provides increased insurance against drought. (Dumanski *et al*, 2006.) Soil physical properties that are influenced by conservation tillage include bulk density, infiltration and water retention (Osunbitan *et al* 2004 cited in Mpangwa *et al* 2008). Andrade-Sanchez *et al* 2007 mentioned that studies had shown that increased level of soil compaction leads to a reduction in infiltration characteristics of soil, which in turn leads to low soil moisture.

Energy plays a key role in the various tillage systems Implement width, operating depth and speed are factors that affect draught of a tillage implement. Also depends on soil conditions and geometry of the tillage implements (Upadhyaya *et al.*, 1984). (Grisso *et al.*, 1994). Farmers mostly depend on past experience for selecting tractors and implements for various farming operations. This previous experience may not be sufficient in selecting newly available implements. Therefore performance data under different soil conditions is important for animals, tractor selection and implements matching as these are important parameters for measuring and evaluating performance of tillage implements

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2. Objective of the Study

The objective of this study was to test and compare the performance (working depth, draught power and work rates) of four tillage implements (two for CT and two for CV) used by farmers in Omusati.

Research hypotheses

- Animal and tractor drawn CA implements used in this study exhibit significantly different performance characteristic in terms of depth, compared to Conventional Tillage implements.
- Animal and tractor drawn CA implements used in this study exhibit significantly different performance characteristic in terms of draught power requirements compared to Conventional Tillage implements.
- Animal and tractor drawn CA implements used in this study exhibit significantly different performance characteristic in terms of work rates compared to Conventional Tillage implements.

3. Methodology

3.1. Experimental Site Characteristics

The experiment was carried out at Ogongo Campus in the north of Namibia during 2010 and 2011 cropping season. The station lies in a semi-arid region and receives a mean annual rainfall between 300 and 500 mm of rain annually (Kuvare, et al 2008). However the total rainfall recorded at Ogongo from 21st December 2010 to 1st May 2011 was 621.6 mm. The soils at the site are predominantly sands Moisture content at the time of implement tests was ranging from 2.1 to 3.2 %.

3.2. Experimental Procedure and Treatments

On station trials to compare the equipment were conducted at Ogongo. The research involved testing the draught performance of four tillage equipment namely. (1) Animal drawn mouldboard plough (AMP), (2) Animal drawn ripper furrow (ARF), (3) tractor disc harrow (TDH), (4) tractor ripper furrower (TRF). The research was set up in a randomised complete block design with 4 tillage treatments by 4 replications totalling 16 plots. The plots were 10m x 10m, with 5m borders between blocks and 2m between plots to allow proper turning and movement of tractors and animals. An animal drawn mouldboard plough and a tractor disc plough were used to conventionally till the land whilst an animal drawn Baufris ripper furrower and tractor ripper furrower were used for ripping and making furrows

A dynamometer Novatech F 256 Axial Compensated Load cell together with a TR150 portable load meter was used to measure draught. Two tractors A and B were made available. For the tractor drawn implements, draught was measured using a digital dynamometer attached to the front of the tractor on which the implement was mounted. Another auxiliary tractor was used to pull the implement mounted tractor through the dynamometer. Tractor A pulled the implement-mounted tractor B with the latter in neutral gear but with the implement in the operating position. The draught was recorded within the measured distance of 10m as well as the time taken to reverse it. On the same field, the implement was lifted out the ground and the rear tractor was pulled to record the idle draught force. The difference between the two readings, gives the draught of the implement. This procedure was repeated for each of the implements evaluated.

Depth was measured as the vertical distance from the top of the undisturbed soil surface to the implements deepest penetration. During the field operations for each tillage implement, the tractor was operated at the same forward speeds. A moisture meter was used to measure moisture content at the time of testing the implements. The gravimetric method of determining moisture content was also used as a backup.

4. Data Analysis

GenStat (DE3) was used to analyse the data. Analysis of variance was used to test for any significant differences among means of all tillage technologies. Levels of 0.05 were used to determine the level of significance between means.

5. Results and Discussions

It is important to mention that whilst the graphs and tables in this document show all four tillage treatments in one graph or table, the authors understand that tractors and animals cannot be compared one to

another. However in cases where tractors and animals can complement each other this will be clarified in the text.

Table 1: Implement specifications and performance

Implement Type	Function	Model	Dimensions	Working Depth (cm)	Working Width (m)	Draught Force (kN)	Speed (km/hr.)	Effective field capacity (ha/hr.) SWE/10	Efficiency (%)	Draught Power <u>Pull(kn)</u> <u>speed (m)</u>
Standard Animal Drawn single furrow plough (AMP)	Conventional tillage	Standard V8 Mouldboard plough	20mm	Mean 8.31 Range 7.5 - 9.75	0.20	0.650	2.4	0.03	67	3.6
Animal drawn ripper furrower (ARF)	Conservation tillage	Baufis ripper furrower	10mm	Mean 13.7 Range 13.3 -14.8	0.10	0.933	2.4	0.16	65	0.62
Tractor drawn offset Disc Harrow (TDH)	Conventional tillage NB Whilst this implement is generally a secondary tillage implement, in Namibia it is used as a primary tillage implement.	Offset -20 discs	2.2 x 2.2m	Mean 14.9 Range 14.5 -15.3	2.2	1.774	6.7	0.97-1.18	52	3.30
Tractor Drawn ripper Furrower (TRF)	Conservation tillage	Baufis 2 tine	185cm x 166 Height - 60 - 100cm	Mean 29.4 Range 26.3 - 31.3	167-2.0	2.797	6.7	0.70-0.88	65	5.21

5.1. Draught Performance

It was possible to achieve depths of 31 cm with the tractor ripper furrower as compared to the 14.9cm with the tractor disc harrow. It was also possible to achieve 13.7 cm with the animal drawn ripper furrower as compared to the 8.31cm with the animal drawn plough. The speed for both animal drawn implements was 2.4 km/hr. whilst for both the tractor equipment was 6.7km/hr. (Table 2) Table 2 shows the summaries of depth for each implement. There are significant differences ($p < 0.001$) in mean depth among the tillage methods. Figure 1 below shows the depths for various tillage implements.

Table 1 also shows the summaries of draught performances of each implement. There are significant differences ($p < 0.001$) in mean draught among the tillage methods. Figure 2 below shows the mean draught or pull in kN for various tillage implements.

From the two graphs above, this shows that draught requirements vary with implement type, speed of operation and depth of operation. This means that in cases where there is soil compaction and reduced root penetration, the tractor ripper furrower can be used to achieve greater depths and thereafter an animal drawn ripper furrow or ripper can be used.

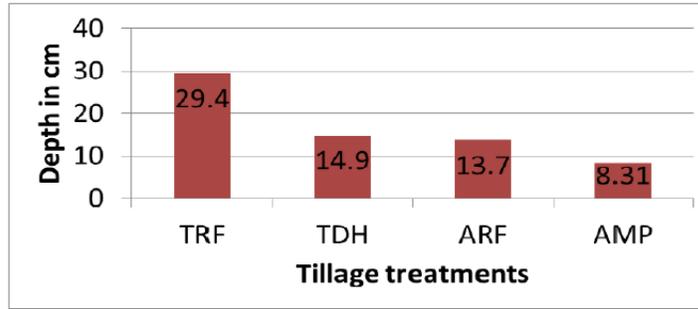


Fig. 1: Mean depths for 4 tillage implements

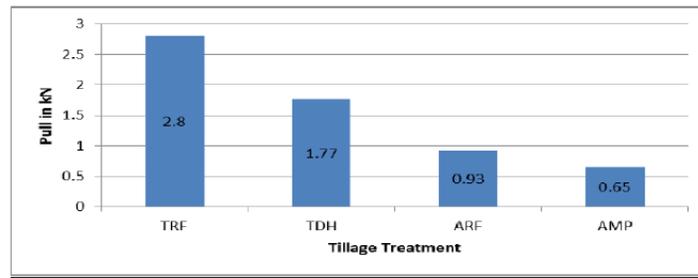


Fig. 2: Mean draught (kN) for four tillage implements

5.2. Draught Capabilities for the Donkeys

A team of 3 donkeys was used for pulling the animal drawn equipment. The weight of the animal drawn plough is approximately 300N (30kg) and the animal drawn ripper furrower is approximately 340N (34 kg). From the results shown in figure 2 above (AMP, 0.93kN) (ARF, 0.63kN) and table 1 above we can deduce that the 3 donkeys 218.6kg, 242kg and 212.6kg are capable of pulling the two implements as donkeys can pull 17 – 25 % of body weight, 15 % for horses and 12.5% for oxen while ploughing (Starkey, 1985).

5.3. Efficiency

Table 1 also shows the efficiencies for various tillage implements. The tractor disc harrow was least efficient. This was mainly because the plot distances were small so more time was taken during turning. With bigger plots the efficiency is bound to improve. However the disc harrow is one of the methods that is being increasingly used by farmers but causing the most disturbance and pulverisation to the soil.

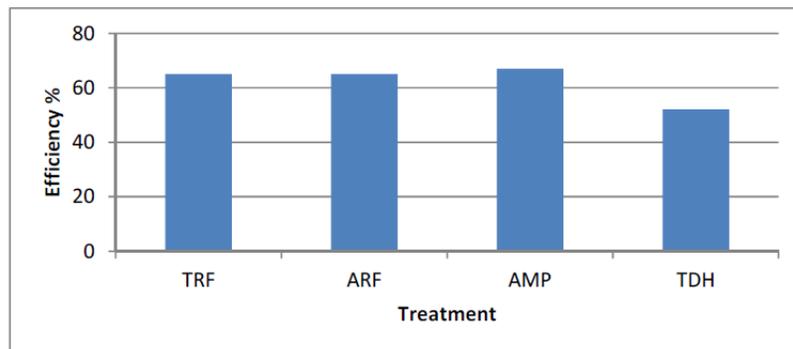


Fig. 3: Percent Efficiency of various tillage methods

5.4. Effective Field Capacity

Summaries of effective field capacity for each implement are also shown in table 1. There are significant differences ($p < 0.001$) in mean effective field capacity in ha/hr among the tillage methods. Figure 4 below shows the effective field capacity for various tillage implements.

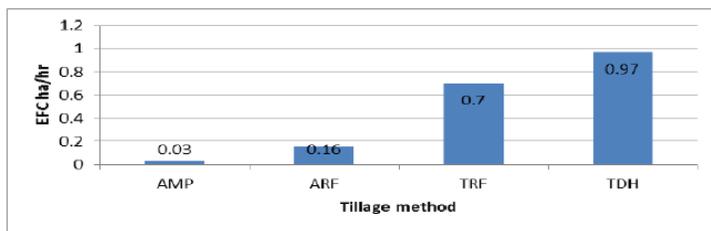


Fig. 4: Mean EFC in ha/hr. for four tillage implements

Figure 5 below shows the draught power in kilowatts needed for the various implements.

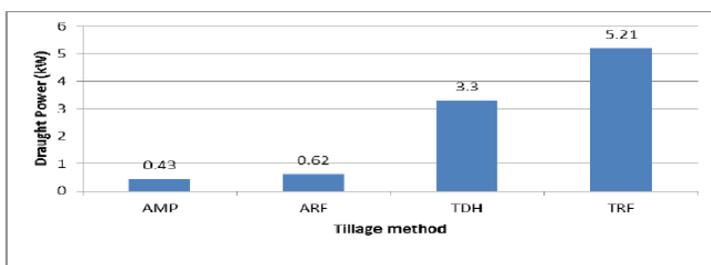


Fig. 5: Draught power (kW) for four tillage treatments

6. Conclusions and Recommendations

Four tillage implements (two for Conventional Tillage (CV) and two for Conservation tillage (CT) used by farmers in Omusati were tested. There are significant differences ($p < 0.001$) in mean depth, draught and effective field capacity among the tillage methods. The TRF managed to achieve greater mean depth of 29.4cm. Both CT methods can be used for breaking the plough pans and to enable root penetration and water infiltration. Tractors and animals can actually complement each other. The Tractor Ripper Furrower can be used in the first year to break the plough pan and thereafter an animal drawn ripper furrower can be used in subsequent years. The animal drawn ripper furrower method has shown that it can achieve equally comparable results in terms of effective field capacity and draught requirements are less. It can also achieve minimum soil disturbance much better than the Tractor ripper furrower method. Since tractor drawn equipment is expensive and most smallholder farmers use draught animals, it might be important to explore options that address the utilization of animal-drawn CA equipment.

7. Acknowledgements

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