GEF

LESOTHO'S NATIONAL ADAPTATION PROGRAMME OF ACTION

(NAPA)

ON CLIMATE CHANGE

Under the United Nations Framework Convention on Climate Change

MINISTRY OF NATURAL RESOURCES

LESOTHO METEOROLOGICAL SERVICES

FOREWORD

Article 4 of the UNFCCC mandates Parties to consolidate their *Commitments* by way of "*formulating, implementing, publishing and regularly updating national measures to facilitate adequate adaptation to climate change*". The Article under clause 8 provides for Parties to "*give full consideration to meet specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on*" countries that are highly vulnerable to climate change including "*countries with fragile and mountainous eco-systems*" as well as "*land-locked and transit countries*". Additionally, provisions of Article 12 (4) provides for developing country Parties to "*propose projects for financing, including specific technologies, materials, equipment, techniques or practices that would be needed to implement such projects*".

In its Seventh Session (COP7) the Conference of the Parties having considered special circumstances of the least-developing country Parties (LDCs) through *Decision 28/CP.7* adopted measures to address specific needs and concerns of the LDCs by making provisions for the said group of countries to prepare and submit NAPAs. This NAPA document represents an official submission by Government of Lesotho in satisfying the said provisions of the Convention in conformity with Decision 28/CP.7. The Lesotho NAPA is a consolidated document arising from inputs made by national stakeholders of the NAPA process. It entails the country's "*urgent and immediate*" priority adaptation needs aimed at providing an enabling mechanism for the country to minimize the impacts of climate change while at the same time enhancing adaptive capacity of vulnerable communities that are most prone to the adverse effects of climate change.

Lesotho being one of the chronic poverty stricken LDCs has adopted the NAPA as one of the key elements for national poverty reduction. The Lesotho NAPA process was undertaken under conditions of extreme challenge when the nation is facing exponentially rising levels of poverty that have maintained livelihoods at their survivalist point. Climate change induced poverty remains a major challenge for now and in the foreseeable future.

The key objectives of the NAPA process entail: identification of communities and livelihoods most vulnerable to climate change, generating a list of activities that would form a core of the national adaptation programme of action, and to communicate the country's immediate and urgent needs and priorities for building capacity for adaptation to climate change.

To ensure across the board ownership of the NAPA process the country adopted a participatory and integrated approach in the development of this report. Hence the report represents views and concerns of the various stakeholders of the NAPA process from the grassroots level to policy makers. Through submission of this report Lesotho wishes to beckon for assistance and support to ease livelihoods of communities whose lives have been subjected to a greater challenge due to climate change. Adequate provision of resources to undertake the said country's priorities would set a firm platform for poverty reduction and achievement of MDG, among others.

As its key national priorities the country has embarked on promoting good governance, financial reforms measures to address the needs of the needy, promotion of private sector, poverty reduction strategy and infrastructure development. The NAPA will be integrated into these endeavors.

In submitting this NAPA report Lesotho wishes to request the Convention Secretariat, development partners, bilateral cooperating partners and agencies to support to country's efforts identified under the NAPA process. On its part the country has elevated efforts to strengthen institutional capacities to implement the projects identified and prioritized under the NAPA process through policy and legislative reforms.

ACKNOWLEDGEMENTS

On behalf of the Government of the Kingdom of Lesotho, I wish to convey my special vote of thanks and gratitude to the Global Environment Facility (GEF) and its implementing agency the United Nations Environment Programme (UNEP) for funding the NAPA process of consultations and compilation of this report.

The Government of Lesotho is especially indebted to the national NAPA task team for their invaluable and selfless contribution of their skills and expertise. The preparation and coordination of this project was made possible by the dedication and commitment of the staff of the Lesotho Meteorological Services, and I am thankful for their professionalism and leadership.

I further acknowledge the cooperation and collaboration of the various stakeholder institutions in government and non-governmental organizations. The implementation of the adaptation projects will only be sustained by their involvement environmental activism in the affected communities.

I feel bound and obliged with gratitude to acknowledge the cooperation and participation of the communities and their leadership structures for openly and truthfully sharing their most sensitive livelihood vulnerabilities to climate change. I am hopeful that the NAPA project will meet their most urgent and heartfelt needs against the adversity of climate change

EXECUTIVE SUMMARY

As a least developed country party under the UNFCCC, Lesotho is among a group of countries that have embarked on the preparation of a National Adaptation Programme of Action on Climate Change. The key objectives of the Lesotho NAPA were set as:

- Identification of regions and communities vulnerable to climate change
- Assessment of impact of climate change on community livelihoods
- Identification and prioritisation of responsive adaptation activities for implementation in the vulnerable zones

Owing to its geographical position and geophysical features that are characterized by mainly mountainous terrain, coupled by poor economic situation, Lesotho is in a critical state of vulnerability to climate change. The livelihoods of over 85 percent of the population are exposed to the risks of climate change more especially as livelihoods have become survivalist due to chronic poverty crippling the country.

Climate change will have a range of negative impacts on the welfare of communities. Lesotho is prone to a number of key environmental stresses mainly drought, land degradation, desertification and loss of biodiversity. Under climate change conditions these afore-mentioned stresses get more pronounced and hence undermine sustainable development efforts. With soaring unemployment rate estimated at over 60% and scarcity in natural resources, the effects of climate change are due to become more unbearable. The livelihood of the population is dramatically curtailed as destituteness increases unabated.

Lesotho supports four livelihood zones namely Lowlands, Foothills, Senqu River Valley and Mountains. The key common feature of the livelihoods is dependency on agriculture and livestock production to support domestic food supplies.

The Lesotho NAPA Team conducted an intensive assessment to characterize the country vulnerability zones. Three main vulnerability zones were depicted namely; Zone I (Southern Lowlands across the Senqu River Valley), Zone II (Mountains) and Zone III (Lowlands and Foothills). Zone I emerged as the most vulnerable area in the country followed by Zone II and subsequently Zone III. Communities that reside in Zone I are mainly peasant subsistence farmers and small livestock farmers including destitute households that have no means to support livelihood. The area also is under critical environmental stress and would be under high threat of climate change. In Zone II the rugged mountainous terrain with minimal land presents a critical vulnerability area. Zone III is also exposed to risk of climate change due to its drought proneness and livelihoods being supported by farming.

The Lesotho NAPA process identified and prioritised the eleven adaptation activities which will be implemented in the various vulnerability zones. These projects will address the adaptation needs of communities within, and shall build capacity within designated vulnerable communities. These projects have been organized in a hierarchy of importance of which development and improvement of livestock production occupies the critical rung and is closely followed by the development of crop based livelihood.

Lesotho's National Adaptation Programme of action is to identify and prioritise national needs so that effective implementation measures may be put into place to combat the adverse effects of climate change.

The NAPA process identified eleven adaptation options outlined below in their order of priority

Option 1:	Improve Resilience of Livestock Production Systems Under Extreme Climatic Conditions in Various Livelihood Zones in Lesotho
Option 2:	Promoting Sustainable Crop Based Livelihood Systems in Foothills, Lowlands and Senqu River Valley
Option 3:	Capacity Building and Policy Reform to Integrate Climate Change in Sectoral Development Plans
Option 4:	Improvement of an Early Warning System Against Climate Induced Disasters and Hazards
Option 5:	Securing Village Water Supply for Communities in the Southern Lowlands
Option 6:	Management and Reclamation of Degraded and Eroded Land in the Flood Prone Areas (Pilot Project for Western Lowlands)
Option 7:	Conservation and Rehabilitation of Degraded Wetlands in the Mountain Areas of Lesotho
Option 8:	Improvement of Community Food Security Through the Promotion of Food Processing and Preservation Technologies
Option 9:	Strengthening and stabilizing eco-tourism based rural livelihoods
Option 10:	Promote Wind, Solar and Biogas Energy Use as a Supplement to Hydropower Energy
Option 11:	Stabilizing Community Livelihoods which are Adversely Affected by Climate Change Through Improvement of Small Scale Industries

These activities represent the key adaptation needs that communities need to be supported with to sustain livelihoods in view of climate change risks. The first three priority activities: Improvement of livestock production Systems under extreme climatic conditions in the various livelihood zones, Improvement of Crop Production Systems to reduce food insecurity in the drought prone lowlands as well as Capacity building and Policy reform to integrate climate change into sectoral development plans are the major, urgent and immediate needs priority activities that the country seek support in implementing as a baseline adaptation measure followed by other subsequent priority activities. For cost effectiveness and in view of interrelationship among the said three priority activities, it is preferred that these afore-mentioned projects be implemented concurrently for complementarity.

The NAPA consultative process adopted a multi-disciplinary approach that was designed in a way that would allow successful implementation of the priority activities. The process entailed ten key steps namely: Establishment of multidisciplinary Team, Synthesizing material related to NAPA process, Conducting participatory Vulnerability assessment, Stakeholder consultations, Compilation of potential NAPA activities, Prioritisation and screening of NAPA Activities, ranking

of the NAPA activities, Formulation of project profiles, compilation of the NAPA document and review and adoption of the NAPA.

The Lesotho NAPA has outlined an implementation strategy for the NAPA projects. The strategy has been designed with view of empowering the vulnerable communities to adopt adaptation capacities. The strategy has three building blocks namely: Establishment of a Project Steering Committee to allow transparency and accountability in the implementation of the project and strengthening of project coordination and management Teams and involvement of vulnerable communities in spearheading capacity building on adaptation

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a.s.l	Above Sea Level
AGOA	America's African Growth and Opportunity Act
ARV	Anti Retro Viral
ATS	Appropriate Technology Section
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
COP	Conference of the Parties
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEM	Geography and Environmental Movement
GIS	Geographic Information System
IMF	International Monetary Fund
LDC	Least Developed Country
LEG	Least Developed Countries Expert Group
LHWP	Lesotho Highlands Water Project
LMS	Lesotho Meteorological Services
LTDC	Lesotho Tourism Development Corporation
LVAC	Lesotho Vulnerability Assessment Committee
MCA	Multi-Criteria Analysis
MDG	Millennium Development Goals
MEA	Multilateral Environmental Agreement
MFA	Multi-Fibre Agreement
MW	Megawatts
NAPA	National Adaptation Programme of Action
NES	National Environmental Secretariat
NGOs	Non-Governmental Organizations
NSC	National Steering Committee
PRS	Poverty Reduction Strategy
SACU	Southern African Customs Union
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United National Framework Convention on Climate Change
USA	United States of America
WB	World Bank

1. INTRODUCTION AND SETTING

1.1. Background

Lesotho is a landlocked country completely surrounded by the Republic of South Africa. The land area of Lesotho covers 30,352 square kilometers dominated by rugged topography of the Maloti and Drakensberg mountain ranges.

The population of Lesotho is estimated at 2 million people (1996 census) a majority of which earns their livelihoods from agriculture. The population growth rate is 2.3 percent per annum. An estimated 85 percent of the population in Lesotho resides in rural areas. Almost half of the population, about (50%), lives below the poverty line (source: IMF). Across a greater interior from the mountain region to the Senqu River valley communities live under chronic poverty with survivalist livelihoods. Most communities are more vulnerable to climate change since they do not have sufficient capacities to outlive the consequences of climate change and variability.

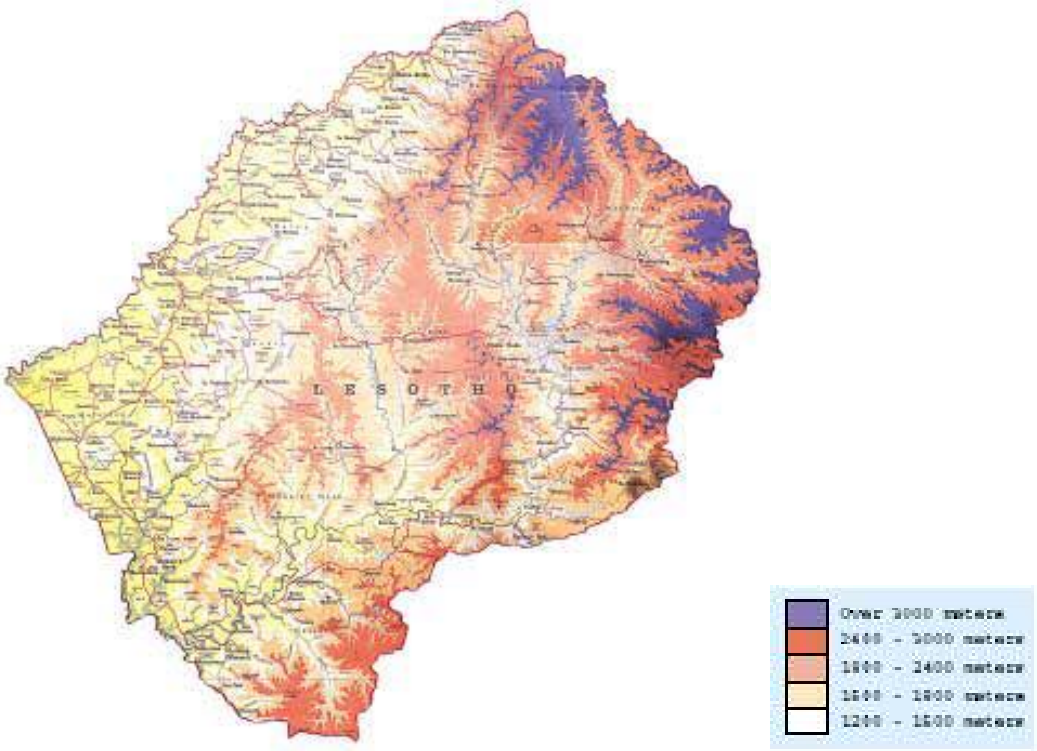

Figure 1: Physical Map of Lesotho

The latitudinal position of Lesotho in the *subtropics* under the global high-pressure belt (30^{o}S) makes its latitude the primary factor that determines the country's climate. In winter, Lesotho has low weather activity because of the strengthened high-pressure system. The weakening of the high pressure may allow the intrusion of extra tropical frontal systems across the country, leading to snowfall and strong westerly winds. In summer, low pressure systems dominate over Southern Africa and bring rain-bearing moist tropical air masses across the country. Autumn and spring are transitional seasons

from summer to winter and vise versa respectively. During these seasons either summer or winter weather patterns can occur.

Lesotho has continental temperate climate with well-marked seasons of spring, summer, autumn and winter. The average temperature ranges between -2^{o} C in winter and 28^{o} C in summer. Heavy frost is frequent particularly in the mountain region and determines the length of the summer growing season. Precipitation varies from 450mm per annum in the Senqu River valley and the southern lowland districts to over 1300mm per annum in the northeast of Drankensberg Mountains.

1.2. The Socio-Economic Situation

Economically, Lesotho is resource poor. The agricultural sector has historically been a major employer. However, the sector's contribution to the GDP has declined from 30% in the 1980s to less than 20%. Currently the country produces about 150,000 metric tonnes of cereal per annum while its requirement stands at 400,000 metric tonnes (LVAC 2005). This is attributed to soil erosion, poor agricultural practices, recurring bouts of drought and increased cost of farming inputs. With an estimated 85% of the population based in rural areas the communities are most vulnerable to climate change due to their agricultural based livelihoods. Subsistence farming, the major source of living in the rural areas, is in steady decline due to recurring droughts.

Another major development in Lesotho's economy was the coming on stream of the Lesotho Highlands Water Project (LHWP), which was commissioned in 1986. The project is designed to capture, store and transfer water to South Africa while South Africa pays royalties and has rendered Lesotho self-sufficient in the production of electricity from the 'Muela Hydropower Station that has capacity of 72 MW. The project contributes 13.6% to the country's GDP. The long-term performance sustainability of the benefits of the LHWP to the communities in the mountains and the country at large will be affected by climate change.

The country is continually registering a slump in economy resulting in unemployment and concomitant poverty remaining significantly high. Lesotho would have to achieve economic growth of 7.5% per annum to reach the MDG targets of halving poverty by 2015. It is unlikely that the country would meet these targets as its current growth rates have averaged 3%. Unemployment is estimated at 42 percent of the estimated 593, 200 labour force (Central Bank Annual Report 2005).

Lesotho has the third highest HIV infection rate in the world, estimated at one in three people among the adult population. The high HIV/AIDS prevalence has lead to higher morbidity and mortality rates which have further undermined the viability of the already weakened livelihood strategies and thus further entrenching poverty.

1.3. Key Environmental Stresses

In as far as the environment is concerned; Lesotho faces the challenges accentuated by the various multilateral environmental agreements (MEAs), in particular: United Nations Convention to Combat Desertification (UNCCD), Convention on Biological

Diversity (CBD), Convention on Wetlands (Ramsar), and Convention on International Trade of Endangered Species (CITES). Lesotho is particularly prone to the following environmental stresses: drought, soil erosion and land degradation, desertification, deforestation and rangeland degradation, loss of biodiversity, degradation and drying up of the wetlands and mountain sponges. These environmental stresses will be more exacerbated under climate change conditions.

1.4. Climate Change Vulnerabilities of Major Sectors

The country meets the criteria outlined in S*ection 8 of Article 4 of the UNFCCC,* for countries that are particularly predisposed to adverse effects of climate change, and have low adaptive capacity and thus deserving special attention. Lesotho: *"is small and landlocked, is liable to drought and desertification, has a fragile mountainous ecosystem, is prone to natural disasters, is situated in the sub-tropics and has a semi-arid climate"*.

One of the key outcomes of the NAPA preparation in Lesotho was the identification of socio-economic sectors that are particularly vulnerable to climate change, and should receive "*immediate and urgent*" special attention in identifying intervention programmes. The sectors thus identified, are as follows:

The Water Sector

The vulnerable communities are highly dependent on water resources to sustain livelihoods. Availability and access to water is critical to meet domestic water needs, livestock rearing, crops irrigation, hydropower generation, small-scale industrial activities and to perform rituals. The sources of water in the rural communities are spring water, river flows, sponges and the wetlands.

Climate change will have severe impact on water resources in Lesotho, as diminishing rainfall will lead to the shrinkage of surface and ground water resources. Already catchments yields have waned to the extend that springs that were once perennial have run dry, the once great and robust rivers have been reduced to mere trickles and dams remain dry for most part of the year. The issue of management and preservation of water resources has thus become one of the very critical developmental challenges for the country.

Due to recurring droughts, fresh water availability is set to diminish. It had been projected that Lesotho would enter a water stress period of less than 1,700m^3 per capita per year by the year 2019, and a water scarcity period of less that 1,000m^3 per capita per year by 2062. With the advent of climate change, these conditions could set in much earlier, which would spell suffering for humans and animals.

The Agricultural Sector

Over 70% of the communities derive their livelihoods from agricultural activities. The rural communities are dependent on agriculture to meet their daily food supplies and to generate income.

Lesotho continues to be immersed in an ongoing crisis of severe food insecurity and failing livelihoods. The impact of climate change on the agricultural sector in Lesotho will be quite significant. With the country already importing 60% of its annual cereal requirement, recurrent droughts have lead to a steep decline in the production of cereals and other staple crops (Maize yields have fallen from 1,400 kg per hectare in the mid 1970s to the current 450-500kg per hectare) which has led to Government declaring *a food shortage state of emergency* and appealing for food aid from the international community on a regular basis.

The falling agricultural output has lead to a precarious and deteriorating food security situation in the country and staple food prices are steadily increasing.

The situation is set to degenerate further as the affects of climate change become entrenched.

The Forestry Sector

Forests resources play a critical role in the vulnerable zones; in particular for fuel wood, prevention of soil erosion, income generation, scenery for tourists attraction, building material, forage and shelter.

Lesotho is one of the least forested countries in Africa. Less than 1% of the country is forest and woodland. The country has around 874 hectares of planted trees, mainly eucalyptus and pine trees, which accounts for 0.2 % of total area under arable production. Climate change will lead to the destruction of natural vegetation, trees included.

There is a net depletion of forests as harvesting outstrips replenishment because drought curtails the survival of replacement stock.

Exhaustion of forests is expected to continue as climate change grips the country.

The Rangelands Sector

In Lesotho rangelands are important and serve as grazing land for pastoralists. Livestock rearing in the rural areas entirely relies on open land grazing as commercial fodder production is minimal.

About 70% of Lesotho's land area, approximately 1 981 896 hectares, is rangelands. The annual soil loss from rangelands is estimated at 23.4 million tonnes compared to 15.4 tonnes soil loss from cropland. Rangelands have suffered a major destruction on account of climate change. Chronic drought has impeded recovery of grasses and vegetation. The result has been severe attenuation of the carrying capacity of pastoral lands. The number and quality of livestock produced has, as a result, deteriorated significantly.

The degeneration of livestock farming has had dire knock-on effects on the economy. Production of wool and mohair, meat and milk, which are major contributors to the country's GDP, have been hit hard.

Future scenarios are not too encouraging either. The deterioration of rangelands is set to carry on as climate change takes root.

Soils and Desertification

The soil is a key resource in Lesotho since a great majority of the population derives all or part of their livelihood from agriculture. Soil is not only limited in quantity and quality but is also diminishing and yet a non-renewable resource. Lesotho losses about 730,771 tonnes and 38,842,399 tonnes of soil per year as a result of gully erosion and sheet and rill erosion respectively. The loss is equivalent to more than 2% of the topsoil every year and at this rate all the soil will be lost by year 2040 (……). Due to mountainous terrain the soil eco-system in Lesotho is very fragile and susceptible to erosion. Climate change will lead to increased rates of soil loss (soil erosion) and loss of soil fertility, which will in turn diminish the efficacy of the soil as a resource.

It is predicted that the climatic and environmental factors that engender rapid soil erosion, which include: high temperatures, scant vegetation cover, frequent bouts of droughts, rainstorms, strong winds and heavy snowfall and the subsequent melting thereof; will intensify and result in the acceleration of soil erosion and desertification. With an estimated 9% of Lesotho's land suitable for agriculture climate change could result in a shrinkage of arable land to as low as 3%.

Biodiversity

Biodiversity plays an important role in Lesotho. Indigenous plant species are used for medicinal and cultural purposes, tourist attraction and income generation among others.

It has been established that Lesotho has a total of 4,482 species of animals and plants (NES 1997) of which 3,094 are plant species. The destruction of the environment that is an adjunct to climate change will lead to loss of species. Siltation and drying up rivers and their sources, increased aridity and disappearance of wetlands and marshlands, soil erosion and land degradation and diminished vegetation cover will result in loss of habitat and source of sustenance for many indigenous as well as exotic animal and plant species.

Indications are that global warming is likely to lead to a rather rapid environmental change to which species might not be able to adapt. Hence if no special conservation measures are put in place, many species, including endemic plants, are likely to disappear.

The Health Sector

Due to high altitude and extreme winters, Lesotho has remained free of climate-related diseases that are common in tropical countries. However, Lesotho is prone to extreme weather particularly heavy snowfall in winter.

Climate change induced recession of fresh and clean water resources will lead to increased incidence of water-borne infections such as typhoid.

Climate change scenarios indicate that Lesotho is likely to have a warmer climate in the future. This could lead to incursion into the country of tropical diseases for which the country is ill prepared.

Basotho Culture

The demise of farming and loss of livelihood in rural areas has led to mass migration of young men and women to urban areas as they seek alternative means to earn a living. This demographic shift has in turn lead to a myriad of social problems in both urban and rural areas.

Changing climatic and environmental conditions will require people to resort to new ways of living, which will impinge on Lesotho's cultural heritage.

Extensive consultations with stakeholders enabled tabulation of vulnerabilities of communities in the various sectors: Table 1.1 summarizes the outcome of the consultations.

Table 1: List of Vulnerable Sectors and Associated Community Vulnerabilities

Vulnerable Sectors	Vulnerabilities
Water Resources	Ground water resources are negatively affected by shortened rainfall season. This will result in inadequate annual recharge of aquifers, lower water tables and drying up of springs. In the mountains, the wetlands are drying up affecting reliability of perennial streams.
Agriculture	Crop production is adversely affected by reduced rainfall and frequent drought occurrences. Drought and high temperatures exacerbate incidences of diseases and pests. Resultant crop failures lead to famine and food shortages.
Forestry	Rural communities depend on biomass fuels as a major energy source. The resilience and regenerative capacity of forest resources are negatively affected by extreme climatic conditions. A decrease in forestry resources negatively impacts on the stability of energy supplies for both cooking and heating.
Livestock & rangelands	Livestock production is deteriorating due to degradation of rangelands. The net effect is increased livestock mortality rate and quality of livestock products. Extreme weather conditions are conducive to disease and pest incidences.
Culture	The natural heritage and culture of the Basotho is closely linked to the environment. Their housing, clothing, medicine and other traditions are affected by climate change.
Health	Frequent drought occurrences result in limited availability and quality of water leading to disease outbreaks compounded by famine and malnutrition.
Energy	Climate change induced drought affects the generation of hydropower.
Soils	Climate change affects soil cover (range and forest resources) negatively. Soil erosion, desertification and land degradation are increased by incidences of drought and flooding. The end result is loss of soil fertility.

2. FRAMEWORK FOR ADAPTATION PROGRAMME

2.1. Climate – Current Situation

Lesotho's climate has four distinct seasons of summer, autumn, winter and spring. Summer (November to January) is characterized by high temperatures and precipitation. Winter (May to July) is characterized by high-pressure dominance that results in clear skies, dry air, and warm temperatures during the day and a sudden drop in temperatures after sunset, and low precipitation. Autumn (February to April) and spring (August to October) are transitional periods between summer and winter, respectively.

Precipitation patterns in Lesotho are determined by regional and local climate controls. The lowest average annual precipitation occurs in the Senqu River Valley (450 mm) and the highest in the northeastern mountains zones (1300 mm). The amount of precipitation received is highly variable in both time and space resulting in common occurrence of droughts and floods. High intensity rainfall often produces flash floods that accelerate soil erosion leading to high sediment loads in rivers. Snowfall occurs annually over the mountain tops and once every three years in the lowlands. The heaviest snowfall was in 1903 (Germond, 1967). Other significant heavy snowfalls were recorded in 1964, 1988 and 1995. The heavy snow storms cause drastic human problems in the form of cold and restriction of movement and access to the mountain communities.

Lesotho experienced recurrent droughts in the 19th century with eleven of the droughts reported between 1802 and 1885. Their impacts included famines (4), food shortages (3), disease epidemics (2), locust invasions and dust bowls (2) (Hyden, 1995). Long term records of the 19th and 20th century show occurrence of drought with a quasi-periodicity of nine in ten years up to 1978. The period 1979 to 1996 has experienced the highest incidence of drought in almost 200 years with the longest drought in the country's history lasting from April 1991 to October 1995.

2.2. Climate Change Scenario (Projections and Potential Impact)

Climate change scenarios that were generated with the assistance of the six global circulation models using historical data for the years 1961 to 1992 predict warmer future climatic conditions over Lesotho, lower precipitation, particularly in the spring and summer seasons, higher precipitation in winter, and gradually increasing precipitation in autumn. The result would be a shift in precipitation patterns in such a way that seasonal rains that characterize the summer season could then set in late autumn. This is likely to have serious implications for agro-ecological conditions in the country as the growing season is pushed forward and perhaps shortened. On the other hand, an increase in precipitation in winter may suggest increased activity in frontal systems which may result in heavier snowfall occurrences and strong devastating winds which often bring disasters and human suffering.

2.3. Livelihood Zones

Lesotho is demarcated into distinct livelihood zones, namely Lowlands, Foothills, Senqu River Valley, Mountains and Peri-Urban and Urban Areas. Each of these zones is characterized by; types and levels of availability of resources, agro-climatological and ecological conditions. An analysis of local livelihoods is essential for a proper understanding of the impacts of hazards associated with climate change at community level. Livelihood patterns clearly vary from one area to another according to local factors such as climate, soil and access to markets. Where a community lives is one factor determining its options for obtaining food and generating income. The Livelihood Zones in Lesotho more or less coincide with the agro ecological regions (Fig. 2).

The Lowlands have been further divided into the Northern and Southern parts. Cross-cutting all the livelihood zones is the importance of environmental resources such as water, soil, range and forestry resources supporting both human and livestock requirements all of which are sensitive to climate change.

Lesotho has a highly variable climate characterized by droughts, floods, frosts, snow, hailstorms and tornadoes. These climatic extremes will be exacerbated by climate change to the detriment of the vulnerable communities.

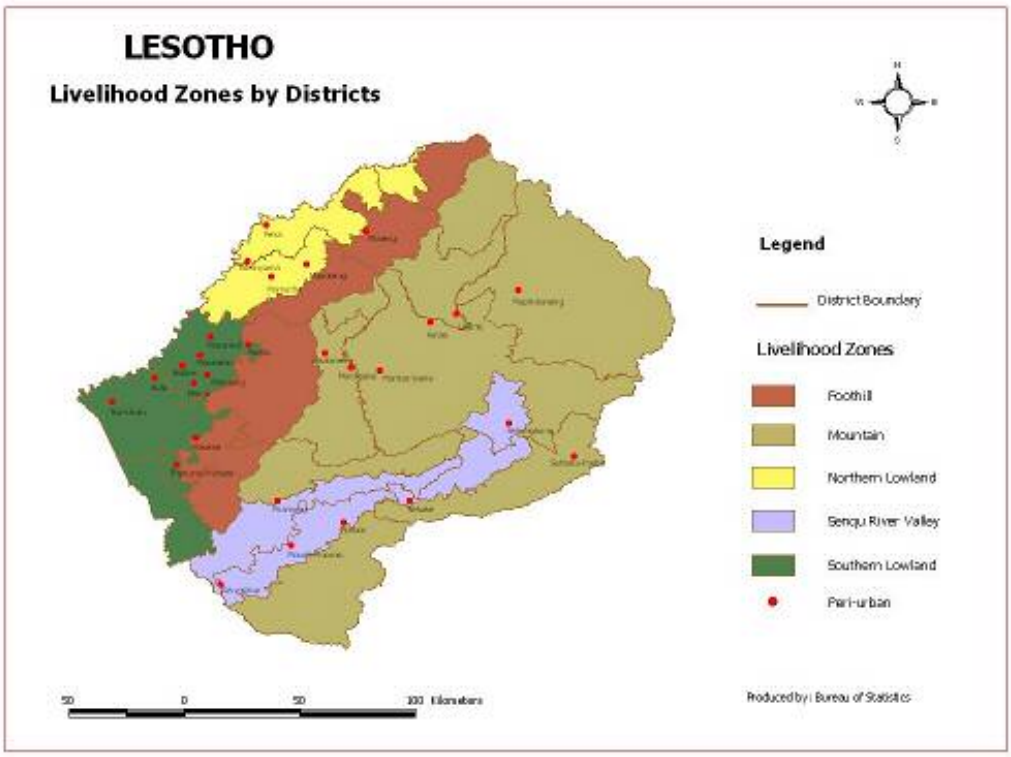

Figure 2: Map of Major Livelihood Zones in Lesotho

The country is administratively divided into ten districts across which the livelihood zones can be overlain (Fig. 2). The estimated areas for the livelihood zones are shown in table 2.

Table 2: Major livelihood zones overlaid on the districts in Lesotho. ***(Source: Ministry of Agriculture District Economic Strategies 2002).***

District	Livelihood Zones				
	Northern Lowlands	Southern Lowlands	Foothills	Mountains	Senqu River Valley
	Area in Hectares				
Botha-Bothe	102,626	N/a	37,053	38,986	N/a
Leribe	118,780	N/a	79,187	84,843	N/a
Berea	133,317	N/a	77,768	11,110	N/a
Maseru	119,812	N/a	132,649	175,439	N/a
Mafeteng	N/a	171,380	31,350	6,270	N/a
Mohale's Hoek	N/a	81,768	99,544	135,096	39,107
Quthing	N/a	N/a	N/a	162,819	127,929
Qacha's Nek	N/a	N/a	N/a	75,703	160,870
Thaba-Tseka	N/a	N/a	N/a	343,988	85,997
Mokhotlong	N/a	N/a	N/a	410,403	N/a
Totals	**474,535**	**253,148**	**457,551**	**1,444,667**	**413,903**

Southern Lowlands

The Southern Lowlands cover approximately 253,148 ha and are generally hotter and dryer with annual precipitation ranging from 600 to 700 mm per annum. This zone supports approximately 597,175 people. The four main sources of livelihood in this zone are: food crops, paid employment, livestock, and trade. Up to 53% of the population is estimated to be "poor". The poor are highly dependant upon local wage employment as a source of income, and derive the smallest share of income from cash crops, focusing narrowly on vegetables surplus to their own needs.

Farmers, pastoralists and small traders residing in this zone will suffer most as a consequence of climate change. They have adopted coping mechanisms to avert impact of extreme climatic conditions such as drought. During times of drought, when rangelands are in bad condition, pastoralists barter their livestock for food cereals to supplement their food requirements. Being close to commercial centers, farmers in this zone migrate to nearby towns to seek employment during years of low agricultural output. In addition to these coping mechanisms, government distributes donor-provided food aid.

Northern Lowlands

The Northern lowlands cover approximately 474,535 ha of land across the districts of Botha-Bothe, Leribe, Berea and Maseru. This is the most productive arable land in the country that has generally good annual rainfall ranging from 700mm to 800mm. The area is estimated to support 430,658 people. Up to 43% of population in this area is deemed poor. The population in this area derives its livelihood from dryland crop production, paid employment, cash crops and trade. Crops and livestock sales form an

important source of cash income. Livestock holdings in the area are generally high. During years of low agricultural productivity, farmers and pastoralists in this zone resort to petty trade and street vending.

Foothills

This is an area that occupies a long strip of rugged and terrain that separates the mountains from the lowlands. It supports 235,106 people. Livelihoods are more agriculturally orientated. Up to 41% of the population is estimated to be poor. Livelihoods in the area are driven by crops and livestock holdings.

The farmers that inhabit this zone, also resort to petty trade and street vending when climatic conditions curtail their farming activities.

Senqu River Valley

This area occurs along the banks of the Senqu River. It supports an estimated 122,680 people. Livelihoods in this area are derived from food crops and livestock rearing (goats). Up to 50% of the population is poor in this area.

This area has low soil fertility, and therefore generally low agricultural output inadequate to meet local demand. Moreover, this area is located away from trade centers and is not easily accessible due to lack of roads infrastructure. As a result the area has highest prevalence of poverty in the country.

Communities in this zone rely primarily on food aid, as they have no other options to sustain livelihoods.

Mountains

This is the least densely settled part of the country and communities in this area tend to be more isolated from services and markets. This zone supports approximately 385,991 people. Livelihoods in this area are dependant on food crops and livestock. 55% of the population in this area is poor.

People in this area are mostly pastoralists. During years of drought, they exchange livestock for food cereals to supplement their food requirements.

2.4. Vulnerability Zones and Coping Strategies

2.4.1. Vulnerability Zones

The NAPA consultation workshops were held throughout the country to assess vulnerability zones, identify communities at high risk of climate change and to formulate remedial adaptation activities to ease climate change impacts on the vulnerable communities. The consultation workshops were inclusive and key feedbacks were provided by the concerned stakeholders. To come up with vulnerability zones considerations were made of the various socio-economic

indicators, agro-climatic conditions of the regions, climate change risks affecting the regions, poverty levels (Fig.7), population at risk (Fig.3), livestock statistics (Fig.5&6), drought severity (Fig.4) and Livelihoods. The assessment culminated into demarcation of the regions into three vulnerability zones namely; Zone I (*Southern Lowlands across the Senqu River Valley*), Zone II (*Mountains*), and Zone III (*Lowlands and Foothills*) (see Fig. 8). The area under high climatic risk and also with poor socio-economic indicators denotes area of chronic vulnerability.

Figure 3: Population Density

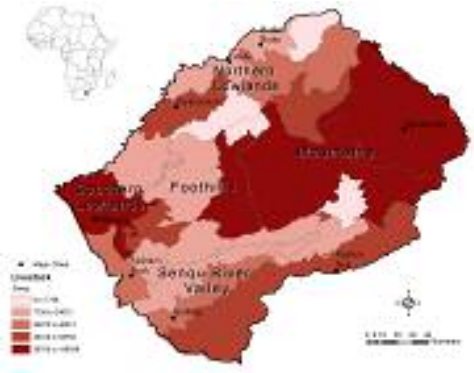

Figure 6: Cattle statistics

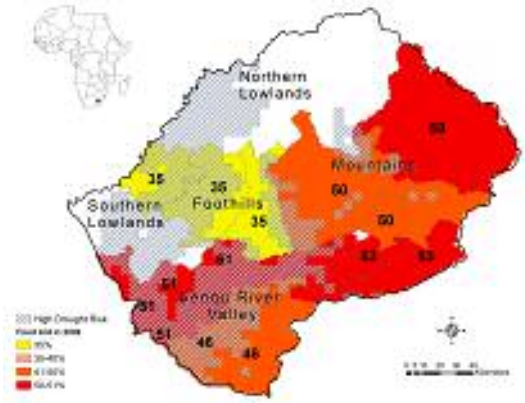

Figure 4: Drought Risk Areas

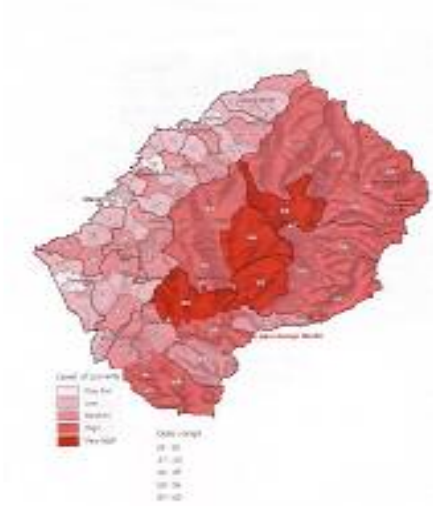

Figure 7: Poverty Distribution by Constituency

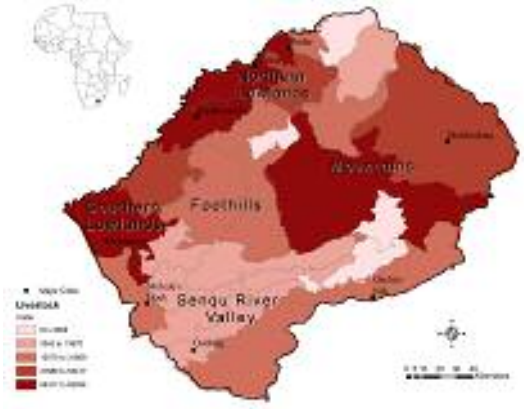

Figure 5: Cattle Statistics

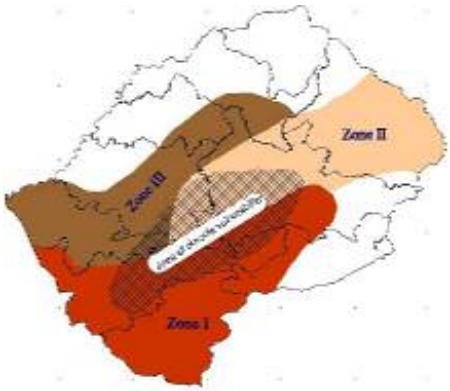

Figure 8: Vulnerability Zones

Reddest areas denote region of chronic poverty

Zone I (Southern Lowlands across the Senqu River Valley)

Vulnerable communities in the zone:

- Small livestock farmers (rear goats and sheep)
- Peasant subsistence farmers (maize, sorghum and beans)
- Poor households with either no ownership of field or livestock surviving on Government and Donor Aid

Characteristics of the Zone:

- Very high poverty levels
- High unemployment
- Low soil fertility
- High soil erosion and environmental degradation
- High level of desertification
- Low crop production (high food insecurity)
- High loss and extinction of biodiversity
- Minimal arable land
- Area of recurring natural disaster (Critically drought prone with high frequency of drought occurrence)
- High population density
- High malnutrition
- High incidence of erosive thunderstorms, hail and dust-storms,
- Poor vegetation cover
- Low livestock holdings
- Lack of infrastructure (No roads, water utilities, electricity grid & remote from town center)
- Medium literacy rate
- Poor accessibility to clean potable water
- Poor hygiene and sanitation
- Increased hunger and high mortality rate

Zone II (Mountains Region)

Vulnerable communities in the zone:

- Livestock farmers (rear cattle, goats and sheep for mohair and wool)
- Crop farmers (grow maize, wheat, sorghum, potatoes, beans and peas)
- Labourers during peak agricultural season
- Households surviving on wild vegetables
- Eco-tourist guides
- Small scale industry operators

Characteristics of the Zone:

- High livestock holdings
- Low literacy rate

- High levels of poverty
- Area of recurring natural disaster (Frequent heavy snowfall occurrence)
- Poor infrastructure
- Abundant water resources
- High frequency of wind storms
- Early frost onset
- Rugged mountainous terrain
- Low crop production (food insecurity)
- Inadequate arable land
- High degradation of indigenous vegetation
- Extreme low temperatures (cold conditions)
- Abundant but deteriorating rangelands
- Relatively high rainfall
- Low population density
- Livelihoods supported by livestock holdings

Zone III (Lowlands and Foothills)

Vulnerable communities in the zone

- Crop farmers (grow vegetables, maize, sorghum, wheat, beans and potatoes)
- Livestock farmers (rear cattle, goats and sheep)
- Cash crop farmers
- Dairy cattle farmers

Characteristics of the Zone:

- High drought risk
- High rate of soil erosion
- High population density
- Low soil fertility
- Poor vegetation cover
- Frequent hail and duststorm occurrence
- Area of recurring natural disaster (Prone to floods)
- Risk of water borne diseases
- Relatively improved infrastructure
- High literacy level
- Moderate crop production although still not sufficient to meet local demand
- Livelihoods dependent on cereal production and cash crops
- High environmental degradation
- Marginal lands

2.4.2. Future Coping Strategies and Mechanisms

Lesotho is in dire need of adopting appropriate future coping mechanisms and strategies. In view of the key adaptation needs outlined in section 3, and the survivalist nature of livelihoods in Lesotho, eleven projects have been identified in support of future coping strategy, which will be implemented in the various

vulnerability zones. The projects will address adaptation needs of communities within specific vulnerability zones.

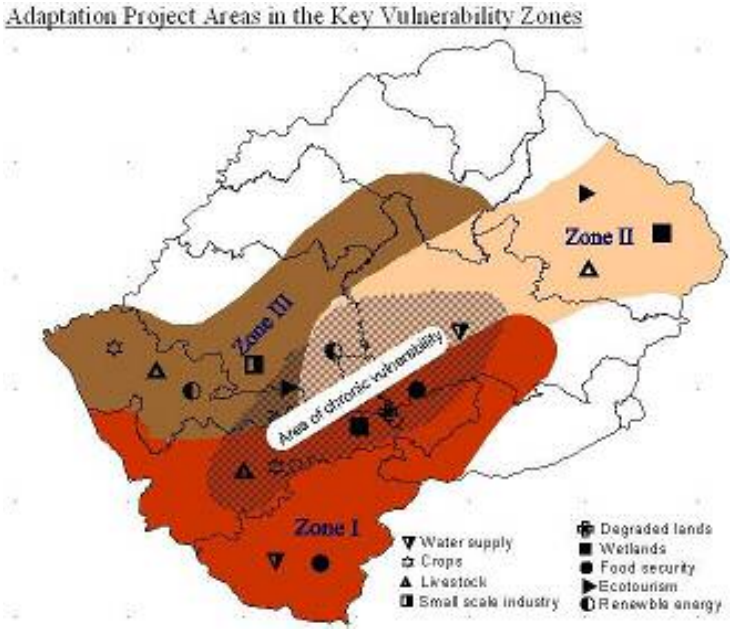

Figure 9: Adaptation Project Areas

2.5. Relation of NAPA to Lesotho's Development Goals

2.5.1. The Backdrop to NAPA

The thrust of Lesotho's National Adaptation Programme of Action is to identify, prioritize and communicate the country's urgent and immediate needs for the development and implementation of responsive adaptation measures to climate change.

The primary focus of the programme is to address the needs of vulnerable communities within the specified livelihood zones. These are the people with the least capacity to adapt to climate change and as a result, are especially susceptible to its adverse effects. In Lesotho the most vulnerable groups within the communities comprise: the elderly, women and children and people living with HIV and AIDS. These are incidentally mostly found among the rural communities.

The NAPA is designed and will be implemented within the framework of the main national development programmes, in particular:

The National Vision 2020 which outlines Lesotho's long-term perspective within which national short to medium-term plans are being formulated enable Lesotho's aspirations to be: *1) a stable democracy, 2) a united nation, 3) a country at peace with itself and its neighbors 4) endowed with a healthy and well developed human resource base 5) a strong nation with a strong economy and 7) well advanced in technology;* by the year 2020.

The Poverty Reduction Strategy which outlines national priorities and strategies to reduce poverty and promote equitable economic growth, and identifies the following as the key priority areas: *1) Employment creation, 2) Food security 3) Infrastructure development, 4) Peace and security, 5) Health Services, 6) Education, 7) The Environment, 8) Public Services.*

The Millennium Development Goals: Lesotho is signatory to the United Nations Millennium Declaration of 2000, which outlines challenges facing humanity, sets out a response to these challenges and establishes concrete measures for assessing performance in combating the challenges. The goals are: Combat HIV and AIDS, Eradicate extreme poverty and hunger, Achieve universal primary education, Promote gender equality and empower women, Reduce child mortality, Improve maternal health, ensure environmental sustainability and develop a global partnership for development.

Lesotho stands to benefit from NAPA projects, as these projects will directly contribute in uplifting the livelihoods of communities vulnerable to climate change. The broad goals of the NAPA in Lesotho are:

- Identify and prioritise urgent and immediate needs with a view to assist vulnerable communities to adapt to the adverse effects of climate change
- Support and improve livelihoods of vulnerable groups
- Management and conservation of natural resources on which rural communities depend
- Prevention and reversal of the destruction of the environment and natural resources
- Support and promotion of the use of appropriate technologies to enhance adaptive capacities of vulnerable communities
- To stabilize and improve existing sources of livelihood for rural communities
- Integrate climate change and related issues in national policy dialogue and development programmes.
- To seek synergies with other multilateral environmental agreements with emphasis on the effects of climate change.

2.5.2. Barriers to Implementation

- Insufficient financial resources to implement environmental activities
- Inadequate institutional and systemic capacity for climate change initiatives
- Shortage of human resources with requisite environmental expertise and skills in both community and institutional levels
- Lack of awareness on the impact of climate change in peoples livelihoods

3. KEY ADAPTATION NEEDS

The following table outlines a matrix of concerns and associated impacts, current situation and future adaptation strategies identified by communities consulted through workshops, seminars and public meetings.

Table 3: Potential Adaptation Measures

CONCERN/ CHANGE	IMPACTS	CURRENT ADAPTATION MEASURES	FUTURE ADAPTATION MEASURES
CROPS SECTOR			
Scanty Precipitation	• Drought • Delays in ploughing • Crops stagnate in growing • An increase in insects and pests • Famine and food shortage	• Use of fertilizers and lime • Short lived reservoirs • Conservative irrigation	• Introduction of improved drought resistant crop varieties • Drip irrigation technology • Improvement of early warning systems • Improved cooperation between farmers and the private sector • Improve market potential • Improve efficiency of irrigation equipment
High Temperatures and heat waves	• Crops wilt • High soil moisture loss	• Application of herbicides	• Installation of greenhouses in major regions
Strong winds and dust storms	• High loss of moisture • Soil erosion increased	• Undertake tree planting • Rehabilitate gullied areas	• Land reclamation and gully rehabilitation
Early Frost	• Plants wilt • Poor harvest	• Short season cultivars	• Promotion of use of short season cultivars • Promotion of small-scale cash crops
Floods and hail	• Heavy soil erosion	• *Hail shields*	• Promotion of use of hail shields
Cold Winters	• Poor harvest	• Maintaining nurseries that provide cultivars	• Agriculture policy reform
HEALTH SECTOR			
Drought	• Poor water quality • Famine (malnutrition) • Disease outbreaks	• Introduction of water purification programmes • Promotion of use of sanitary services	• Promotion of water purification programmes
Heat waves	• Diseases (heat stroke) • Increase level of discomfort • Multiplication of bacteria		
Wind storms	• Increase in air-borne diseases		
Cold winters	• Increase incidences of colds and influenza	• Use of traditional herbal practices & Influenza vaccines • Reliance on biomass fuels for heating	• Promote conservation and regeneration of biodiversity • Promote use of renewable energy technologies for heating and cooking
CULTURE SECTOR			
Drought	• Extinction of indigenous medicinal plants and herbs • Migration of rare wild animals • Increased incidences of alien species • Decline in biodiversity	• Policy reform through Environment Act 2001 • Protection and conservation of plants	• Establishment of botanical gardens
RANGE AND LIVESTOCK			
Drought	• Poor rangelands • Increased livestock mortality/death • Water sources dry up • Poor quality of livestock and livestock products (wool, mohair and hides) • Increased soil erosion and gully formations	• Construction of conservation dams • Plant fodder to feed animals • Promote communal grazing system • Registration of livestock	• Rear well bred animals to withstand extreme weather • Promotion of rangelands sharing within communities • Improve animal nutrition
High temperatures	• Increased incidence of animal disease • Wild fires	• Use of veterinary services • Anti-fire awareness campaigns	• Promote use of fire breaks • Increase public awareness on fire hazards and management
Extreme cold spells and heavy snowfall in winter	• Shrinkage of grazing land due to snowfall • Increased livestock mortality	• Provision of animal feeds (crop residues)	• Introduction of dairy livestock breed that would not heavily rely on rangelands • Planting animal feeds
ENERGY SECTOR			
Drought	• Water shortages and reduced hydropower generation	• Formulation of energy policy	• Development and promotion of renewable energy technologies (wind, solar, biogas)

SOILS AND FORESTRY			
Intense drought	• Poor soil fertility • Deforestation	• Reforestation • Community and individual tree nurseries Adoption of soil conservation practices e.g. agro-forestry, contour cropping, terracing and others	• Reforestation of multi-purpose trees • Introduction of grafted trees and varieties
Extremely high temperatures in summer	• Forest fires • Increase in tree bugs and diseases • Increased soil moisture loss	• Reforestation	• Regenerating damaged areas with different tree species • Fire prevention • Capacity building and policy reform
Heavy floods	• Increased soil sedimentation • Increased gully formation	• Construction of silt traps and diversion furrows • Construction of waterways	• Promote land management practices and use land reclamation techniques. • Construction of water conservation and collection dams • Promote biological erosion measures: planting trees and grasses
Strong winds	• Dust storms • Increased soil erosion	• Forestry and rangelands conservation programmes • Grazing associations and livestock improvement programmes being practiced	• Intensify afforestation programmees • Use conservation agriculture with soil cover crops • Increase use Land reclamation programmes
WATER SECTOR			
Shortened rainfall season	• Underground water not adequately recharged • Water sources dry up	• Rainwater harvesting from roof-tops • Development of well fields for water supply	• Build small dams • Drilling boreholes • Promotion of rain water harvesting • Increase coverage of well fields • Rehabilitation of boreholes
Drought	• Decline in water availability • Stagnant water causes diseases • Poor water quality • Outbreak of water borne diseases e.g. cholera	• Conserve water sources • Water rationing • Encourage communities to protect natural springs and wetlands	• Demand management and leak detection • Promotion of water recycling and procurement of requisite equipment e.g. water testing kits • Conservation of wetlands and mountain sponges • Dredging of existing ponds and water collection points that have been silted over the years
Floods	• Outbreak of water borne diseases e.g. typhoid	• Use domestic water purification systems	• Intensify investments in purification technologies

4. CRITERIA FOR SELECTING PRIORITY ACTIVITIES

4.1. The Criteria

A Multi-Criteria Analysis technique was applied in prioritising adaptation options. The methodology involved: identification of options, scoring the options against selected criteria and weighting the criteria.

Six criteria which were used to prioritise the country's needs were selected as the most appropriate for Lesotho. This selection was made in the context of the major developmental challenges facing the country (environment degradation, unemployment, poverty, gender equity and HIV and AIDS) as well as the policies and programmes put in place to combat the challenges. The overriding consideration in selecting and prioritising the criteria was the degree of focus on the uplifting of the vulnerable groups and enhancement of their capacity to adapt to climate change.

The criteria are as follows:

4.1.1. Impact on Vulnerable Groups and Resources

Climate change will affect vulnerable communities in Lesotho. Firstly, livelihoods of the vulnerable groups will be negatively affected by diminishing resources upon which they subsist such as reduction in water resources, soil erosion and range degradation, and productivity of crops and livestock systems. Secondly, climate change creates conditions detrimental to the health of the people and their livestock due to high incidences of disease and pests resultant from drought and other extreme weather conditions. The outcome of reduced productivity of crops and livestock is the deterioration of nutritional status and constraints in the economic income streams. Thirdly, extreme climatic events will also influence the frequency and magnitude of natural disasters which in turn affects the livelihood resources of the people. Thus, the extent to which an activity addresses the adaptation needs of the vulnerable groups is an important parameter.

4.1.2. Impact on the Economic Growth Rate of the Vulnerable Communities

Any project prioritised for adaptation must help the communities to achieve a stable and improving economic performance measure by the reliability and diversity of income sources. It is desirable to have an activity which makes the greatest impact at least cost and within a shortest possible time within sustainable limits of investment.

4.1.3. Impact on poverty reduction

Lesotho has a high incidence of poverty. Estimates are that 50 percent of households in Lesotho's rural areas fall below the poverty line, and 30 percent of households in the urban areas are classified as poor.

Poverty is one of the most intractable development challenges that Lesotho has to grapple with, to the extent that a national poverty reduction strategy has been devised.

The potential of to support the effort to eradicate poverty is an important factor in selecting priority activities for Lesotho.

4.1.4. MEA synergies

Lesotho is signatory to the multi-lateral environmental agreements. This criterion is adopted in recognition that Lesotho has initiated efforts to address climate change and other important environmental issues espoused in the other Rio conventions. Thus by taking a complementary approach to the efforts of implementing other conventions, it is possible to achieve results greater than what would occur if efforts to address a common problem were undertaken independently. Thus, the extent to which an activity crosscuts the other environmental conventions and is aligned to the MEAs creates a multiplier effect required for integrated development efforts.

4.1.5. Employment Creation

Unemployment in Lesotho stands at 40 percent. The situation is likely to degenerate further as more migrant workers are retrenched from the mines in South Africa, textile factories are closed following the expiration of the Multi-Fibre Agreement and the termination of AGOA in 2015.

Unemployment is the highest cause of poverty in Lesotho hence it is regarded as a high priority challenge for poverty reduction especially among the rural communities.

4.1.6. Prospects for Sustainability

The degree to which a project is community-driven and community-owned is a good indicator of its likelihood for sustainability. It therefore follows that projects with high prospects of gaining favour and involvement of beneficiary communities are more likely to succeed and therefore desirable.

4.2. Scoring of Options (Activities) and Weighting of Criteria

Allocation of scores for the options (activities) against the criteria, and allocation of weights to the criteria (prioritisation of criteria), and hence identification of priority activities for the country, were attained through a rigorous consultation process. Relevant stakeholder groups were identified (as listed below) and each was given a chance to discuss and debate the issues. The outcomes of the group deliberations were collated into the tables and diagrams presented hereinafter.

Groups of stakeholders consulted included:

- Community representatives
- Traditional healers
- Youth Groups
- Representatives of teachers organizations

- Representatives of students at the National University of Lesotho
- Community leaders and parliamentarians
- Members of NAPA task forces
- Representative of Government Departments
- NGOs
- Representatives of Local Government Councils

The comprehensive list of stakeholders involved in the NAPA consultation process is attached as Annex 2.

Table 4 captures the score allocations to the options against the criteria. The scale of 1 to 5 was used to allocate scores for criteria; impact on vulnerable groups and resources, MEA synergies and Prospects for sustainability. In this scale 1 denotes that the proposed adaptation measure would have minimal impact on the vulnerable group while on the other hand 5 denotes that that the proposed activity would bring enhanced adaptation capability in the vulnerable zones. As for the criteria Impact on economic growth of vulnerable communities, impact on poverty reduction and employment creation scores were allocated using percentages. On the scale 0% indicates that the identified option would have low impact on vulnerable communities. In contrast, 100% score signifies that the activity would yield highest benefit for adaptation to the communities. The scores were standardized in order to apply a common scale to call criteria. .

Table 4: Score Allocations on the Options Using the Criteria Including Standardized Scores (0 – 1) and the Resultant Ranking

Evaluation of the Criteria for Various Options						
OPTIONS (See Table 4.2)	CRITERIA					
	IMPACT ON VULNERABLE GROUPS AND RESOURCES	IMPACT ON ECONOMIC GROWTH RATE OF VULNERABLE COMMUNITIES	IMPACT ON POVERTY REDUCTION	MEA SYNERGIES	EMPLOYMENT CREATION	PROSPECTS FOR SUSTAINABILITY
UNITS	SCALE 1 TO 5	%	%	SCALE 1 TO 5	%	SCALE 1 TO 5
Option 1	5	75	76	4	66	5
Option 2	4	72	74	4	67	5
Option 3	4	70	75	4	49	5
Option 4	4	73	73	4	45	5
Option 5	4	69	65	4	63	4
Option 6	4	62	58	5	54	4
Option 7	3	60	62	4	52	4
Option 8	4	56	58	3	50	4
Option 9	3	52	56	4	57	4
Option 10	3	54	54	4	56	3
Option 11	2	49	55	1	70	2
Standardized Scores						
Option 1	1.00	1.00	1.00	0.75	0.83	1.00
Option 2	0.67	0.88	0.90	0.75	0.88	1.00
Option 3	0.67	0.81	0.95	0.70	0.16	1.00
Option 4	0.67	0.92	0.86	0.75	0.00	1.00
Option 5	0.67	0.77	0.48	0.75	0.74	0.67
Option 6	0.67	0.50	0.17	1.00	0.35	0.67
Option 7	0.33	0.42	0.36	0.75	0.28	0.67
Option 8	0.67	0.27	0.18	0.50	0.20	0.67
Option 9	0.33	0.12	0.09	0.75	0.48	0.67
Option 10	0.67	0.19	0.00	0.75	0.44	0.33
Option 11	0.00	0.00	0.05	0.00	1.00	0.00

Note: Full Description of Options 1 to 11 are prescribed on Table 5

Table 5: Key to the List of Prioritised Options used in Table 4

Option	Title
Option 1	Improve Resilience of Livestock Production Systems Under Extreme Climatic Conditions in Various Livelihood Zones in Lesotho
Option 2	Promoting Sustainable Crop Based Livelihood Systems in Foothills, Lowlands and Senqu River Valley
Option 3	Capacity Building and Policy Reform to Integrate Climate Change in Sectoral Development Plans
Option 4	Improvement of an Early Warning System Against Climate Induced Disasters and Hazards
Option 5	Securing Village Water Supply for Communities in the Southern Lowlands
Option 6	Management and Reclamation of Degraded and Eroded Land in the Flood Prone Areas (Pilot Project for Western Lowlands)
Option 7	Conservation and Rehabilitation of Degraded Wetlands in the Mountain Areas of Lesotho
Option 8	Improvement of Community Food Security Through the Promotion of Food Processing and Preservation Technologies
Option 9	Strengthening and stabilizing eco-tourism based rural livelihoods
Option 10	Promote Wind, Solar and Biogas Energy Use as a Supplement to Hydropower Energy
Option 11	Stabilizing Community Livelihoods which are Adversely Affected by Climate Change Through Improvement of Small Scale Industries

Table 6: Standardized Scores with Criteria Allocated Weights

Options	Impact on			MEA Synergies	Employment Creation	Prospect for Sustainability
	Vulnerable Groups and Resources	Economic Growth Rate of Vulnerable Communities	Poverty Reduction			
	7	7	8	6	8	6
Option 1	0.17	0.17	0.19	0.07	0.17	0.14
Option 2	0.08	0.15	0.18	0.07	0.19	0.14
Option 3	0.08	0.13	0.19	0.07	0.03	0.14
Option 4	0.08	0.15	0.17	0.07	0.00	0.14
Option 5	0.08	0.12	0.09	0.07	0.17	0.07
Option 6	0.08	0.05	0.00	0.14	0.01	0.07
Option 7	0.00	0.06	0.00	0.07	0.05	0.00
Option 8	0.08	0.03	0.02	0.00	0.11	0.07
Option 9	0.00	0.00	0.02	0.07	0.06	0.07
Option 10	0.08	0.02	0.04	0.07	0.04	0.07

Table 6 reflects the standardized scores with the criteria allocated weights. This table further reflects that the criteria of Employment Creation and Impact on Poverty Reduction received the highest and second highest weights respectively. This is hardly surprising since unemployment and poverty are the major challenges facing the country. Table 4.4 shows a representation of the scores in the descending order.

Table 7: Ranking of various Options

Adaptation Option	**MCA 1**	**MCA 2**	**MCA 3**
	Ranking (Score)	Ranking (Score)	Ranking (Score)
Option 1: Improve Resilience of Livestock Production Systems Under Extreme Climatic Conditions in Various Livelihood Zones in Lesotho	1 (0.93)	1 (0.90)	1 (0.91)
Option 2: Promoting Sustainable Crop Based Livelihood Systems in Foothills, Lowlands and Senqu River Valley	2 (0.85)	2 (0.80)	2 (0.81)
Option 3: Capacity Building and Policy Reform to Integrate Climate Change in Sectoral Development Plans	3 (0.71)	3 (0.66)	3 (0.64)
Option 4: Improvement of an Early Warning System Against Climate Induced Disasters and Hazards	4 (0.70)	4 0.61	4 0.61
Option 5: Securing Village Water Supply for Communities in the Southern Lowlands	5 (0.68)	4 (0.61)	5 (0.60)
Option 6: Management and Reclamation of Degraded and Eroded Land in the Flood Prone Areas (Pilot Project for Western Lowlands)	6 (0.56)	6 (0.43)	6 (0.39)
Option 7: Conservation and Rehabilitation of Degraded Wetlands in the Mountain Areas of Lesotho	7 (0.47)	7 (0.34)	7 (0.28)
Option 8: Improvement of Community Food Security Through the Promotion of Food Processing and Preservation Technologies	8 (0.41)	8 (0.28)	8 (0.27)
Option 9: Strengthening and stabilizing eco-tourism based rural livelihoods	8 (0.41)	9 (0.27)	8 (0.27)
Option 10: Promote Wind, Solar and Biogas Energy Use as a Supplement to Hydropower Energy	10 (0.41)	10 (0.18)	6 0.39
Option 11: Stabilising Community Livelihoods which are Adversely Affected by Climate Change Through Improvement of Small Scale Industries	11 (0.17)		

5. PRIORITY ACTIVITIES

The process of prioritising options was based on such considerations as local availability of resources and inputs for the projects and availability of requisite skills among the intended beneficiary communities. The options were prioritised as shown in Table 7.

The prioritised options are directly aimed at supporting and improving livelihoods, particularly of rural communities. This is a reflection of the fact that the NAPA process ties-in well with government's endeavours to reduce poverty.

The top two options (livestock and arable agriculture) emerged as high priority options for the country. This is also aligned to the national strategies for poverty reduction because agriculture (livestock and crops) are key economic activities in Lesotho's rural areas. These will be hit hardest by climate change especially the consequences of drought and other extreme weather events on agriculture.

6. THE NAPA PREPARATION PROCESS

6.1. NAPA Consultative Process

The NAPA preparation in Lesotho was a multi-level process pursuing the following broad objectives:

- Identifying sectors most vulnerable to climate change (vulnerability assessment);
- Generating a list of activities that would form the core of the adaptation programme of action;
- Identifying a set of criteria against which the activities would be assessed and prioritized;
- Prioritizing the activities;
- Formulating project profiles of priority activities
- Compilation of the NAPA document and its Presentation to government and LEG for endorsement and adoption;:

The process of NAPA development followed the following steps:

STEP 1: BUILD MULTI-DISCIPLINERY TEAM

The project started off by identifying a broad base of relevant stakeholders from both the grassroots and national levels, and the formation of management, coordination and implementation teams as follows:

- NAPA team
- Project Coordination and Management Team
- National Steering Committee
- NAPA technical task teams

STEP 2: SYNTHESIZE MATERIAL

A review of a broad range of documents was then undertaken to synthesize the basis for the NAPA process. Among the documents reviewed were some of the key national programmes like; Poverty Reduction Strategy Paper, National Vision 2020 and Millennium Development Goals. An in-depth review of the Initial National Communication was also undertaken. This was done to ensure that NAPA is in line with other national programmes and policies.

STEP 3: PARTICIPATORY VULNERABILITY ASSESSMENT

A participatory vulnerability assessment exercise was then carried out which identified the following as the sectors most vulnerable to climate change; Water Resources, Agriculture, Rangelands, Livestock, Health, Culture, Forestry and Energy.

An impact and risk assessment exercise was carried-out in all the livelihood zones of the country, to identify and map vulnerable groups and evaluate their adaptive capacities.

STEP 4: CONSULT STAKEHOLDERS AND THE PUBLIC

The NAPA consultative process took the form of integrated approach, entailing workshops, meetings, expert fora and interviews with community representatives. This approach ensured buy-in and ownership of the process by all stakeholders.

Fourteen workshops were held, in all the ten districts of the country, bringing together the various stakeholder groups. The main outcomes of the workshops and other fora were increased awareness of climate change issues and the NAPA process, and identification of local adaptation needs and adaptation projects.

STEP 5: COMPILE POTENTIAL NAPA ACTIVITIES

The process culminated in the production of the list of eleven (11) adaptation projects and their respective activity matrix.

STEP 6: PRIORITIZE CRITERIA AND SCREEN NAPA ACTIVITIES

A set of criteria for prioritizing the activities was identified and weighted. Then weighted criteria were used to prioritize the activities.

STEP 7: RANK NAPA ACTIVITIES

The eleven projects were ranked. Only one lower ranking option was eliminated because its narrow focus on job creation and non-relevance to climate change per se. However, some of the low ranking projects were accorded high priority by development partners in the country.

STEP 8: FORMULATE PROJECT PROFILES

Profiles were formulated for eight of the eleven project areas.

STEP 9: COMPILE NAPA DOCUMENT

The outcomes of the activities provided the basis for the drafting of the NAPA document as herein presented in this report.

STEP 10: REVIEW AND ADOPT NAPA DOCUMENT

The draft NAPA document was reviewed by the National Steering Committee in preparation for its submission to government for its official adoption. The NAPA document and related issues will be escalated to the higher spheres of Government (Cabinet, Parliament, etc.) through the leadership of the Ministry of Natural Resources, which is the line ministry for Lesotho Meteorological services (LMS).

In all of the processes and activities outlined above, LMS played a significant role in coordinating, facilitating and overseeing the whole exercise. LMS will continue in this capacity and will be supported by a core team comprising of the following Ministries and Departments: Natural Resources; Tourism, Environment and Culture; Agriculture and Food Security; Conservation and Forestry and Land Reclamation; Health and Social Welfare. These institutions cover sectors in which the impact of climate change is most directly felt. The other government ministries will, of course, have a major role to play in integrating climate change into their respective spheres.

6.2. NAPA Implementation Strategy

Implementation of NAPA will require active participation of all stakeholders, which include: Government and line ministries, private sector, vulnerable communities and NGOs. Assistance of international implementing agencies and cooperating partners is also critical in particular for providing technical assistance to secure funding for the proposed project activities.

Figure 6.1 below illustrates the organogram for implementation of the NAPA projects. The orghanogram was designed with a view of enabling transparency and effectiveness in the delivery of the projects to address the urgent needs of communities in the vulnerable zones.

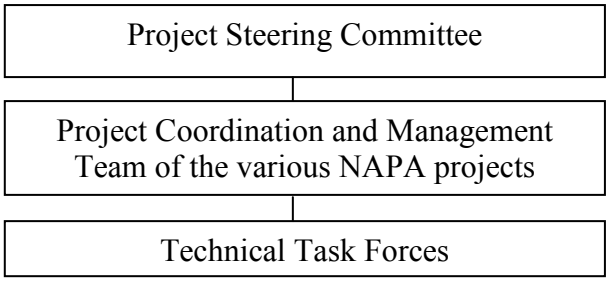

Figure 10: Organogram of the NAPA projects implementation framework

6.2.1. Institutional Framework

The NAPA process in Lesotho is overseen and implemented by multi-disciplinary committees made of experts and representatives from various stakeholder groups.

6.2.2. Project Steering Committee

The key role of the Project Steering Committee is to guide implementation of related projects. The Committee is composed of members drawn from the Private Sector, Government Departments, Local Councils, Local Initiators, Civic Associations, Development Agencies, National University and NGOs. Membership will also include the UNFCCC and GEF operational Focal Points. The Committee sits once quarterly (three monthly) to review progress and make appropriate recommendations.

6.2.3. Lesotho Meteorological Services

The Lesotho Meteorological Services plays the roles of: coordinating the NAPA process, reporting to UNEP, UNFCCC secretariat and COP on all matters relating to NAPA process and activities. The UNFCCC Focal Point is Head of Lesotho Meteorological Services. The Department is also charged with responsibility of facilitating integration of NAPA into the National Development Programme, in particular the Poverty Reduction Strategy, and the National Communication process.

6.2.4. Line Ministries and Development Agencies

The role of participating line Ministries and partner development agencies is to develop and implement NAPA projects in their respective areas of focus in collaboration with LMS and beneficiary Communities.

6.2.5. Non-Governmental Organisations

The NGOs will play a key role during implementation of the projects by providing advocacy on behalf of the communities and create awareness on the need for adaptation measures. They will also serve as local implementing agencies for projects that fall under their work programme.

6.2.6. Community Based Organizations

Community Associations have entered into partnership with line Ministries to promote community ownership of projects for effectiveness and sustainability. Representatives of CBOs will seat in the National Steering Committee and establish local community structures to ensure that NAPA projects are community driven in order to build adaptation capacities among the affected communities.

6.2.7. Reporting

The extensive data collection and review of projects progress reports will be undertaken by LMS in order to integrate related information into National Communication process. Implementation of the projects will be in line with government procedures for donor funded projects. End of project audit reports will be consolidated and submitted for transparency.

Monitoring and evaluation will be done on a project by project basis by concerned cooperating partner.

6.3. Other Enabling Framework for Successful Implementation of NAPA Projects

6.3.1. Private Sector Development

Participation of the private sector as one of the key players in the NAPA process is critical for future coping strategies. Government is undertaking measures to empower the private sector and to promote entrepreneurship. One such current measure is the

World Bank supported *Private Sector Competitiveness Project* which is geared towards strengthening and supporting the private enterprise in the country.

The key role of the private sector in the NAPA is to promote investment and provide management skills for successful implementation of NAPA projects. Participation of the private sector in climate change activities is still weak and hence Government has been soliciting efforts to engage private sector more rigorously in the climate change programme.

6.3.2. Investment Promotion Incentives

The Government of Lesotho is taking measures to create a business and investment environment that is attractive to both local and foreign investors. For example, government has adopted a decision to effect corporate tax exemption for export manufacturing companies. Conducive investment climate in the country will enhance adoptive capacity of the NAPA projects by the beneficiary communities.

6.3.3. Infrastructure Development

The Government of Lesotho accords high priority to infrastructure development. A major share of the country's annual budget is allocated for infrastructure development for poverty reduction. This will be complementary with the goals and objectives of NAPA.

Project Profiles

PROJECT TITLE: IMPROVE RESILIENCE OF LIVESTOCK PRODUCTION SYSTEMS UNDER EXTREME CLIMATIC CONDITIONS IN VARIOUS LIVELIHOOD ZONES IN LESOTHO

1.1 Rationale

Livestock production is one of the most important components of the farming systems throughout all livelihood zones of Lesotho. It provides a major source of cash income, food (milk and meat), draught power, and transport. Livestock is also an important reserve of wealth and security.

For all its importance, livestock farming has been in steady decline both in number and quality over the years. This decline can be ascribed to recurring prolonged droughts which have resulted in the deterioration of rangelands and their carrying capacity. This project would be an intervention to revamp livestock farming in Lesotho, and thus provide a viable option for the people to adapt to the changing climate.

Livestock production in Lesotho is divided among four major economic enterprises:

1.1.1. Sheep & Goats for wool and mohair production

Wool and mohair production are the mainstay of the production systems and livelihoods in the mountains districts of Lesotho. The mountain livelihood zone form the largest single block of land (1,444,667 ha) upon which livestock with particular emphasis on sheep and goats production are the basis for people's livelihoods. The production of wool and mohair is dependent on resilience and quality of range management systems and veterinary programmes. These parameters are affected directly by climate change particularly of extreme drought and temperature dynamics. Drought affects the quality and resilience of the rangelands while extreme temperatures particularly those leading to drought affect disease incidence and require good veterinary services.

Sheep and goats production currently support other forms of income streams like the sale of skins as by products of meat production. Small scale industries in the lowlands of Lesotho depend on good quality skins for production of various products such as shoes and sandals.

The production of meat and milk in the mountain districts is mainly for home consumption and subsistence purposes. For example statistics show that on average 6000 sheep, 2500 goats and 750 cattle are slaughtered annually at household levels in the mountain districts. Overall the mountains accounts for about 54 and 45 percent respectively of the total sheep and goats slaughtered in Lesotho annually.

1.1.2. Dairy Production

A total of 290 farmers in the lowlands and foothills rear improved dairy cows for milk production, using Friesians, Jerseys and Brown Swiss cows. The milk is processed and sold through a series of private and parastatal milk collection centres. While

farmers generally rely on communal rangelands for grazing and feeding of dairy cattle, the commercial sector on dairy relies on stall feeding and zero grazing. In general fodder production is a priority issue for all dairy producers especially in the light of deteriorating state of the rangelands.

1.2. Description

1.2.1. Objectives and Activities

A) Wool and Mohair

Objective 1.A: To stabilize wool and mohair production systems against climate change in the mountain zone livelihood systems.

Activities 1.A:

1. A.1 Upgrade veterinary services
1. A.2 Build capacity of grazing associations
1. A.3 Implement livestock reduction strategies
1. A.4 Establish fodder production schemes
1. A.5 Establish wool and mohair processing centres

B) Dairy Production

Objective 1.B: To improve the state of dairy enterprises in the lowlands and foothills livelihood communities.

Activities 1.B:

1. B.1 Upgrade veterinary services
1. B.2 Establish fodder production
1. B.3 Establish supplementary feeding industries
1. B.4 Improve milk collection centres
1. B.5 Establish milk processing and cottage industries

1.2.2. Inputs

- Technical expertise in the various activities
- Financial resources

1.2.3. Short-Term Outputs

- Improved sustainable livestock enterprises
- Improved production of livestock and livestock products
- A more diversified livestock based income streams

1.2.4. Potential Long-Term Outcomes

The long-term outcome of the project will be an improved and more diversified livestock rearing in Lesotho.

1.3. Implementation

1.3.1. Institutional Arrangement

The project will be implemented by the *Department of Livestock Services*, working in collaboration with other relevant government departments and community organizations.

1.3.2. Risks and Barriers

Potential risks and barriers to the success of the project are:

- Inadequate support and involvement of relevant stakeholders
- Insufficient financial resources

1.3.3. Evaluation and Monitoring

Monitoring committees will work in close collaboration with the Department of Livestock Services and the Ministry of Local Government. Monitoring and evaluation will be done on regular basis.

1.3.4. Financial Resources

The cost of the project is estimated at USD$ 3, 210, 000

ACTIVITY	**COST (USD$)**
Build capacity of grazing associations	275,000
Implement livestock reduction strategies	115,000
Establish fodder production schemes	150,000
Upgrade wool and mohair processing centres	300,000
Establish supplementary feeding industries	220,000
Promote dairy industry	280,000
Establish milk collection centres, milk processing and cottage industries	300,000
Promoting Improved housing of livestock	250,000
Promoting Feed Production and supply channels	210,000
Organize community marketing structures	240,000
Upgrade veterinary services	340,000
Build Capacity and skills on livestock development	320,000
Grand Total	**2,980, 000**

2. PROJECT TITLE: IMPROVEMENT OF CROP PRODUCTION SYSTEMS TO REDUCE FOOD INSECURITY IN THE LOWLANDS OF LESOTHO

2.1. Rationale

Crop production is one of the most important components of the farming systems throughout all livelihood zones of Lesotho. Approximately 9 to 12 percent of the total land area of Lesotho is used for arable crop production 90 percent of which is dryland farming and approximately 10 percent falling under irrigated conditions. Arable agriculture employs more people than any other sector in Lesotho and provides principal means of livelihoods for about 90 percent of the country's rural population. While 55 percent of the population is landless, arable agriculture contributes about 10 percent to the national GDP (Chakela 1997). The cropping sector is dominated by smallholder farmers struggling to meet their subsistence requirements from year to year.

The main cropping region is the north and south western lowlands and the Senqu River Valley, although significant cropping does occur on the sloping land in the foothills and mountains. The south western lowlands are in particular susceptible to erratic agroclimatic conditions especially annual rainfall patterns. The amount and distribution of precipitation is an important factor in the success or failure of crop production endeavors. However, under the climate change water conservation and water saving irrigation technologies would significantly stabilize and improve current livelihoods based on dryland and irrigated agriculture.

Drought, frost, snow and hail pose significant risks for agricultural production in Lesotho. Rainfall occurs mainly during the summer season but is extremely variable in quantity and timing. The lowlands areas are significantly drier and crop failure from drought is very common. Rainfall is higher in the mountains and foothills but the cropping season is much shorter due to the early onset of frost which will be exacerbated by climate change.

The domestic production of fruits and vegetables is a source of livelihood for at least 10 percent of the population in the foothills, lowlands and Senqu River Valley. Current development initiatives are exploiting the country's potential to increase the yields of fruits trees. However, this potential has been marginalized by skewed climate extremes and hazards such as: hail, frost, and extreme temperatures. These climate hazards are projected to be more severe under climate change conditions.

Crop production in Lesotho is divided among three major economic cropping systems:

2.1.1. Cereal Crop Production: Promotion of conservation agriculture technologies and drought resistant crop varieties to support dryland farming in the Lowlands and Senqu River Valley.

The principal dryland crops in Lesotho are maize and sorghum which account for about 80 percent of the planted area followed by wheat (12 %) and bean /peas (7 %). Maize and sorghum are primarily cultivated for household subsistence, while wheat, beans, peas are grown mainly for cash crops. Minor dryland crops include sunflower, lentils and fodder crops.

The most significant manifestation of climate change in Lesotho is chronic drought and diminishing rainfall. Surviving periods of drought is now the biggest challenge for farmers. One of the most effective strategies for adapting to the changing climatic conditions is development and promotion of crop strains that can withstand drought. This project aims to support and facilitate the development and widespread use of drought-resistant crops and use of conservation agriculture technologies.

2.1.2. Horticulture and Fruit Production: Improve Production of Fruits and Vegetables in the Lowlands and Foothills

The foothills and lowlands of Lesotho are major fruit production areas. There are about 34 seedling nursery facilities installed in the southern districts which supply seedlings to farmers country wide. A total of 74 farmers are involved in seedling production to support horticultural farming. However, these nurseries have of late not been able to meet the country's domestic seedling needs as their production is curtailed by extreme climatic events mainly hail, frost and temperature borne diseases. As a coping strategy farmers have installed plastic insulation sheets nurseries to minimize climatic hazards on their produce. However, occurrences of severe thunderstorms associated with hail often destroy these facilities. Due to poor insulation of these facilities frost kill temperatures associated with cold front surges often destroy the seedlings. It has been projected that cold fronts will be more frequent and more severe under climate change conditions.

2.1.3. Irrigation Farming Systems: Promotion of Water Conserving Irrigation Systems in the South-western Lowlands and Senqu River Valley.

The lowest annual precipitation (450 mm) in Lesotho occurs in the Senqu River Valley and peaks at 700 mm in the south and western lowlands compared to highs of 1,000mm in the northern lowlands and eastern highlands. Lesotho's precipitation is characterized by fluctuating trends, with high variability from year to year. The occurrence of summer rainfall is an important factor in rainfed subsistence crop production in Lesotho. Furthermore, the topographical and climatic variations impose severe constraints on crop production.

The largely subsistence farming systems in these areas is heavily reliant upon rainfall. Irrigations systems have also been adopted by an increasing number of farmers who grow vegetables for commercial purposes. Most irrigation systems are supported by water collection dams from which sprinkler irrigation systems powered by small to

medium engines are used. In the Senqu Valley and foothills areas of the southern lowlands, irrigation systems are powered by gravity.

The advent of climate change has brought about considerable uncertainty and curtailment of farming due to frequent drought occurrences. This has had a severely negative impact on the livelihoods and food security – especially for rural communities in the southern lowlands and Senqu River Valley. To adapt to the changing climatic conditions, the farming communities in these area have to reduce their reliance on rainfall. This can be achieved by promoting water conservation strategies and water-saving irrigation systems like drip irrigation as well as energy efficient systems like the gravity driven sprinkler systems into the farming operations.

2.2. Description

2.2.1. Objectives and Activities

i) Promotion of conservation agriculture technologies and drought resistant crop varieties to support dryland farming in the Lowlands and Senqu River Valley.

Objectives 2.A: Multiplication of drought-resistant strains of various crops

Activities 2.A:

2. A.1 Promote local generation of drought-resistant cereal and crop varieties

Objective 2.B: Facilitation of availability and accessibility of drought resistant strains to farmers

Activities 2.B:

2. B.1 Development of distribution channels for drought resistant and short season seeds throughout the farming community

Objective 2.C: Promotion of moisture-conserving practices among farmers

Activities 2.C:

2. C.1 Promote water conserving practices among farmers

ii) Improve Horticultural Production: Fruits and Vegetables in the Lowlands and Foothills.

Objective 2.D: To revive and strengthen irrigated commercial and domestic horticulture in the lowlands and foothills

Activities 2.D:

2. D.1 Development of vegetable and fruit tree gardens
2. D.2 Expansion of production of high value cash crops such as asparagus
2. D.3 Development of local produce marketing and distribution channels

Objective 2.E: To develop robust horticultural seedling nurseries whose production will be less affected by climate variability and change.

Activities 2.E:

2. E.1 Establishment of nurseries of both indigenous and exotic vegetables and fruit trees
2. E.2 Provision of quality seedlings to horticultural farmers
2. E.3 Development of local produce marketing and distribution channels
2. E.4 Expansion of floricultural sector for domestic and export supplies

C) Promotion of Water Conserving Irrigation Systems in the Southwestern Lowlands and Senqu River Valley.

Objective 2.F: To build the capacity and skills /knowledge base of rural farmers in management and operation of irrigation methods/techniques.

Activities 2.F:

2. F.1 Training communities on irrigation methods and techniques.
2. F.2 Creating irrigation farming blocks for cost sharing
2. F.3 Building small dams and other storage facilities

Objective 2.G: To promote adoption and use of water saving irrigation methods and technologies.

Activities 2.G:

2. G.1 Acquisition and maintenance of equipment for trip irrigation systems.
2. G.2 Training farmers in the management of trip irrigation systems.
2. G.3 Extension services to support irrigation farmers and schemes.

Objective 2.H: To promote conservation agriculture: zero and minimum tillage systems for soil water conservation.

Activities 2.H:

2. H.1 Training farmers in the use of manual conservation agriculture methods.
2. H.2 Acquisition of conservation agriculture equipment and implements

2.2.2. Inputs

- Technical expertise in the various activities
- Financial resources

2.2.3. Short-Term Outputs

- Enhanced awareness and appreciation of low cost drip irrigation techniques and technologies in rural communities in the lowlands regions
- Increased accessibility of low cost drip irrigation equipment to farmers
- Improved and sustainable crop production
- An expanding domestic production of fruits and vegetables in Lesotho
- Increased and stable yields of drought resistant crop varieties
- Conservation agriculture widely adopted

2.2.4. Potential Long-Term Outputs

Potential long-term outputs of the project are:

- Contribution to national food security and poverty reduction in the target areas
- Capacity building and skills development for use of irrigation technologies
- Improved management of village plantations
- Strong horticultural industry in Lesotho
- Mainstream use of crop resistant varieties

2.3. Implementation

2.3.1. Institutional Arrangement

The Ministry of Agriculture and Food Security in close collaboration other the Ministry of Local Government, NGOs and local communities will coordinate and implement this project.

2.3.2. Risks and Barriers

- Inadequate support and involvement of communities and farmers
- Insufficient financial resources

2.3.3. Evaluation and Monitoring

Village monitoring committees will work in close collaboration with Ministry of Agriculture and Food Security with Research Institutions. Monitoring and evaluation will be done on regular basis. The coordinating ministry will prepare quarterly progress and financial reports to the international funding agency during the implementation of the project.

2.3.4. Financial Resources

Total estimated cost of the project: USD$ 4, 235, 000

Activity	COSTS (USD$)
Training communities on irrigation methods and techniques.	150,000
Creating irrigation farming blocks for cost sharing	200,000
Building small dams and other storage facilities	250,000
Acquisition and maintenance of equipment for trip irrigation systems.	300,000
Training farmers in the management of trip irrigation systems.	180,000
Extension services to support irrigation farmers and schemes.	225,000
Training farmers in the use of manual conservation agriculture methods.	220,000
Acquisition of conservation agriculture equipment and implements.	215,000
Development of vegetable and fruit tree gardens	140,000
Expansion of production of high value cash crops such as asparagus	275,000
Development of local produce marketing and distribution channels	240,000
Establishment of nurseries of both indigenous and exotic vegetables and fruit trees	250,000
Provision of quality seedlings to horticultural farmers	125,000
Development of local produce marketing and distribution channels	150,000
Expansion of floricultural sector for domestic and export supplies	250,000
Promote local generation of drought-resistant cereal and crop varieties	175,000
Development of distribution channels for drought resistant and short season seeds throughout the farming community	150,000
Promote water conserving practices among farmers	120,000
Promote local generation of drought-resistant cereal and crop varieties	175,000
Development of distribution channels for drought resistant and short season seeds throughout the farming community	150,000
Promote water conserving practices among farmers	120,000
Promote local generation of drought-resistant cereal and crop varieties	175,000
GRAND TOTAL	**4,235,000**

3. PROJECT TITLE: CAPACITY BUILDING AND POLICY REFORM TO INTEGRATE CLIMATE CHANGE IN SECTORAL DEVELOPMENT PLANS

3.1. Rationale

The awareness campaigns on climate change issues were initiated in 1996 following the country's ratification of the UNFCCC in 1995. While the potential impact is acknowledged and appreciated in Lesotho, the issues around climate change have not been integrated into the national development agenda in any significant way. Climate change affects all aspects of life hence national stakeholders broadly acknowledge that it should be accorded high priority along with other national challenges such as HIV/AIDS and Poverty Reduction.

This project seeks to mainstream climate change issues into the national policy development debates and legislative frameworks by building capacity at both institutional and systemic levels. In Lesotho, climate change affects major economic sectors: water, environment, agriculture, forestry, energy etc. The major limitations in the current policy developments and legislative frameworks are that issues of climate change are not featuring prominently despite the levels at which the aforementioned sectors are prone to instabilities induced by climate change. The national capacity self assessment process has identified the need to address policy and legislative gaps and /or discrepancies. Thus this project will facilitate awareness raising, policy review and developments including research elements in the various stakeholder sectors.

3.2. Description

3.2.1. Objectives and Activities

Objectives 3.A: To mainstream the issues of climate change into the national dialogue, policy development, planning and programme implementation

Activities 3.A:

3. A.1 Advocating for the inclusion of climate change issues in major national programmes – i.e. Vision 2020, Poverty Reduction Strategy, Three-year Development Plans and Local Government Structures
3. A.2 Instigating for the development of a national policy on climate change
3. A.3 Formulation and implementation of an extensive training programme on climate change
3. A.4 Advocating for the inclusion of climate change in the curriculum at the different levels of education and training
3. A.5 Urging for the development of legislation on climate change that would facilitate and support the *National Adaptation Programme of Action*

3.2.2. Inputs

- Technical expertise
- Financial resources

3.2.3. Short-Term Outputs

- Inclusion of climate change in Vision 2020, PRS, and Three-year plans
- Inclusion of climate change in education and training curricula
- Introduction of policy and enactment of legislation on climate change

3.2.4. Potential Long-Term Outcomes

The potential long-term outcome of the project is the increased prominence of climate on the national agenda, and an effective national adaptation programme of action, which will be supported by positive policy and legislative environment.

3.3. Implementation

3.3.1. Institutional Arrangement

The Lesotho Meteorological Services will play the project leadership role and will work hand-in-hand with other relevant stakeholders.

3.3.2. Risks and Barriers

Potential risks and barriers to the success of the project are:

- Inadequate support and involvement of critical stakeholders
- Insufficient financial resources

3.3.3. Evaluation and Monitoring

Monitoring committees will work in close collaboration with the Ministry of Natural Resources in collaboration with the Ministry of Development Planning. Monitoring and evaluation will be done on regular basis. The coordinating ministry will prepare quarterly progress and financial reports to the international funding agency during the implementation of the project.

3.3.4. Financial Resources

Cost of the project is estimated at USD$ 1, 260, 000

ACTIVITY	COST (USD$)
Advocating for the inclusion of climate change in major national programmes – i.e. Vision 2020, Poverty Reduction Strategy, Three-year Development Plans and Local Government Structures	120, 000
Formulation and implementation of an extensive training programme on climate change	410, 000
Advocating for the inclusion of climate change in the curriculum at the different levels of education and training	520,000
Urging for the development of legislation on climate change that would facilitate and support the *National Adaptation Programme of Action*	100,000
Instigating for the development of a national policy on climate change	110, 000
GRAND TOTAL	**1,260,000**

4. PROJECT TITLE: IMPROVEMENT OF AN EARLY WARNING SYSTEM TO REDUCE IMPACTS OF CLIMATE DISASTERS AND HAZARDS

4.1. Rationale

The need for an early warning system against potential natural disasters can not be over-emphasized. In Lesotho, the natural phenomena that have potential for disastrous effect are tornadoes, droughts, strong winds, hail storms and snow. These events leave masses of people perilously vulnerable to life threatening situations and crop /animal damage wreaking havoc with food security.

Of the principal natural disasters, drought is unique in terms of the length of time between the first indications that a drought may be developing and the point at which it begins to have an impact on populations of the affected areas. Although it cannot be prevented, its impact can be lessened through properly designed and implemented preparedness measures. Today, drought conditions are a common phenomenon which has to be taken into account in all national development plans. Major drought emergencies were experienced in 1932-33, 1945, 1965,1982-84, 1991-93 and 1994-97.

Experiences of the past have highlighted the need to introduce effective and longterm disaster mitigation, preparedness and response measures. An effective early-warning system must be put in place to effectively respond to climate related natural disasters thereby assisting communities to adapt and minimize adverse impacts of climate change.

4.2. Description

4.2.1. Objectives and Activities

Objectives 4.A: Development of an early warning system and technical capabilities to monitor and issue warnings on climate and weather extreme events

Activities 4.A:

4. A.1 Acquisition of equipment to upgrade and increase climate observation network
4. A.2 Strengthen capacity to monitor weather (drought, floods etc.) and prepare and disseminate long-range forecasts
4. A.3 Upgrading and strengthening observational and data collection capacity (both meteorological and hydrological)
4. A.4 Install automatic weather stations at synoptic stations
4. A.5 Build a climate data bank and develop an archiving system
4. A.6 Improve warning communication to rural communities

4.2.2. Inputs

- Technical expertise
- Financial resources

4.2.3. Short-Term Outputs

- An improved weather monitoring and long-range forecasting
- An increased meteorological and hydrological observational network
- An improved relay of early warning to rural communities

4.2.4. Potential Long-Term Outcomes

An advanced early warning communication system for rural communities
A well developed climate data bank
Early and timely warnings of climate and weather extreme events

4.3. Implementation

4.3.1. Institutional Arrangement

The project will be implemented by the Lesotho Meteorological Services in collaboration with the Department of Water Affairs and the Disaster Management Authority.

4.3.2. Risks and Barriers

Potential risks and barriers to the success of the project are:

- Vandalism especially in remote areas
- Insufficient financial resources

4.3.3. Evaluation and Monitoring

Monitoring committees will work in close collaboration with the Lesotho Meteorological Services and the Department of Water Affairs. Monitoring and evaluation will be done on regular basis. The coordinating Departments will prepare quarterly progress and financial reports to the international funding agency during the implementation of the project.

4.3.4. Financial Resources

The cost of the project is estimated at US$ 920, 000

ACTIVITY	COST (USD$)
Acquisition of equipment to upgrade and increase climate observation network	230,000
Strengthen capacity to monitor weather (drought, floods etc.) and prepare and disseminate long-range forecasts	120,000
Upgrading and strengthening observational and data collection capacity (both meteorological and hydrological)	200,000
Install automatic weather stations at synoptic stations	150,000
Build a climate data bank and develop an archiving system	75,000
Improve warning communication to rural communities	145,000
GRAND TOTAL	**920, 000**

5. PROJECT TITLE: SECURING VILLAGE WATER SUPPLY FOR COMMUNITIES IN THE DROUGHT PRONE SOUTHERN LOWLANDS

5.1. Rationale

The supply of adequate and good quality water is essential for people's livelihoods especially in the rural communities. The southern lowlands livelihood zone supports approximately 279,000 people. Historically communities relied on collection of surface water and use of natural springs. Increasingly these sources are insufficient and many boreholes have been sunk. In the southern lowlands for example, Mafeteng has some 22 percent of the total number of boreholes in Lesotho with an average yield of 41 percent of the national average. On the other hand, in Mohale's Hoek (Taung & Mekaling) communities have particular problems of water shortage despite the fact that about 65 percent of the population in this area had been covered through water projects in the late 1990s.

The foregoing problems will be exacerbated by extreme and frequent drought occurrence. It is the recurring drought and the overall diminishing amount of rainfall that are the source of grave concern for the sustainability of sources of domestic water in the southern lowlands of Lesotho. This has had dire consequences for the livelihood and well-being of the people in the region particularly the vulnerable rural communities.

The burgeoning rural communities are placing mounting pressure on the already precarious water resources. Thus, the need to institute measures for sustainable management of water resources is imperative.

5.2. Description

5.2.1. Objectives and Activities

Objective 5.A: To improve community access to clean and optimal water supply

Activities 5.A:

5. A.1 Building tanks for roof water harvesting
5. A.2 Rehabilitation of boreholes and silted collection points
5. A.3 Install community water purification systems and procure requisite equipment e.g. testing kits
5. A.4 Introduce well fields artificial recharge concepts

Objective 5.B: To increase a network of water collection systems and points for the affected communities.

Activities 5.B:

5. B.1 Identify new well fields and sink boreholes for water supply in the communities.
5. B.2 Increase collection of spring water by use of pipes and distribution tanks.

Objective 5.C: To improve community capacity to manage the demand and usage of water.

Activities:

5. C.1 Promotion of water recycling
5. C.2 Implementing integrated catchment management systems
5. C.3 Develop and promote community policies on sustainable use of water.

5.2.2. Inputs

The inputs in this project will be:

- Technical expertise in the different areas of development of water collection systems and water collection points
- Financial resources for the acquisition of equipment and materials

5.2.3. Short-Term Outputs

- More and improved water collection systems and water collection points
- Clean and adequate water supply for household use particularly for rural communities
- Improved water supply infrastructure

5.2.4. Potential Long-Term Outcomes

The major potential outcomes of this project are:

- Adequate supply and environmentally sustainable use of water resources in rural communities.
- Improved quality of water for storage purposes
- Improved quality of people's livelihoods

5.3. Implementation

5.3.1. Institutional Arrangement

The lead departments in the implementation of this project will be the Department of Rural Water Supply in collaboration with the Department of Water Affairs supported by ministry of Local Government including community based structures and relevant civic organizations.

5.3.2. Risks and Barriers

Potential inhibitors for the implementation and success of the project include:

- Inadequate support and involvement of critical stakeholders
- Insufficient financial resources
- Vandalism of installed water systems

5.3.3. Evaluation and Monitoring

The project will be monitored and evaluated by the Commissioner of Water. Monitoring will be done on monthly basis by the Department of Rural Water Supply through inspection and community gatherings. Quarterly progress and financial reports will be prepared during the implementation of the project.

5.3.4. Financial Resources

The total estimated cost of the project: USD$ 1,170, 000

Activities	**COSTS USD$**
Building tanks for rain water harvesting	100,000
Rehabilitation of bore holes and silted collection points	100,000
Installation of community water purification systems and procurement of requisite equipment	150,000
Introduce well fields artificial recharge	170,000
Increase coverage of well fields and boreholes for water supply	100,000
Increase collection of spring water by use of pipes and distribution tanks	100,000
Promotion of water recycling	50,000
Implementing integrated catchment management systems	250,000
Develop and promote community policies on sustainable use of water	150,000
GRAND TOTAL	**1,170,000**

6. PROJECT TITLE: MANAGEMENT AND RECLAMATION OF DEGRADED AND ERODED LAND IN THE FLOOD PRONE AREAS (PILOT PROJECT FOR WESTERN LOWLANDS)

6.1. Rationale

Land is a valuable but scarce resource in Lesotho. The problem of soil erosion in Lesotho has been noted since the turn of the century but has become more pronounced since the drought of the 1930s. The western lowlands of Lesotho are characterized by high degrees of soil degradation and loss of soil cover mainly due to compound effect of drought, flood and wind. The most visible consequence of soil erosion in these areas is extensive gully formation and desertification.

The western lowlands are characterized by highly erodible duplex soils, erratic and high intensity rain storms which are very erosive. According to vulnerability assessment studies, Lesotho will experience on the one hand more prolonged and intense droughts and severe floods on the other hand. This implies that the western lowlands are particularly vulnerable to climate change and face the risk of endangered livelihoods.

6.2. Description

6.2.1. Objectives and Activities

Objective 6.A: To implement soil erosion combating measures

Activities 6.A:

6. A.1 To conduct GIS mapping of degraded lands
6. A.2 Construction of stone lines and diversion furrows
6. A.3 Planting trees and grasses in the gullies
6. A.4 Reallocation of degraded lands and gullies
6. A.5 Reseeding of rangelands

Objective 6.B: To reclaim the productivity of marginal

Activities 6.B:

6. B.1 Planting fodder crops and grasses on marginal lands
6. B.2 Construction of diversion furrows and terraces
6. B.3 Introducing grass based crop rotations
6. B.4 Planting fruit trees on marginal lands
6. B.5 Afforestation of marginal lands

Objective 6.C: To build capacity in the communities for participatory land use planning.

Activities 6.C:

6. C.1 Training community leaders as trainers for conducting participatory land use planning.
6. C.2 Conducting village land use plans

Objective 6.D: To implement integrated catchments management systems

Activities 6.D:

6. D.1 Establish and train community structures for integrated catchments management.
6. D.2 GIS mapping of integrated catchments for each community livelihood zone

6.2.2. Inputs

- Technical expertise
- Financial resources
- Community and stakeholder support

6.2.3. Short-Term Outputs

- Improved and proper land use management
- Intensified soil conservation measures
- Increased productive use of marginal lands
- A functioning programme of improved catchments management
- Rehabilitated degraded lands and gullies
- Improved vegetation cover

6.2.4. Potential Long-Term Outcomes

The potential long-term outcome of the project is the establishment of a more robust and integrated programme for soil conservation, rehabilitation and recovery of marginal lands and catchments management as well as improved land resource to support livelihoods in the project area.

6.3. Implementation

6.3.1. Institutional Arrangement

The project will be implemented by the *Ministry of Forestry and Land Reclamation* working closely with Local Government and community organizations.

6.3.2. Risks and Barriers

Successful implementation of the project could be curtailed by, among others:

- Inadequate support and involvement of communities
- Insufficient financial resources

6.3.3. Evaluation and Monitoring

Monitoring committees will work in close collaboration with the Ministries of Forestry and Land Reclamation and Local Government. Monitoring and evaluation will be done to ensure the success of the project. The coordinating ministry will prepare quarterly progress and financial reports to the international funding agency during the implementation of the project.

6.3.4. Financial Resources

The estimated cost of the project is USD$ 966,000

Activity	**COST (USD$)**
To conduct GIS mapping of degraded lands	120,000
Construction of stone lines and diversion furrows	130,000
Planting trees and grasses in the gullies	50,000
Reallocation of degraded lands and gullies.	50,000
Reseeding of rangelands	25,000
Planting fodder crops and grasses on marginal lands	70,000
Construction of diversion furrows and terraces	125,000
Introducing grass based crop rotations	120,000
Planting fruit trees on marginal lands	50,000
Afforestation of marginal lands	75,000
Training community leaders as trainers for conducting participatory land use planning.	30,000
Conducting village land use plans	81,000
Establish and train community structures for integrated catchments management.	40,000
GRAND TOTAL	**966,000**

7. PROJECT TITLE: CONSERVATION AND REHABILITATION OF DEGRADED WETLANDS IN THE MOUNTAIN AREAS OF LESOTHO

7.1. Rationale

Wetlands are extremely important environmental ecosystems. They provide a unique habitat for several plant and animal species; they act as natural sponges, absorbing water so that it moves more slowly through the system, thus preventing flooding.

Wetlands are important to the environment in two major ways. They form a good natural habitat due to the diversity of plants and animals found around wetlands; and they are natural reservoirs that maintain perennial stream flows and the quality of water flowing from them.

Climate change exacerbates the deterioration of wetland conditions. Drought negatively affects the hydrological regimes of the mountain wetlands. Thus destruction of wetlands endangers water sources and river flow to the detriment of human, livestock populations as well as the sustainability of hydropower generation.

7.2. Description

7.2.1. Objectives and Activities

Objective 7.A: To rehabilitate degraded and eroded wetlands in the mountain areas

Activities 7.A:

7. A.1 Conduct an inventory and GIS mapping of existing wetlands ecosystems.
7. A.2 Conduct survey of degradation and erosion status of the existing wetland ecosystems.
7. A.3 Construct gabions where the wetlands are eroding

Objective 7.B: To protect and conserve wetlands ecosystems

Activities 7.B:

7. B.1 Conduct public awareness campaigns on the sustainable use and conservation of wetlands.
7. B.2 Setting community monitoring structures.

Objective 7.C: To raise public awareness about the importance of wetlands

Activities 7.C:

7. C.1 Conduct public meetings and campaigns
7. C.2 Conduct media publicity on wetlands conservation

7. C.3 Produce participatory land use and management strategies with the communities.

7.2.2. Inputs

- Technical expertise
- Financial resources

7.2.3. Short-Term Outputs

- An inventory of wetlands, providing information on characteristics, extent and status of wetlands in Lesotho
- A wetlands rehabilitation and protection programme
- Awareness programmes

7.2.4. Potential Long-Term Outcomes

Potential long-term outcomes of the project are;

- Enhanced public awareness on the importance of wetlands,
- Job opportunities for local communities.
- Improved stream flows and water quality
- Protected biodiversity around wetlands
- Increased potential for eco-tourism based livelihoods

7.3. Implementation

7.3.1. Institutional Arrangement

Department of Water Affairs in collaboration with the National Environment Secretariat and local communities will lead in the implementation of this project.

7.3.2. Risks and Barriers

Potential risks and barriers to the success of the project are:

- Inadequate support and involvement of local communities
- Insufficient financial resources

7.3.3. Evaluation and Monitoring

Monitoring and evaluation will be done on regular basis by the village monitoring committee and the Department of Water Affairs. The project coordinator will prepare quarterly progress and financial reports during the implementation of the project.

7.3.4. Financial Resources

Cost of the project is estimated at USD$ 690,000

ACTIVITY	COST (USD$)
Conduct an inventory and GIS mapping of existing wetlands ecosystems.	250,000
Construct gabions where the wetlands are eroding	60,000
Conduct public awareness campaigns on the sustainable use and conservation of wetlands.	185,000
Setting community monitoring structures.	75,000
Conduct media publicity on wetlands conservation	70,000
Produce participatory land use and management strategies with the communities	50, 000
Grand Total	**690, 000**

8. PROJECT TITLE: IMROVEMENT OF COMMUNITY FOOD SECURITY THROUGH THE PROMOTION OF FOOD PROCESSING AND PRESERVATION TECHNOLOGIES

8.1. Rationale

Recurring drought and irregular rainfall patterns have had the effect of fluctuating levels of agricultural production, with relatively high yield in some years and meager output in others. These conditions will be more pronounced under climate change. It is for this reason that there is a pressing need to enhance the capacity of farmers to preserve their produce during years of abundance, to be able to save for years of scarcity.

Moreover, the lack of capacity to process and preserve the produce has meant that the rural communities have food security for a limited period following harvest. Food processing and preservation will extend the period of high food security following harvest in the winter including preservation of summer production of vegetables and fruits.

8.2. Description

8.2.1. Objectives and Activities

Objective 8.A: To enhance availability and accessibility of food processing and preserving technologies

Activity 8.A:

8. A.1 Promote growth of food preservation and processing industry

Objective 8.B: Reinforcement of commercialisation in agricultural products

Activity 8.B:

8. B.1 Promote development of appropriate technologies for food preservation (e.g. driers, canneries etc.)

8.2.2. Inputs

- Technical expertise in the development, production and running of appropriate food processing/preserving technologies
- Financial resource

8.2.3. Short-Term Outputs

- An expanding food processing industry

8.2.4. Potential Long-Term Outcomes

The potential long-term outcome of the project:

- Improved food processing and preservation industry
- Increased awareness on food preservation techniques

8.3. Implementation

8.3.1. Institutional Arrangement

The project will be implemented by the Appropriate Technology Section (ATS) in collaboration with local communities.

8.3.2. Risks and Barriers

Potential risks and barriers to the success of the project are:

- Inadequate support and involvement of critical stakeholders
- Insufficient financial resources

8.3.3. Evaluation and Monitoring

Monitoring committees will work in close collaboration with the Appropriate Technology Section. Monitoring and evaluation will be done on regular basis. The coordinating ministry will prepare quarterly progress and financial reports to the international funding agency during the implementation of the project.

8.3.4 FINANCIAL RESOURCES

The estimated cost of the project is USD$ 620,000

ACTIVITY	COST (USD$)
Improve community food preservation and processing industry	380,000
Strengthening development of appropriate technologies for food preservation (e.g. driers, canneries etc.)	240,000
GRAND TOTAL	**620,000**

Stakeholders

Principal Chiefs
Parliamentarians
District Secretaries
Head of Government Departments
Traditional Leaders
Local Initiators
Local Councillors
Teachers
Lecturers
Final Year University Students
Students Associations (SAIF)
Youth Groups
Women's Groups
Street vendors
Community Councils
Farmers
Non-Governmental Organisations
Community Based Organisations